

The
Indian Journal of
Surgery

1951

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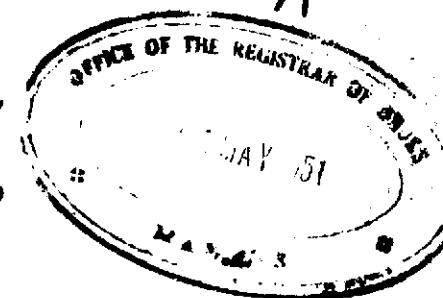
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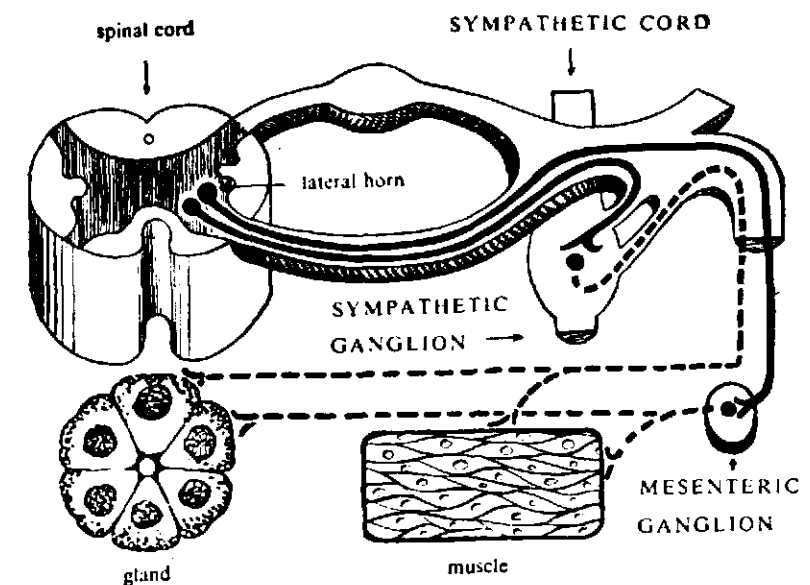
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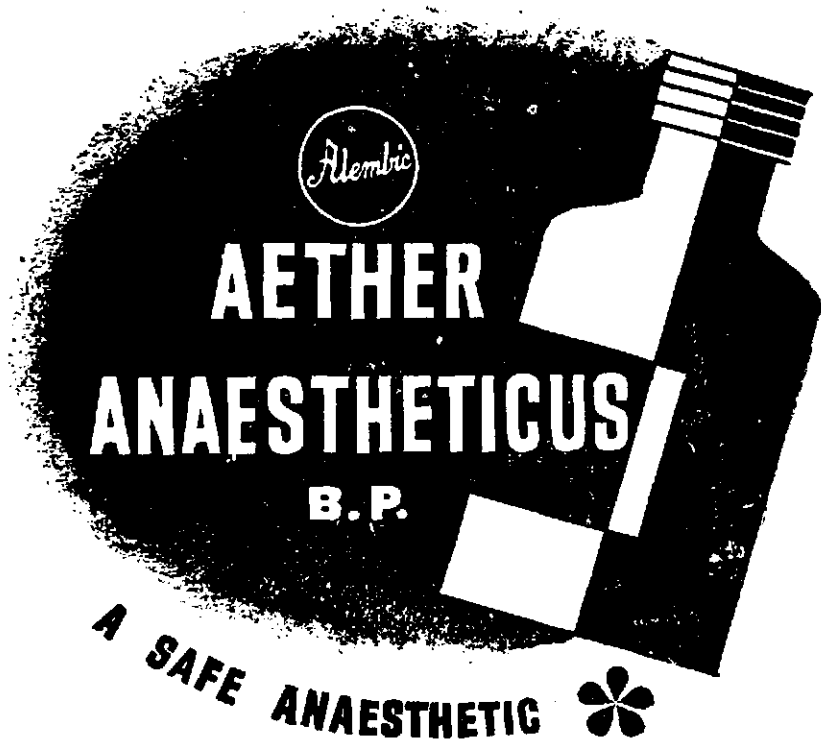
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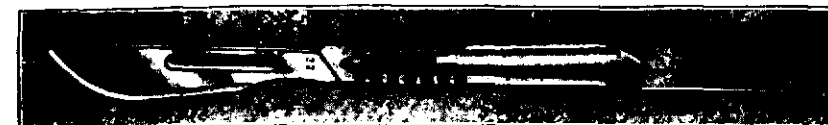
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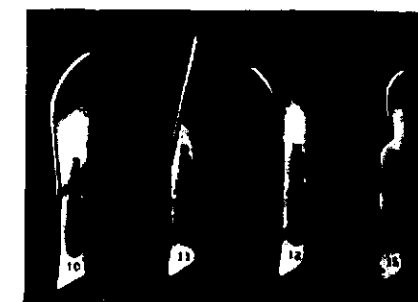
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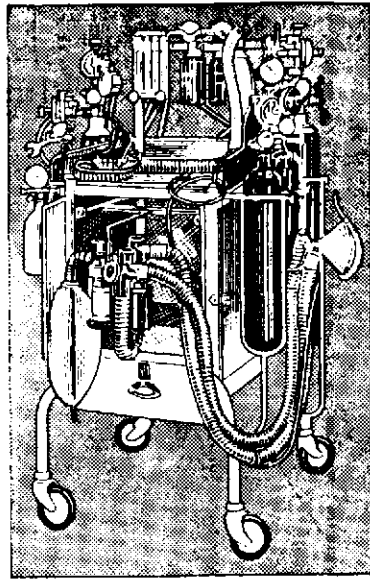
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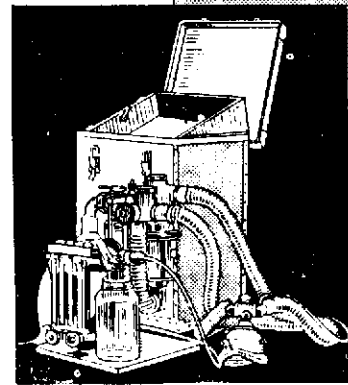
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No. 1

LUNG ABSCESS*

by S. J. MEHTA, Bombay.

This is an analysis of sixty nine cases of lung abscess. Out of these, 8 cases followed tonsillectomy operation, one due to an inhalation of a nail (Fig. 1) one by inhalation of a small whistle, one was due to an amoebic liver abscess causing a lung abscess, one due to a malignant growth of the bronchus with a secondary lung abscess, one due to a foreign body, a green pea aspirated whilst swallowing food (Figs. 2, 3 and 4). The remaining 56 cases were due to pneumonia.

Of these 56 cases, 45 started as pneumonia; in the remaining 11 cases, the cause was undetermined. These 11 cases came under

treatment late and had very putrid lung (Figs. 5 and 5-a) abscesses, with large cavities, foul-smelling sputum, and 6 of them with a marked swelling of the chest wall even involving the skin in the inflammation.

Practically every case of putrid lung abscess with foul-smelling sputum had gross dental sepsis. Spirochaetes and fusiform bacilli were found in the putrid lung abscess.

None of these severe putrid lung abscesses had followed an abdominal operation. "It is said that a tooth extraction is a more common cause; multiple tooth extraction, especially a complete clearance in one sitting, is especially dangerous. The use of local anaesthesia does not exclude the risk." —Brock. I have personally done, at one



Fig. 1
Lung abscess due to a nail.

*A paper read at the XII Annual Conference of the Association of Surgeons of India at New Delhi on 30-12-1950.

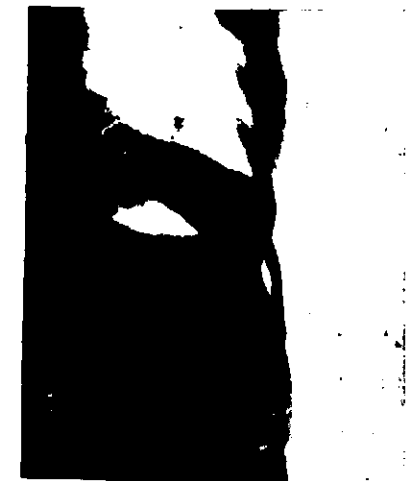


Fig. 2.
Radiogram of a lung abscess caused by a green pea; involving the middle lobe.



Fig. 3.
Lung abscess due to a green pea; involving the middle lobe.



Fig. 4.
Radiogram after six years—showing a displacement of the trachea towards the affected side.



Fig. 5.
Radiogram showing a large putrid abscess of the right lung after a pneumonitis.

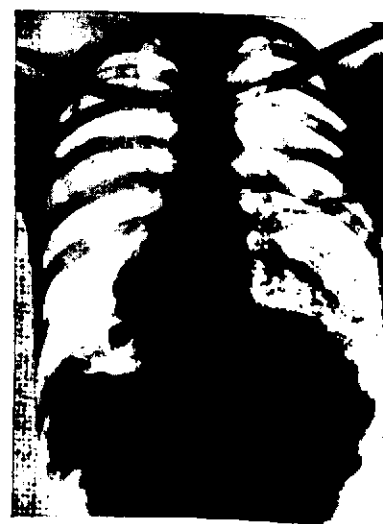


Fig. 5-a.
Lung abscess right lobe following pneumonitis; clearing with antibiotics and postural drainage.

sitting total tooth extraction on over 100 patients suffering from carcinoma of the tongue, tonsils, etc., under general anaesthesia with an intratracheal tube and plugging of the pharynx, and have had no lung complication.

But I agree that gross dental sepsis plays an important part in post operative septic pneumonitis, especially after major abdominal operations. Preliminary mouth toilet, even scaling of the thick foul tartar if circumstances permit should always be done.

The organisms commonly found in lung abscesses following pneumonia have been mixed, such as streptococci, staphylococci and Friedlander's bacillus.

In one case there was an acute illness, with high fever, leucocytosis, cough, and expectoration of foul, blood-stained sputum. On the 11th day radiography showed a large cavity in the base of the right lung with a fluid level. Repeated examinations of the sputum showed a mixed bacteriology of streptococci, staphylococci, Friedlander's bacillus and pneumococci, but no tubercle bacilli. On the 21st day of the illness, sputum showed a few tubercle bacilli and

two days later the sputum was teeming with tubercle bacilli, and there was generalized involvement of both lungs radiologically.

Streptomycin was started and the patient showed a quick response. With 40 grams of streptomycin the generalized involvement of the lungs cleared up and the cavity was almost non-existent. He has been on "P.A.S." for the past one year and has shown no recurrence.

This patient was actually transferred from the medical unit to my side for open drainage on the eleventh day, as the condition was becoming worse.

There was only one case of amoebic abscess of the lung following a hepatic abscess. This patient required no other treatment except emetine injections with a course of penicillin for the secondary infection.

Recently a colleague of mine had a case of multiple abscess cavities of one lung, where actinomyces have been found in the sputum.

Lung abscesses after tonsillectomies occurred with general as well as local



Fig. 6.
Acute lung abscess in the upper lobe after tonsillectomy.

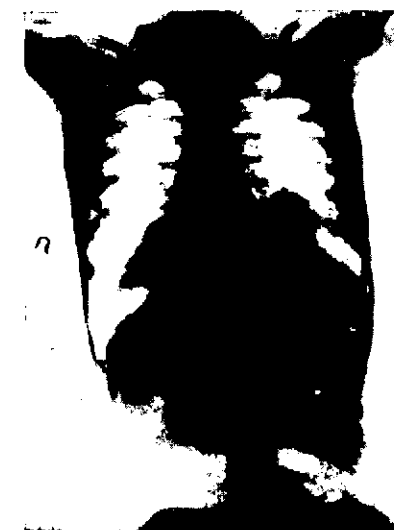


Fig. 7.
Lung abscess involving both lower lobes after tonsillectomy.

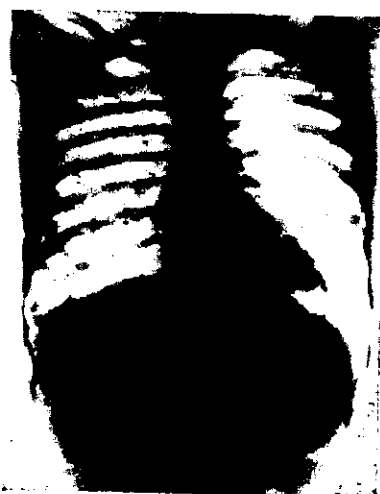


Fig. 8.
Lung abscess, left lower lobe after tonsillectomy.



Fig. 8-a.
Bilateral lung abscesses, a large one in the right and small one on the left after a tonsillectomy operation.

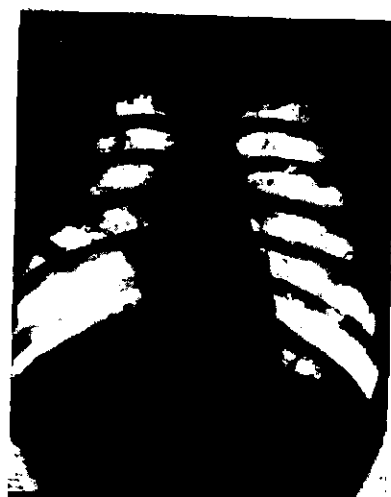


Fig. 9.
Radiogram of the chest, four years after an open drainage of an acute abscess of the right upper lobe. The cavity still persists.



Fig. 10.
Lung abscess following a tonsillectomy operation. Open drainage done in 1945.



Fig. 11.
Radiogram after five years. She had an acute lung abscess involving the right upper lobe, which was drained externally five years ago.

anaesthesia. Most of them showed chest signs within a week. One of them showed (Figs. 6, 7, 8 and 8-a) chest signs after a period of 10 days. Unilateral as well as bilateral abscesses have occurred. Both upper and lower lobes have been involved. At one of the hospitals where I work, we do, on an average, 600 tonsillectomies a year. Since the past three years, general anaesthesia with ether and ethyl-chloride, with an intra-tracheal tube, the oral pharynx well packed, is universally used. Penicillin, two to four lacs of units per day for two days is given intramuscularly every 4 hours. During this period, there has been no case of any chest complications.

Out of these 8 cases of lung abscesses following tonsillectomies, only two required surgical interference. The remaining cleared up with postural drainage, antibiotics and instillation of antibiotics through the bronchus. Bronchoscopic aspiration has not helped much. Intrabronchial instillation of penicillin was done after passing a large intratracheal tube under local anaesthesia. Through this a small rubber catheter was introduced and passed under the X-ray screen into the diseased side, then the position of the patient was arranged so that the penicillin could pass into the diseased segment. Special tubes were not used. Antibiotics used intramuscularly have been penicillin 50,000 units 3 hourly and streptomycin $\frac{1}{2}$ gram every 6 hours. Six cases cleared up completely, the remaining two required open drainage. Both healed up well. One of them after 4 years, had fever, cough, expectoration of foul-smelling pus and radiologically, showed a cavity in the original place again (Fig. 9). Conservative treatment with postural drainage, antibiotics intramuscularly (penicillin + streptomycin) and twice intrabronchial instillation of penicillin made the patient afebrile, sputum diminished, general condition improved, but the cavity persisted. Lobectomy was advised, but has so far been refused.

The second case (Figs. 10 and 11) which was done five years ago remains free from

symptoms of any kind and radiologically is clear.

The one with the nail in the bronchus was a small child of 8 years. The child was running a high temperature, and had cough with expectoration, high leucocytosis. Radiologically it showed a large nail in the bronchus with an abscess in the lower lobe. On removal of the nail, a large quantity of pus could be aspirated through the bronchoscope. Clinically and radiologically, the child showed a marked improvement within a week. The child remains free from symptoms after a year.

Exactly similar findings were found in the case of an aspirated small whistle.

Food particles can be aspirated whilst eating and produce pneumonitis and abscess formation. The patient may or may not be aware of the food particle having gone the wrong way down. A medical man complained of fever and pain in the side. On the second day, he had cough, and the fever was higher. He ran a high temperature, had cough with expectoration, dyspnoea and high leucocytosis for a week. Radiograph at the end of a week showed an opa-

city in the middle lobe. The radiologist thought this to be an inter-lobar empyema; the physician in charge advised needling and aspiration. It was decided that the correct treatment would be an open thoracotomy as the surgeon thought that it was a middle lobe abscess. Due to the deep inter-lobar presentation of this pus, the main pleura may be quite free from adhesions, and needling and aspiration may be dangerous. Further radiograms were taken. Four hours after this, the patient coughed out a large quantity of pus tinged with blood with an inspissated mass, in the centre of which was a green pea. No surgical interference was necessary, as the general condition of the patient improved rapidly.

The subsequent radiograph shows that the lesion has cleared up, but the patient is not completely free from symptoms. On exertion, he gets dyspnoea, and about a few months ago, he had a severe attack of asthma, cough, which was continuous, slight fever, but radiologically there was no pneumonitis or recurrence of the abscess, or bronchiectatic changes in the affected lobe. This patient remembers having eaten green peas four days before the commencement of his illness. He does not remember, however, any mishap during the dinner.

The mechanism of production of a lung abscess is bronchial occlusion following the inhalation of infected material. This material may enter from the upper air passages, for example, tartar, infected blood clot or pus during tonsillectomies, or an infected food particle, or inhaled vomit.

Occlusion causes a segmental pneumonitis. Progress of this pneumonitis will depend upon the nature of the inhaled material and the virulence of the organisms. Infected tartar masses or squeezed material from a tonsil will carry spirochaetes and fusiform bacilli and streptococi, and an acute putrid abscess with a gangrenous slough results. This acute inflammation causes thrombosis of the vessels supplying the segment. This forms the abscess with its sloughs. Except in very severe infec-

tion, the circulation in the lung under the pleural surface is maintained by the sub-pleural plexus of vessels. Thus the abscess cavity in almost all cases is separated from the pleural cavity by a thin layer of normal lung. If the gangrenous process is severe, the process may involve the pleura, which may rupture if the abscess becomes tense with pus. The pleural cavity then becomes infected. If needling is done, the pleural cavity becomes infected unless the needle luckily passes through adherent visceral and parietal layers. In one of the cases, a very large putrid abscess was tapped by a physician thinking it to be an empyema thoracis and a large quantity of pus was aspirated. The chest wall became infected. Open drainage was done with resection of three ribs. The intercostal muscles had sloughed. The abscess cavity contained large sloughs.

This means that the lung abscess is always peripheral, never central or hilar. The abscess usually presents on the costal pleura, but it may present on the inter-lobar, mediastinal, diaphragmatic, or paravertebral surface. This means that if the correct presentation of the abscess is assessed prior to operation for external drainage, the pleura will always be found to be adherent over it.

This description of the morbid anatomy is applicable to all lung abscesses except a few of the primary type, or of those, usually non-foetid. In these cases the abscess cavity may be smaller and more deeply situated and over-lying pleural adhesion may not exist.

If healing is delayed, the walls become indurated, dense pleural thickening occurs, the surrounding lung becomes chronically inflamed, and new abscesses are formed. Thus when it heals it leads to permanent secondary fibrosis, and bronchiectasis. Two of my cases show this condition, where multiple chronic lung abscess cavities are seen involving the whole of the lung on that side. There was universal adhesion of all the surfaces of the lung — at some places the adhesions were very thick.

Metastatic pyaemic lesion notably brain abscess, may also occur. One of the series, a young shipworker developed pneumonia when his ship touched Southampton. He developed a lung abscess which was drained in a hospital in Southampton. When he returned to Bombay, he had a discharging sinus and the cavity had not yet obliterated. Ten days after admission, he developed typical signs and symptoms of a cerebellar abscess which was drained. He refused later, further treatment of his lung abscess which was still discharging pus.

Clinical picture consists of a febrile illness associated with cough, expectoration of a large quantity of purulent material which may or may not be blood-stained. The commencement of the illness with fever, cough, and pleuritic pain leads to a diagnosis of pneumonia, and is treated as such, till the expectoration of a large quantity of purulent, foetid or non-foetid pus, or the radiological diagnosis of a cavity with fluid, a fluid level, and an air bubble above, points to the correct diagnosis. Quite often the radiological picture shows a solid mass, showing a homogeneous opacity. This is the dangerous type. It means that it is a closed cavity. Pus here is under tension as it cannot escape through the blocked bronchus. It is likely to spread into the pleural cavity.

Many lung abscesses heal very quickly and spontaneously without ever being diagnosed, with the modern antibiotic treatment. In private practice, as well as hospital practice, all cases of "pneumonitis" are not radiologically examined, hence small acute, communicating lung abscesses rapidly heal up and are missed. More often there are intermissions, and exacerbations of fever, illness, and expectoration with gradual retrogression and improvement over several weeks.

One of the cases, who had a cardiospasm, developed a pneumonitis due to inhaled vomit. This was treated with "M. & B. 693" tablets. With 14 tablets, he developed anuria, which was relieved after catheterization with an ureteric catheter. Penicillin

was not available then for civilian use. His febrile condition, cough, and expectoration improved.

Four months after, he had a remission of his illness. Penicillin was now available and was started. The attack subsided. This went on for a period of one year. His general condition deteriorated. At the end of a year, both the patient and his physicians consented to surgical interference.

The most valuable aid to diagnosis is radiography. Tomography is of help in some cases, and bronchograms may assist in both localization and diagnosis.

Prognosis:—A lung abscess is always a serious condition. The prognosis is doubtful, even when it appears to have resolved. Relapses lead to chronicity or even to a fatal termination. Secondary changes like bronchiectasis are common in spontaneous healing of these abscesses. Chronic fibrosis with deviation of the trachea is common. Vital capacity of the lung or intrathoracic pressure changes lead to breathlessness on exertion.

Almost every lung abscess forms in relation to a segment, and it is essential to localize the exact site of the lesion in relation to its segmental anatomy. To do this, both postero-anterior and lateral skiagrams are necessary. The lung abscess is commonly found in sub-apical or postero-lateral segments of the upper lobes and the apical segment of the lower lobes. This exact localization of the abscess is necessary for postural drainage and to plan a correct approach for external drainage.

The management of an abscess in the lung differs but little from an abscess anywhere else in the body. The general principles are:—Encourage resolution, or spontaneous discharge by rest, by heat, by chemotherapy, and by measures which improve general health. If the abscess does not discharge, incision, evacuation, drainage and obliteration of the cavity should be resorted to. The more complex surgical approach to a lung abscess justifies a somewhat longer conservative treatment, especially if improvement is occurring, but per-

sistence in delay if there is little or no improvement is dangerous.

The conservative treatment consists in rest in bed, chemotherapy, postural drainage, and bronchoscopic instillation of penicillin and transfusion of blood.

An arbitrary period, such as 6 to 8 weeks, during which every case of lung abscess should be treated by a conservative regime is not correct. If steady improvement is occurring in the general condition, if the drainage of pus through the bronchus is free, if the cavity is not increasing, the conservative treatment can be continued. Early drainage may be necessary in acutely spreading abscesses, and operation may be required within a few days. In pure staphylococcal or even non-foetid abscesses, a longer delay is not dangerous.

If the abscess is allowed to become chronic (of more than 8 weeks' duration) the dangers of operation are increased, and post-operative complications, like a permanently damaged lung, fibrosis, bronchiectasis, or broncho-pulmonary fistula are more common.

The best operation for acute lung abscess is external drainage. With the modern advancement in anaesthesia, and in the treatment of shock, for chronic lung abscesses of more than 8 weeks' duration, lobectomy or pneumonectomy will be preferable. Certain complications such as haemorrhage from the lungs, spreading pulmonary sepsis, metastatic brain abscess and the persistence of a chronic state after the acute infection has subsided, are completely avoided. By a lobectomy, the period of disability is shortened and the overall mortality is diminished. The healing occurs by first intention, and the difficulties of a secondary lobectomy are avoided.

External Drainage:—Exact anatomical localization of the abscess is essential and is done by the study of postero-anterior and lateral skiagrams. The "spot" method of localization advocated by Rabin (1941) is often helpful.

In a majority of the cases, one stage operation is thus possible. Only in one case, the two stage method had to be used. On resection of the rib, the pleura was thin and transparent and the lung could be seen moving beneath it.

A two stage operation will be necessary when the pleural presentation is not costal, for example, interlobar or paravertebral presentation. Local anaesthesia is used as there is a danger of flooding the lungs in inhalation anaesthesia.

Resection of long segments of several ribs over an area in which the abscess is suspected to be is most undesirable. Effective coughing is more difficult and the danger of opening the pleura is great with long resections.

The selected rib is resected. The periosteum is cut transversely where the rib is resected. The parietal layer of the pleura is then palpated. If the pleura is thick, indurated and opaque, and solid lung is felt underneath, one stage operation could be done. The intercostal vessels are under-run at both ends and tied. The segment of the intercostal bundle above and below the space is excised. The abscess is located by needling. Pus and air will be found in the syringe; even if the abscess has emptied through the bronchus, air will be aspirated in the syringe. The abscess is now incised by an ordinary knife. If the chest wall incision has been accurately placed over the abscess, the tissues which must be divided are relatively avascular, and coagulation of vessels is not necessary. Pus is sucked out. Sloughs are removed; and the interior of the abscess cavity is inspected and palpated to find out the direction in which the incision should be enlarged to unroof the cavity. If there are any loculi, they should be opened. To unroof the cavity, a circular portion of the tissues, including the visceral and parietal pleurae and the periosteum of the resected rib is excised.

The cavity is then packed with dry gauze. It is important to pack the superficial portion widely, the wound should not

be stitched. A firm dressing is strapped in place; it is important to do this to ensure effective coughing.

If the pleura is thin and transparent and the movement of the lung can be seen, a two stage operation is necessary. A small gauze pack, moistened with iodine, is put between the pleura and the chest wall, and the wound closed. Within 3 or 4 days, the second stage could be done. If the general condition of the patient needs earlier drainage, it could be done at the end of 48 hours.

After treatment consists of daily renewal of outer dressing and changing of the gauze pack at intervals of several days. Within 4 to 6 days, the gauze pack becomes soaked in pus and becomes loose. The gauze pack is renewed. After the abscess cavity has made progress towards closure and the outer portion of the wound has begun to close in, a soft rubber tube replaces the pack. When the cavity is practically obliterated, the rubber tube is removed. It takes several weeks or months for complete healing.

Sweet states that "complete and permanent healing of the average lung abscess, treated by drainage alone occurs in not more than one-third of the cases, even though the external opening may ultimately heal over. In the remaining cases of those who survive, it is necessary to perform a lobectomy to effect a definite cure."

Previously, a two-stage operation was preferred as cellulitis of the chest wall used to occur in one-stage operation, by the pus coming in contact with the recently opened tissue planes. The use of antibiotics has prevented this complication in one-stage operations now.

For chronic lung abscess of over 6 to 8 weeks' duration, lobectomy or pneumonectomy should be done, if the general condition of the patient will allow it.

Two cases (Figs. 12-a, 12-b, 13-a, 13-b and 13-c) of multiple lung abscess cavities affecting the whole of one lung, required total pneumonectomy. Both were male patients, one a boy of 19 years and another of 20 years. The duration of illness was one year in one, and six months in another.



Fig. 12-a.

Radiogram showing multiple cavities involving the whole left lung.



Fig. 12-b.

Bronchogram of the same lung, showing multiple cavities.



Fig. 13-a.

Bronchogram showing multiple cavities in the whole lung.



Fig. 13-c.

Radiogram of the chest after a right pneumonectomy done for chronic suppuration involving the whole lung.

They had chronic cough and expectoration of large quantities of pus. One of them had repeated haemorrhages.



Fig. 13-b.

Radiogram 48 hrs. after pneumonectomy showing collection of fluid.

Pre-operative treatment consists of antibiotics, penicillin and streptomycin for a week; postural drainage; blood transfusion; and complete rest.

Postero-lateral approach with resection of the 6th rib in its entirety was done. The prone position of Overholt which I think, is preferable for most cases of lung abscess requiring lobectomy or pneumonectomy, was not done in these two, as the anterior dense shadow meant dense anterior adhesions, which would make dissection of the superior pulmonary vein very difficult. To get a wider approach, one inch of the posterior ends of the rib, above and below, were resected. This allows both hands to move freely in the thorax. Of the numerous difficulties which may be encountered in attempting to remove the lung, none is more difficult to deal with than a large, solid, uncollapsible lung.

The lungs were solidly bound to the parietal pleura. For these vascular adhesions, careful, slow, tedious, mostly sharp dissection was used. Finger or gauze dissection was avoided to prevent excessive blood loss. In both cases, the anaesthetist was informed as soon as the chest was



Fig. 14.

Radiogram showing a hiatus hernia of the stomach.



Fig. 15.

Radiogram of the chest four weeks after left lower lobectomy.



Fig. 16.

Bronchogram showing multiple bronchiectatic abscesses.



Fig. 17.

Bronchogram showing a bronchiectasis of the middle lobe.

opened, that there will be excessive loss of blood during the dissection. In one case, 2,400 c.c., and in the other, 3,500 c.c. of blood were required on the table to maintain the blood-pressure throughout the operation.

"Gelfoam" was required over the apex and mediastinal surface to check excessive oozing.

It was difficult to find an intrapleural plane of cleavage at many places. A small light on a flat malleable retractor which could be sterilized was used to trans-illuminate these adhesions. This was an important factor in avoiding injury, both to the lung itself, and important structures at the dome of the pleural cavity, or on the mediastinal surface.

Wherever it was impossible to enter the intrapleural plane, retropleural fascial plane of the chest wall was entered, and a section of the parietal pleura along with the lung itself in the area where dense fixation existed, was removed.

Hilar dissection:—1% procaine hydrochloride solution was injected into the perihilar tissues to control reflex coughing during this dissection. Pleura was reflected first from the posterior surface to cover the bronchial stump.

One of the greatest technical improvements in pulmonary surgery has been the individual ligation of the pulmonary vessels, separate ligature of the bronchial arteries and careful closure and covering of the bronchial stump.

The pulmonary artery is secured first. This demands separate ligation and division of the various lobar or segmental branches in cases of segmental excision or lobectomy, or of the entire artery proximal to its branches in the case of pneumonectomy.

The bronchial arteries approach the hilus of the lung from behind and send branches which surround the bronchi in a loose network of vessels. The branches tend to

group themselves, so that the largest vessels lie on the posterior, anterior and inferior surfaces of the respective bronchi. The bronchial arteries should be severed at the same level at which the bronchus is to be cut across.

This precaution ensures the preservation of an adequate blood supply to the tissues.

The bronchus should be cut to leave the shortest possible stump. A heavy clamp, such as a curved kidney pedicle clamp is placed across the bronchus. The division of the bronchus is now begun, proximal to the clamp. After cutting a short distance, a suture is passed from edge to edge across the partially divided end. The bronchus is divided further, another suture is applied, and so on, till the bronchus is divided completely. Sutures are now tied. Suture material used is silk. If there is any leakage, more sutures are applied. Saline is poured in the pleural cavity to see if there is any leak in the tied bronchus. The closed bronchial stump is now covered.

Mediastinal tissues are approximated over the stump by means of a series of sutures.

In pneumonectomy, the phrenic nerve is crushed to raise the diaphragm to reduce the cavity. This is not done in lobectomies, as the action of the diaphragm should be preserved to further the respiratory function of the remaining portion of the lung.

It is preferable not to use a drainage after pneumonectomy. The effusion of fluid prevents a too sudden or too pronounced shift of the mediastinum and the fluid aids in the ultimate obliteration of the pleural cavity.

In lobectomy, a drain placed on suction or water seal is preferable to allow the remaining portion of the lung unrestricted access to the pleural space to ensure its complete expansion.

After the operation, antibiotics are continued. Oxygen with a B.L.B. mask is administered — 6 litres per minute. The patient is encouraged to breathe deeply,

movements are not restricted; he is allowed to sit up, and cough freely.

Age Incidence

0 to 10 years	— 2 cases.
11 to 20 years	— 6 cases.
21 to 30 years	— 3 cases.
31 to 40 years	— 10 cases. — 1 case died.
41 to 50 years	— 1 case. — Died.
51 to 60 years	— 1 case. — Died.
61 to 70 years	— 1 case. — Died.
25 cases. — 4 deaths.	

The largest number of cases occurred in the age period of 11 to 40 years.

The four deaths were large, putrid abscesses; in two cases, even the chest wall was involved. In one case, needling was done previously.

CASES OF LUNG ABSCESS TREATED SURGICALLY

	No. of cases	Died	Cured
Rib resection with drainage.	17	4	13
Lobectomy — Left lower lobe.	1	—	1
Lobectomy — Right lower lobe.	3	—	3
Right Pneumonectomy.	1	—	1
Left Pneumonectomy.	1	—	1
Two foreign bodies removed by a bronchoscope.	2	—	2
	25	4	21

This gives a mortality of 16% for surgically treated cases.

Out of these, 13 cases of external drainage, one case after 4 years has a recurrence and the cavity is persisting.

Three had a persisting sinus after 3 months, and were advised lobectomy, but refused. No bronchial fistula was noticed. None of them had haemorrhage. Lobectomy and pneumonectomy cases had no complications, and the wounds healed well.

LUNG ABSCESES TREATED CONSERVATIVELY

Total Number—44

Age Groups.	Cases.
10 to 20 years.	— 6
21 to 30 years.	— 11
31 to 40 years.	— 15
41 to 50 years.	— 7
51 to 60 years.	— 5

—

44

Sex incidence.

Male:—	36
Female:—	8
	—
	44

Results:—Died 10; of these, one was an abscess with a malignant growth of the bronchus; four were with large putrid lung abscesses involving the chest wall. The condition of the remaining 5 on admission was hopeless.

The mortality rate is over 19%.

It would have been higher, if all the cases seen, had come for treatment. A few very serious cases were only seen once, and refused operative treatment.

The remaining 34 cases were discharged free from fever, and acute symptoms. It has not been possible to follow up all these cases after discharge. 18 of these were private patients. These are followed carefully and over 50% had subsequent symptoms. Four of them had recurrence of abscess. Two of these have come now for lobectomies; the other 2, refused surgical treatment as the symptoms subsided with rest and antibiotics. The other 5 are showing fibrotic changes.

ANAESTHESIA

Thoracic surgery is always elective surgery. Thus having known about it, the anaesthetist in collaboration with the surgeon discusses the details of surgical procedure, and chalks out an appropriate technique. He must evaluate the degree of surgical risk and institute, well in advance, measures to combat the obvious pathology and improve the patient's condition to the optimum. This will include postural drainage; combating toxicity; bringing up haemoglobin and red blood corpuscles percentages, fattening by proper diet, etc.

Pre-medication.—Patients undergoing lung surgery are often in the hospitals for long periods, and they have been receiving varying amounts of sedatives for relief of pain, haemorrhage or cough. These sedatives vary from morphine derivatives including codein to barbiturates, long and short acting, or both. This long and continuous use of sedatives often leads to tolerance to these drugs and unless really heavy pre-medication is administered, they arrive in the operating room almost awake. However, these patients have impaired vital capacity, and one is hesitant to give large depressant doses lest sub-oxygenation might result. With these considerations, the following procedure is adopted. Previous night "Nembutal" or "Seconal" $1\frac{1}{2}$ grains is given at bed-time. The same dose of "Nembutal" or half the dose depending on the vital capacity, is given $1\frac{1}{2}$ hour before the operation, and morphia $1\frac{1}{6}$ grain with atropine 1 100 grain or scopolomine 1:150 grain is given 45 minutes before the operation. If the vital capacity is as low as 30%, pethidine 100 mgms., in place of morphine is given.

Atropine has a dual role to perform. First of all it produces a dry pharynx, trachea and bronchi. This is one of the steps towards combating sub-oxygenation due to obstruction from secretions, which one can ill-afford in a thoracic case. Secondly, this powerful para-sympathetic depressor helps

to abolish or diminish reflexes which cripple respiration and circulation.

If in spite of atropine, secretions do interfere with proper oxygenation, they must be dealt with effectively and promptly by suction through an endo-tracheal tube.

Induction.—It is important that before the patient is anaesthetised, he should be comparatively dry. Postural drainage two hours before the operation, usually gives satisfactory result.

Pharynx and larynx are thoroughly sprayed with a 2% solution of "Anethaine," using an ordinary spray or atomiser. In addition to this, with a curved forceps or applicator pyriform fossae on both sides are touched with small swabs of "Anethaine" and kept like that for five minutes each on either side. This procedure anaesthetises the recurrent laryngeal nerve as it traverses under the mucous membrane of the pyriform fossa. Furthermore, one c.c. of 2% "Anethaine" is injected through the crico-thyroid membrane. The patient usually gets a violent bout of cough and the tracheal and bronchial mucosa is well sprayed with the "Anethaine" solution. This thorough local anaesthesia, diminishes the cough reflex greatly.

Barbiturates used as pre-medication help to counteract side effects of "Anethaine" if any. No convulsions are noticed when barbiturates are used. However, more than 5 to 6 c.c. of "Anethaine" are never used for the whole procedure.

After this thorough anaesthetisation and depending on the vital capacity of the patient, "Pentothal" induction is done. If the vital capacity is above 50% of the normal, a 5% solution of sodium "Pentothal" is used, and rapidly injected to produce relaxation of the jaw. Usually, $\frac{1}{4}$ gram to $\frac{1}{2}$ gram is enough. A quick atraumatic intubation under direct vision is performed. The biggest possible size of the endo-tracheal tube is used. Because of the thorough anaesthetisation no spasm or cough occurs. If the vital capacity is reduced to 30% and

below after a sleeping dose of "Pentothal" ($2\frac{1}{2}\%$), Nitrous oxide induction followed by cyclopropane is resorted to, and as soon as possible, a large endo-tracheal tube under direct vision is passed. In the use of either "Sodium Pentothal" or cyclopropane if respiratory depression occurs in a person of low vital capacity, it can be easily corrected by quick intubation, followed by controlled supplementary respirations until the effect of the drug wears off.

As soon as the endo-tracheal tube is passed it is connected to the machine and the patient well oxygenated. Soon after this, through a Cobb's connections trachea and bronchi are aspirated. One is often amazed at the amount one can aspirate despite the postural precautions. Perhaps, this emphasises the importance of having the patient as dry as possible before the induction. I have no doubt in my mind that induction does irritate the tracheo-bronchial tree no matter what agent is used.

The need for keeping a constant, powerful suction handy, and ready for the use of the anaesthetist cannot be over-stressed. A common suction for the use of the surgeon and the anaesthetist is most inadvisable, for it may happen that both simultaneously and urgently may need it.

One practical point needs mention, and that is to see that the catheter on the suction nozzle is flexible, long and of adequate bore. Before starting, one must make sure that the catheter is at least an inch longer than the distal end of the endo-tracheal tube. So much for the induction.

Posture.—This is best decided by the surgeon in collaboration with the anaesthetist. Lateral position is the most commonly used posture. However, from the point of view of effective drainage, a Trendelenberg position is important. It is usually the upper half of the table which is tilted to about 25° . This accomplishes the following:—

(1) Drainage of secretions from cavities, haemorrhages, etc., along-side of the endo-

tracheal tube without contaminating the contra-lateral lung.

(2) It is also the most convenient position from the surgeon's point of view.

(3) In case of haemorrhage and shock, vital centres in the medulla get more blood supply.

(4) It helps to reduce the incidence of emboli.

Maintenance.—After the induction and adjustment of posture, maintenance of anaesthesia is carried on by a trace of ether with absorption technique, using Water's Cannister. N_2O and O_2 in a proportion of 50% each is also maintained. This helps to cut out ether, and effectively eliminate the CO_2 from alveoli.

In one of the upper extremities, a sphygmo-mano-meter is applied to record blood pressure readings. On the other extremity, a glucose (5 to 10%) saline drip with a bi-valve adjustment is started. In order to minimize lung and diaphragm movements and cut out the amount of general anaesthetic administered, D-tubocurarine (B. W. & Co.) in varying doses from 10 mgms. to 40 mgms. is used. This is injected intravenously in the bi-valve connection of the drip.

There is some controversy regarding the use of ether in lung surgery. Use of ether denies the surgeon the benefit of using a cautery to prevent haemorrhage. However, there is almost an unwritten law, that once the pleura is opened no cautery will be used. Besides, some surgeons do not like to "cook the meat" to achieve haemostasis. Ligature of bleeding points and use of "Gelfoam" for oozing is considered far superior to the use of the cautery.

The strain on the circulatory system from open pleura, furthermore, needs an agent that will not increase it. The tolerance of patients even with frank circulatory impairment for ether is well established. This ability to support the circulation, outweighs all the other handicaps of ether, viz., irritation to mucosa and risk of explo-

sion if cautery is used. For these reasons, I prefer to use a trickle flow of ether. Patients are none the worse for it. In fact, they are better off. However, steadying of diaphragm or lungs is achieved not by depth of ether anaesthesia, but by judicious use of d-tubo-curarine.

Use of this drug necessitates, use of controlled or assisted respiration, and use of positive pressure.

Positive pressure diminishes or neutralises anoxia and troublesome reflexes which may arise from mediastinal swing. Positive pressure thus helps to combat the shock in thoracic surgery. Perhaps it is out of place here to describe the technique of positive pressure, but, it is needless to say that it implies some form of general anaesthesia with CO₂ absorption technique, connected to an endo-tracheal tube.

Pressure changes should not be too sudden and abrupt; because they can produce circulatory changes which are reflected in poor colour and marked fall of blood pressure. Positive pressure should be effected slowly over a period of 5 to 10 minutes. Deviation from this should be an emergency of a grave nature. Appearance of cyanosis in the presence of a clear airway, or a markedly depressed circulatory system from swinging mediastinum as evidenced from heaving and fall of blood pressure form important indications for positive pressure. The surgeon can work quickly and efficiently if the lung is collapsed, and if no indication for positive pressure presents, it is advisable to harmonise the work of the surgeon and the anaesthetist. It is just as well to inflate the lungs slowly at the surgeon's request or take the initiative in hand and do it when the surgeon is not working in the cavity.

In cases where disease has fixed the mediastinum, obviously swinging will be absent, and in such cases too much positive pressure must be avoided.

The other indications for the use of positive pressure anaesthesia is a lung case

where one encounters a steadily rising pulse with frequent variations in blood pressure. In such cases slight pressure from time to time does seem to improve the patient's condition clinically.

During the maintenance, one must not omit frequent aspirations. The possibility of a large and sudden haemorrhage from cavities or neoplasms should always be borne in mind, and the promptness and efficiency with which it can be sucked out of the air-ways, offer the only chance of survival from such a catastrophe. In spite of such alertness to the dangers of secretions and the methods to combat it effectively, 25° tilt with head down is important in establishing a permanent postural drainage throughout the operation.

To effectively block the secretions, and prevent them from going from one lobe to another, elaborate contrivances have been developed. Maggil's method of endo-bronchial intubation with use of cuff; and Thompson's blocker used in Scandinavia are a few of these. However, the techniques of putting tubes, tampons and blockers in various bronchi are far too complicated, time consuming, requiring special experience and serve no useful function. Constant or intermittent suction through an endo-tracheal tube is the simplest and yet the most effective known method to accomplish what more complicated gadgets do.

Resuscitation during Anaesthesia.—Even before any un-toward signs of fall of blood pressure and shock appear, a slow-going blood-drip in the leg vein through a cannula after a cut-down procedure is set up. Another drip of glucose saline with bi-valve connection is set up in one of the upper extremities as mentioned above. The glucose saline drip helps to administer curare, atropine, intravenous procaine or ephedrine as need be. The blood-drip and its rate as also saline drip rate needs careful observation. A strained circulatory system should not be over-loaded.

Any occurrence of bradycardia or sweating should not be lightly disregarded. It

may indicate the stimulation of the parasympathetic. Administration of intravenous atropine 1/200 grains to 1/100 grains often prevents the onset of danger.

To combat reflexes arising from the hilar area, infiltration of 10 c.c. of 1% procaine is found most useful. 1 gram of procaine added to a pint of glucose saline drip and allowed to go at a slow rate of 30 to 40 drops a minute is also helpful. In case of emergency besides atropine, 10 c.c. of 0.25% procaine injected rapidly also helps to abolish vagal reflexes.

Injection of procaine in the phrenic nerve to prevent undue movements of diaphragm is a useful procedure, but I have found it seldom necessary with the advent of curare.

Post-operative.—In lobectomies and cardiac oesophageal surgery, collapsed lobes or lung is gradually expanded as the pleura is being stitched. A catheter is put in the pleural cavity with a water-seal and after full expansion of the collapsed lung or lobe when no more air comes out of the catheter it is clamped and later connected to a water-seal in the ward.

A B.L.B. mask, with a 6 litre flow is adjusted and the patient shifted directly to the bed which is wheeled to the ward. Frequent shifts from table to stretcher, and from stretcher to bed must be avoided.

Blood drip is continued slowly or fast depending on the condition unless blood pressure stabilises, and the pulse rate becomes steady with good colour.

Lastly a word about bronchoscopy immediately after the operation. This procedure is not done as a routine for the following reasons:—

Unduly deep anaesthesia or curarisation is required to carry out this procedure until after the closure of the skin wound thus delaying return of consciousness. Besides bronchoscopy can only help to remove secretions, blood or a plug of mucus from the main bronchi, or lower lobe bronchi and until the patient's cough reflex returns, secondary bronchi cannot be altogether cleared. Ordinary tracheal suction before the patient leaves the operation theatre initiates the cough reflex if the anaesthesia is very light at the end of the operation, as it should be, and this enables the patient to get rid of the secretions if any. Thus I have not found it necessary to bronchoscope every patient as a routine.

They can be bronchoscoped later on if:—

- (1) Patient is unable to cough from weakness.
- (2) If there is temperature of unknown cause.
- (3) If the X-ray shows atelectasis.

BRONCHIECTASIS*

by R. MAHADEVAN, Madras.

The name "bronchiectasis" was given by Laennec in 1819 to a condition which he found to be a definite entity in itself, characterized by a chronic, usually progressive, nonspecific inflammatory process in the bronchial walls and adjacent lung parenchyma. Till very recently considered to be a rare disease, it is now known to be common and second only to pulmonary tuberculosis among chronic pulmonary diseases. Thus between July 1948 to date there were 62 cases of bronchiectasis as against 39 of lung abscesses and 6 of empyema in my own unit.

That bronchiectasis is so common came to be realized only rather recently. It is interesting to recall here that no less a person than Sir William Osler⁴ said in 1903 that the diagnosis of bronchiectasis was not possible in a large number of cases. In my days as a medical student bronchiectasis was considered to be a rare disease with no possibility of cure. Consequently no more than a mere passing mention was ever made of the subject. The conception of bronchiectasis was then largely limited to post-mortem appearances. Coming to recent times, as recently as in 1934, Young⁵ stated that the treatment of bronchiectasis remained one of the dark corners of medicine though definite advances had been made and improved measures of amelioration had been introduced.

Now, thanks to the remarkable advances in thoracic surgery, not only is the accurate diagnosis of bronchiectasis possible but the exact extent also of the disease can be clearly defined, and many of these cases can be cured by properly planned surgical excision. This has become possible even in cases of rather extensive or total involvement of one lung and in selected cases of bilateral involvement.

*A paper read at the 12th Annual Conference of the Association of Surgeons of India, at New Delhi on 30th December 1950.

In what follows, I propose to confine myself to the various facts observed in the cases that were under my care, with particular reference to treatment, the difficulties met with in operations, the complications that arose and the ways and means of preventing them and bettering the results as gathered from such experience as I have had. Of the 62 cases that form the basis of this lecture, 54 were males and 8 females. Table I shows age distribution and a few other factors. Majority of these patients had years of history of cough, with foul sputum and frequent bouts of fever. A good proportion dated their illness from childhood, after an attack of measles, whooping cough or pneumonia and the like. Frank haemoptysis occurred in a small proportion and blood stained expectoration in a few more. Almost without exception, these cases were very weak and emaciated at the time of first reporting to hospital.

Table I — Age distribution etc.

Age	Males	Females
0—10	2	0
11—20	12	0
21—30	15	7
31—40	13	1
41—50	6	0
51—60	0	0
61—70	1	0
Age not stated	5	0
Total	54	8

(Of the 54 males 48 were Hindus; 3 Mohamedans and 2 Indian Christians and one Anglo-Indian. All the 8 females were Hindus. No significant inference can be drawn regarding the community involved, from such small numbers.)

EXTENT AND LOCALIZATION OF INVOLVEMENT

The right lung was involved in 14 cases, the left in 9 and both lungs in 16. 8 cases belonged to what may be called infected congenital cystic lung. In 6 out of these 8 cases the entire left lung was affected and in 2 the entire right lung. It is rather unfortunate that in 15 cases the notes are not clear as to the areas involved.

Table II — Details regarding affected areas.

Right Lung (14 cases)

Entire lung	.. 2
Right lower and middle lobes	.. 1
Upper lobe	.. 3
Middle lobe	.. 3
Lower lobe	.. 3
Not clearly stated	.. 2
Total	.. 14

Left Lung (9 cases)

Entire lung	.. 1
Lower lobe and lingula	.. 1
Lower lobe	.. 6
Not clearly stated	.. 1
Total	.. 9

Bilateral involvement (16 cases)

Both lower lobes	.. 7
Both lower lobes and rt. middle lobe	.. 2
Rt. middle lobe and lt. lower lobe	.. 3
Rt. middle and lower lobes & lt. lingula	.. 1
Not clearly stated	.. 3
Total	.. 16

Cystic Lung (Entire lung affected—8 cases)

Right	.. 3 (all males)
Left	.. 5 (3 females)
Total	.. 8 (3 females and 5 males)

Only two cases in the series conformed to the condition of "dry-bronchiectasis". One was a medical student aged 25 whose only trouble was an occasional attack of haemoptysis. The other was in a ward boy aged 30 with similar trouble.

AETIOLOGICAL FACTORS

Some of the aetiological factors worth mentioning are brought out in the following illustrative cases.

(i) Development of bronchiectasis in an area of collapsed lung:

CASE 1. A fountain-pen barrel maker aged 27, used to get bouts of fever with cough and foul smelling sputum. The troubles were of 7 months duration. Skiagrams showed clearly collapse of the right middle lobe (Fig. 1), and bronchograms (Figs. 2 & 3) showed bronchiectatic cavities within the collapsed lobe. In spite of an apparently minimal lesion that the skiagrams suggest, he was bringing up about 10 ounces of foul sputum daily. His general condition though fair was slowly and steadily deteriorating and he was losing weight. Bronchoscopic examination showed no cause for the collapse.

(ii) Enlarged hilar glands causing collapse of the lung:

CASE 2. A boy aged 11 was brought in very ill and emaciated after about an years treatment elsewhere for attacks of fever, cough and foul sputum. Investigation showed extensive bronchiectasis of right lower and middle lobes (Fig. 4). The night following bronchogram he was seized with an attack of intense dyspnoea. An emergency bronchoscopic aspiration brought large amount of thick tenacious foul smelling sputum, with considerable immediate relief. But, every time the bronchoscope was removed the child relapsed into a state of dyspnoea. The pus was obviously blocking the trachea itself. So, an emergency tracheotomy was done and pus was constantly aspirated by a catheter passed down. Some improvement followed, but he never recovered fully and died within 36 hours. Autopsy showed enormously enlarged hilar glands (Fig. 5). It looked possible that the enlarged glands caused collapse of the lung with bronchiectasis as a subsequent development. The sudden increase in



Fig. 1.

(Case 1). Plain x-ray chest showing collapsed lobe.



Fig. 2.

(Case 1). Bronchogram A. P. view.



Fig. 5.

(Case 2). He developed one night orthopnoea suddenly and expired. Autopsy showed markedly enlarged hilar glands, obvious in the picture, which also shows the enlarged right arytenoid cartilage.



Fig. 6.

(Case 3). Abscess left lung showing clearly the fluid level.



Fig. 3.

(Case 1). Bronchogram lateral view. The atelectasis of part of middle lobe and the development of bronchiectasis within, is clearly brought out.



Fig. 4.

(Case 2). Refers to a boy of 11 treated elsewhere for over an year, as chronic lung abscess. The underlying cause was bronchiectasis. X-ray above is bronchogram A. P. view.



Fig. 7.

(Case 3). Shows the condition after a few days of postural drainage and chemotherapy (operation refused).



Fig. 8.

(Case 3). Bronchogram (lateral view) 9 weeks later (to Fig. 7). Note that no lipiodol enters the involved area.

dyspnoea coming on after a bronchogram suggested that possibly the lipiodol and pus together formed an inspissated mass causing massive collapse of the healthy lung tissue also, thus making matters worse. Further, a tumour of the right arytenoid cartilage was also found. Possibly this tumour also played a part in the production of dyspnoea.

(iii) In a few cases, bronchiectasis followed lung abscess in patients who had refused operation and had only palliative treatment.

Fig. 6 shows such an example — an abscess of the left lung in a patient who refused operation and was therefore treated by posture and sulpho-namides (penicillin was unknown then). Fig. 7 taken a few days later shows the condition apparently cured. However, lipiodol skiagrams taken 9 weeks later (Fig. 8) showed that the affected area of the lung had been completely thrown out of action. No lipiodol entered the concerned bronchus, possibly due to bronchostenosis. Lipiodol skiagram taken 1½ years later (Fig. 9) shows clearly the development of bronchiectasis in the area.

DIAGNOSIS AND DIFFERENT DIAGNOSIS

Diagnosis is easy in straightforward cases. However, some of the cases in the

series had been treated elsewhere for varying periods as pulmonary tuberculosis or lung abscess before the real cause was discovered. Some patients came for asthma and investigation showed an underlying bronchiectasis as the possible cause. The following are illustrative examples.

CASE 4. An adult aged 45 was for years the victim of periodical attacks of cough with expectoration and bouts of fever. Indeed he dated his illness from his childhood. His history and other features were suggestive of bronchiectasis. Yet, for years he had been treated for pulmonary tuberculosis in various places. A phrenic crush also had been done. The plain skiagrams of the chest that had been taken also strongly suggested the condition to be one of bronchiectasis. Bronchograms now taken (Fig. 10) confirmed the diagnosis. There was extensive bronchiectasis of the left lower lobe and minimal lesion in right middle lobe.

Asthma and bronchiectasis:—Some patients who came for asthma were found on investigation to have bronchiectasis. That bronchiectasis was the underlying cause was suggested by the fact that im-



Fig. 9.

(Case 3). Bronchogram 1½ yrs. later. Note the development now of bronchiectasis within the area.



Fig. 10.

(Case 4). Bronchogram of a patient treated for years elsewhere as pulmonary tuberculosis. Phrenic crush etc. had been adopted.

examination for penicillin sensitivity are essential.

Congenital cystic lung:—8 cases in the series came under the classification of congenital cystic lung with entire involvement of one lung. Their symptoms practically dated from infancy. Whatever the theory of origin of cystic lung may be and however innocuous the condition may be before the supervention of infection, "cystic lung" has all the features of bronchiectasis, once infection has set in.

TREATMENT

Treatment by *medical measures* has always been unsatisfactory. The position has improved somewhat after the advent of antibiotics and chemotherapeutic drugs. Postural drainage has a very important place both in medical treatment and in pre-operative preparation. Correct postural drainage requires a careful localization of the diseased area by skiagrams in the antero-posterior and lateral views taken with the patient in the erect posture. Nelson's³ pioneer work in this field is well known and the salient features are brought out in Figs. 12 & 13.

Auxiliary measures of treatment are:—

- (1) Penicillin parenterally and by nebulization.
- (2) Periodic bronchoscopic aspirations and penicillin instillations.
- (3) Streptomycin and sulfa group of drugs as and when indicated.
- (4) Correction of anaemia by massive doses of iron, repeated step-ladder blood transfusions, liberal use of vitamins etc.
- (5) Correction of protein deficiencies by nourishing diet use of amino-acids, plasma transfusions etc.

Any focus of infection such as sinusitis, carious teeth, infected tonsils etc. must be appropriately treated. Breathing exercises and graduated physical exercises have an important place in toning up the cardio-respiratory system. The results of these



Fig. 11.

(Case 5). Bronchogram of right lung of a patient treated for asthma for several years. The underlying cause was found to be bronchiectasis.

provement followed treatment by posture, penicillin, bronchoscopic aspirations etc.

CASE 5. Fig. 11 illustrates a case of bronchiectasis in a man aged 32. He came in a condition of "status asthmaticus" and had only slight relief with the usual remedies till the underlying cause was recognized to be bronchiectasis and treated as such.

A diagnosis of bronchiectasis is complete only when the exact area and extent of the disease is accurately localized. This is possible only by bronchograms of both lungs, preferably taken at intervals. Bronchoscopic examination is essential in every case, to find out or to exclude the presence of foreign bodies, new growths etc. Repeated examination of the sputum to exclude tuberculosis, even in cases with obvious bronchiectasis is very essential. Culture of the sputum (aerobic and anaerobic) and

measures of treatment alone have been on the whole unsatisfactory. None of the established cases of bronchiectasis in the series under consideration, where operation had not been done for one reason or other, has ever become fit enough to get back to full wage-earning capacity. This does not mean to say, that medical measures have not an important place in the treatment of bronchiectasis. Majority do receive a considerable measure of benefit by adopting the methods outlined above. Perhaps the position can best be summed up thus. No patient should be advised to have a bronchiectatic area of lung removed until the full benefit of postural drainage, and penicillin treatment has been obtained (Lee Lander²). Illustrative examples where medical treatment had been unsatisfactory in some and of value in some others are outlined below.

CASE 6. A boy aged 9 came with all the features of bronchiectasis, the trouble having started 8 years earlier after an attack of broncho-pneumonia (Fig. 14). Operation was refused. Though some general improvement occurred with the other measures of treatment outlined above, repeated attacks of haemoptysis occurred, sometimes with bouts of fever and ultimately the boy succumbed to the disease.

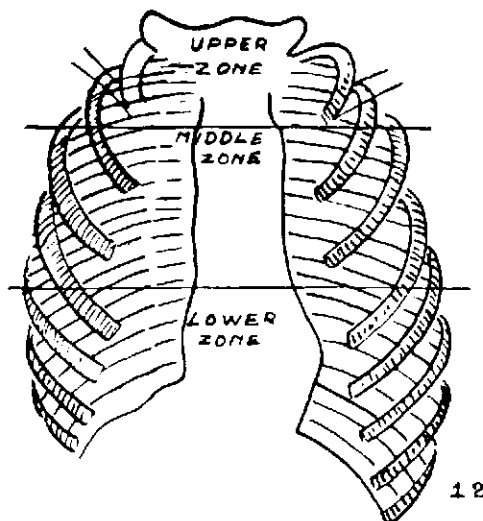


Fig. 12.

Diagram explaining postural drainage. See also Fig. 13. For details see text of article.

A similar fate overtook some others in the series, in some of whom the infection never got sufficiently controlled. However, one lady (case 7) aged 39 and a mother of 7 children has had symptoms for about 15 years and had involvement of the entire left lung and part of the right lung also (Fig. 15). With penicillin nebulization and injections, her troubles (inclusive of asthma which she used to have before) and the quantity of sputum have all diminished. But her case is somewhat different, as she could afford the long and tedious treatment and had not the necessity of earning her livelihood. Even she, with all the best that medical treatment can bestow gets breathless on walking more than a few furlongs. She gets attacks of mucous colitis. Is it possible that the underlying cause for this is bronchiectasis acting like an area of focal sepsis?

Surgical Treatment.

What with great advances in surgical techniques in general and of thoracic surgery in particular, the advent of chemotherapeutic drugs and antibiotics and efficient organization of blood-bank, the stage has now been reached when one can truly

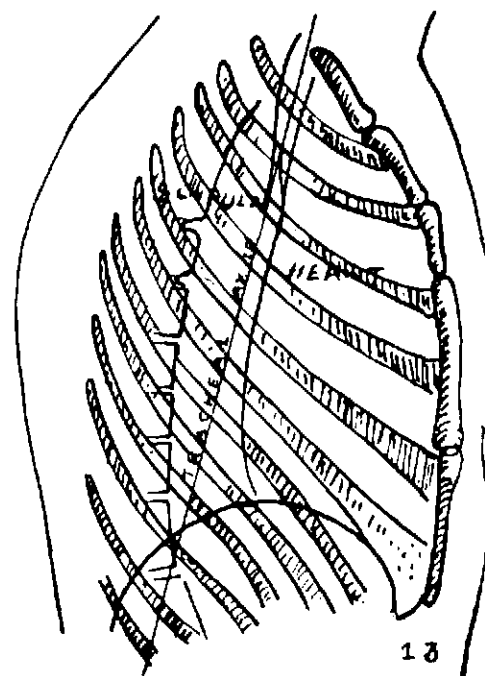


Fig. 13.

See legend to Fig. 12.

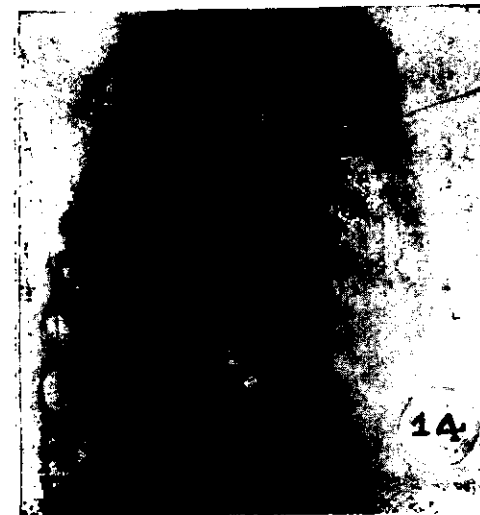


Fig. 14.

(Case 4). Bronchogram right lateral view showing bronchiectasis (boy aged 9). Operation refused. Medical measures gave some relief, but later recurrent haemoptysis occurred and ultimately the child succumbed to one of the attacks.



Fig. 15.

(Case 7). Bronchogram. Case one of infected congenital cystic lung, (left). Note the marked deviation of trachea. There is some involvement of right lung also. The patient a lady of 39 is in comparative comfort with penicillin nebulization and postural drainage.

say that the ideal treatment for bronchiectasis is excision of the affected tissue, provided the patient is fit for operation. The first lobectomy for bronchiectasis was performed by Heidenhain in 1901. The mortality of the operation then and in the years following was so prohibitively high that the procedure was unacceptable till safer measures were evolved. Brunn¹ in 1929 demonstrated the feasibility and relative safety of one stage lobectomy. Shenstone and Janes⁶ devised the lung tourniquet in 1932 and Robert and Nelson⁵ invented modified patterns a little later. Individual ligation of the structures at the hilum by intra-hilar dissection, segmental resection etc. followed as refinements in technique. Now, it is possible to operate even in cases of bilateral involvement: operation on the less affected side is done some months after operation on the more affected side.

Now for a few important details about the technique of operation itself.

Accurate localization of the area involved by lipiodol skiagrams of both lungs, taken at intervals, is essential. Operation is preferably done only about 12 weeks after the last bronchogram.

Premedication:—1/16 gr. "Omonopon" and 1/150 gr. hyoscine hydrobromide 3/4 hour before operation. 3 lakhs of penicillin overnight and the morning of operation apart from previous doses.

Anaesthesia:—Paravertebral and local block. 2—3 c.c. of 2% novocaine (with 2 mns of 1/1000 adrenaline to an ounce of the solution) from the 3rd to the 9th dorsal nerves. Local infiltration along the line of incision and into the tissue all around with 1/2% novocaine solution (with 2 mns of 1/1000 adrenaline to an ounce) using about 200 c.c.



Fig. 16.

Shows line of incision for lobectomy. Starting from the level of the 4th dorsal spine to a point about 2" below and well in front of the inferior angle of scapula.

The throat is anaesthetised by spraying with a solution of 2% percaine. The patient is encouraged to cough out as much as he can of the sputum. An intra-tracheal catheter is passed through the nose and any remaining pus aspirated with the suction apparatus. Now the patient is anaesthetised with gas and oxygen with addition of ether in some cases. In the earlier few cases we used cyclopropane, but later have abandoned it for the simple reason that we could not procure cyclopropane try as we might. The face-down position was the one adopted in the majority of the later cases though in a few earlier cases the lateral position was adopted. We have not got the



Fig. 17.

Sometimes the incision may have to extend forward even as far as the mid-clavicular line as shown in the above picture. Such extension may be required to get free access for release of adhesions.

Overholt table and so used the Albee-Comper orthopaedic table, adding certain improvisations. My feeling is that the patient is not quite comfortable in this position, but it has the great advantage of preventing spill-over infection into the healthy lung, and seems worth adopting for this important reason alone.

Skin incision:—From a point at the level of the 4th dorsal spine to a point 2" below and in front of the inferior angle of the scapula (Fig. 16) extending further forward if necessary, even on to the mid-clavicular line in some cases (Fig. 17). The vertical part of the incision runs about midway between the vertebral border of the

scapula and the spine, but somewhat nearer to the latter as the muscles to be cut here are thinner. The skin vessels are coagulated by diathermy. Deeper vessels and of course all big vessels are tied.

For a lower lobe lobectomy, the 6th interspace is opened into and posterior 1" of the 5th and 6th ribs are resected sub-periosteally. In some of the earlier cases the entire 6th rib was resected with shingling of the posterior ends of 5th and 7th. The pleura is opened into, the parietal adhesions of the lung are released and then the rib spreader is introduced and the wound opened as wide as possible. It is best to inject novocaine into the hilum of the lung at this stage if it is easily accessible. The affected lobe is released from adhesions all around, preferably after putting a temporary ligation to the affected bronchus. Individual ligation of the structures at the hilum is performed and the structures severed between ligatures. When the bronchus is severed, precautions must be taken to aspirate off any spilled material, without contaminating the surrounding structures. The bronchial stump is occluded by interrupted vertical mattress sutures of fine silk. The hilar region and the pleural cavity are thoroughly irrigated with normal saline at body temperature. Two drainage tubes are introduced one at the anterior and one at the posterior ends of the incision. Penicillin 200,000 units and $\frac{1}{2}$ gm. of streptomycin are introduced dissolved in saline. The incision is closed in layers with interrupted sutures of no. 2 silk, soaked in a 1 in 1000 aqueous flavine solution. The patient is turned on to his back and bronchoscopic aspiration is performed. This is a very important routine which is done in every case.

Throughout the course of the operation drip blood transfusion must be kept up, the aim being to replace the blood at the rate it is being lost i.e. increasing or decreasing the rate of flow as required, judged by the pulse rate, blood pressure, respiration, colour of the patient etc. Sometimes, the canula may get blocked and it is a wise precaution to have two veins opened up

and canulae tied in. Arrangements to pump the blood very fast must always be ready at hand, if necessary through both the canulae. Such necessities have arisen in our experience, as one of the ligatures of a main vein slipped and the vein retracted deep within. Considerable blood was lost before it could be caught and retied and the patient's general condition was kept up only by pumping up blood. When the veins of the upper limbs are used there is less trouble with venospasm or blockage.

As regards the blood pressure, one point seems worth mentioning. Sometimes the blood pressure may unduly rise and this is an indication of an oncoming shock, due to the intense peripheral vasoconstriction. It is an indication to run in the blood faster and not to lessen the rate. I believe, that not realising this contributed, at least in part, to the fatal termination of one of my cases. Of course running in too much blood can be as dangerous as running in too little, and extreme nicety of judgment is required in running in the right amount of blood at the right time.

Post-operative care:—

- (1) The patient is put in the oxygen tent for at least 24 hours.
- (2) Drip blood transfusion and saline continued as required.
- (3) X-ray of the chest immediately after operation and thereafter daily if necessary, are taken till the lung is fully expanded.
- (4) Penicillin, streptomycin and "Sulphadiazine" in adequate doses.
- (5) A careful watch must be kept for any pleural effusion, and when present the fluid must be aspirated and penicillin instilled.
- (6) In a favourable case the drainage tubes can come off in 48 hours.

SOME CASES OF INTEREST

CASE 8. (Figs. 18 to 21). A boy aged 11 was admitted in September 1941 with an 8 years history of recurrent attacks of fever, troublesome cough particularly on turning to the right side,



Fig. 18.

(Case 8). Congenital cystic left lung in a boy of 11, bronchogram A. P. view.



Fig. 19.

(Case 8). Shows the condition after cautery pneumonectomy with a large discharging wound in the parietes.



Fig. 20.

(Case 8). Shows picture after complete removal of lung and after thoracoplasty required for closure of the wound.



Fig. 21.

(Case 8). Photograph of specimen of lung removed.



Fig. 22.

(Case 9). A case of bilateral bronchiectasis in whom lobectomy of left lower lobe was done. Picture shows bronchogram left lung A. P. view.

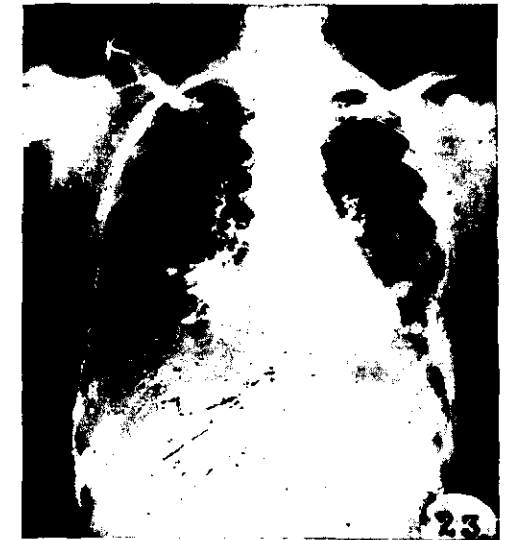


Fig. 23.

(Case 9). Bronchogram right lung A. P. view. For further details see text.

and very foul sputum in large quantities. He was extremely ill, emaciated and anaemic with 45% Hb. Investigation showed the condition to be one of infected congenital cystic lung. After several months of preparation with bronchoscopic aspirations, blood transfusions etc., a pneumonectomy was attempted but at operation the lung was found firmly fused with the parietes. A classical pneumonectomy was out of the question. A form of cautery pneumonectomy was performed removing with the diathermy knife a large lid of lung tissue exposed in the wound. His condition thereafter rapidly improved. He was practically symptom free. However, a large wound in the chest wall with the multiple openings of the various bronchi discharging muco-purulent matter externally was naturally very disgusting to the patient. To close this, several ribs were excised stage by stage, and ultimately the hilum was got at and the lung removed. Now, he has a very small opening in the chest wall and a pedicle graft has been raised to close the wound.

CASE 9. (Figs. 22 & 23). A case of bilateral bronchiectasis in a boy of 16 years, a compositor in a printing press on whom lobectomy was done on the more affected side. He came for recurrent attacks of cough with foul expectoration and fever, the attacks coming on at least twice a month for the past 6 years, more frequently during the last 6 months. Investigation showed

bilateral bronchiectasis of entire left lobe and right middle lobe. Lobectomy of the left lower lobe was performed. He is now perfectly free from symptoms (about 2 years after operation) and is back at his work, and this in spite of the fact that the right middle lobe has not been tackled. Indeed, bronchograms taken after the operation suggests that the bronchiectasis in the right middle lobe is retrogressing. However, it is too early to dogmatise on this point. Anyhow, more and more cases are being reported wherein retrogression of the less affected side follows surgical excision of the more affected side, i.e. our old idea that bronchiectasis is a progressive and irreversible disease may have to be revised.

CASE 10. (Figs. 24 to 26). Refers to a man of 40, a pointsman in the S.I. Ry. who came with a history of attacks of cough during the past 8 years. He had haemoptysis 20 days earlier. He had dyspnoea on exertion and clubbing of fingers. Investigation showed bronchiectasis of right middle lobe. Lobectomy was performed. The patient is now perfectly free from symptoms. The interest in this case is that the bronchiectasis was limited to the right middle lobe only, a localization that is known to occur but rarely.

CASE 11. (Figs. 27 & 28). Refers to a man of 29, a loco-fitter in S. I. Ry. with a history of attacks of cough and fever of one year's duration and occasional haemoptysis. Investigation showed



Fig. 24.

(Case 10). Bronchogram A. P. view (patient shown in Fig. 17) showing bronchiectasis right middle lobe.



Fig. 25.

(Case 10). Bronchogram lateral view.



Fig. 26.

(Case 10). Shows specimen of lobe removed. Note the extensive dilatation of bronchi.



Fig. 27.

(Case 11). Bronchogram A. P. view showing bronchiectasis right upper lobe.



Fig. 28.

(Case 11). Bronchogram lateral view.

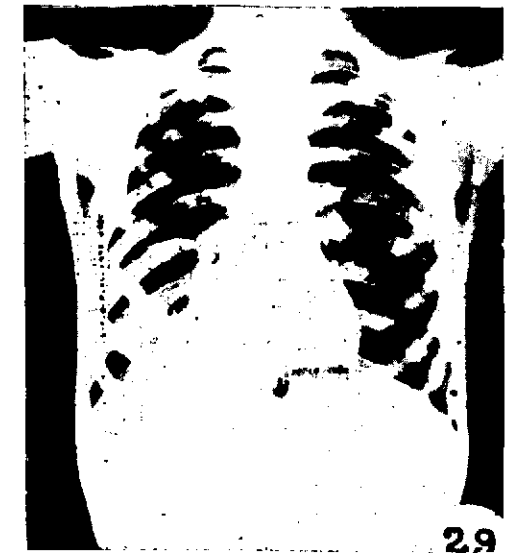


Fig. 29.

(Case 12). Skiagram showing a large cyst in a case of infected giant cyst of lung.

bronchiectasis of right upper lobe. As upper lobe bronchiectasis is thought to be often associated with tuberculosis, a very careful repeated examination of the sputum was done. At no time were tubercle bacilli found. A resection of the affected segment was done. The apex was densely adherent and caused considerable difficulty in mobilization. Considerable bleeding occurred from one of the veins in the depths. The vein was inaccessible and the bleeding had ultimately to be controlled with "Gel-foam." Post-operative course was very stormy mainly due to massive collapse of the rest of the lung. This was possibly contributed to by the "Lipiodol" that had remained in the big bronchiectatic cavity and had escaped into the healthy lung during dissection. Some infection of the pleural cavity also occurred and at drainage a portion of the lung came off as a slough. He is now alright but has still a small broncho-pleural fistula to close. The remaining lung has not yet completely expanded. In retrospect, I feel that lobectomy was performed too soon after the bronchograms. A longer wait, till the cavities got emptied of "Lipiodol" would possibly have resulted in a smoother post-operative course.

CASE 12. A child of 5 years was sent in extremely ill as a case of lung abscess. Drainage resulted in some improvement but further examination showed the case to be one of infected con-

genital cystic lung. The child was too ill to undergo a pneumonectomy and so a cautery pneumonectomy has been done on the lines mentioned in Case 8, to affect free drainage. The child is improving in general condition now and it is hoped ultimately that total pneumonectomy will become possible.

CASE 13. (Fig. 29). Refers to boy of 19 admitted in a condition of extreme emaciation due to long standing fever, cough and foul sputum. Investigation showed the condition to be an infected giant cyst of the lung occupying almost the entire right middle lobe. An anterior thoracotomy and free drainage resulted in rapid amelioration of the symptoms and improvement of general health. He may require a lobectomy as soon as his general condition permits.

CAUSE OF DEATH IN FATAL CASES

Two cases whose general condition was satisfactory at the end of the operation, gradually developed respiratory difficulty, increasing cyanosis, a persistently continuous fall of blood pressure which did not respond to transfusion and died in about 24 hours. No post-mortem could be obtained,

It was difficult to understand the cause for the fatal issue. The oxygen tents were working satisfactorily. As far as could be made out, the remaining lung on the operated side had expanded properly. There was some suggestion of oedema of the lung. Possibly this was due to large quantities of transfusion, but it was difficult to see how this transfusion could have been avoided in the face of a falling blood pressure. As judged by clinical signs there was no evidence of collection of fluid in the chest, if bleeding was the cause.

In a few cases, death occurred after the operation was completed and when the parietal wound was nearly closed. In these cases again respiratory failure occurred, followed almost immediately by cardiac failure. In all such cases very extensive adhesions existed between the lung and the parietes and release of adhesions was always a difficult and prolonged procedure, the time of operation in some having been as long as 6 hours or even more. Possibly such cases should not be selected for surgery or if such adhesions are unexpectedly met with, the operation should either be abandoned or modified methods such as cautery pneumonectomy adopted, followed months later by excision as was adopted with success in some very ill cases in the series. (Cases 8 & 12).

THE POSITION IN OUR COUNTRY

The present standard of thoracic surgery in our country is not as satisfactory as it obtains in some foreign countries. But we have numerous difficulties to surmount. majority of them really avoidable. One of the American authors writing on the subject of bronchiectasis says, that anaesthesia for surgery of bronchiectasis is one of the most difficult problems, that the anaesthetist encounters (Vest⁷). May I say, that our chief and initial difficulty is in getting trained anaesthetists themselves. It is one of the major problems we have got to solve and it will not be solved unless the post of anaesthetist is made more attractive by better conditions of pay and privileges.

I have no hesitation in saying that unless a team of workers, as constant as is possible, is at the job, satisfactory results cannot be obtained. In such a team a capable anaesthetist is the "better-half" of the surgeon. Even at the risk of weary repetition I would like to say to those who ask for results "give us the anaesthetists and we will give you the results" and I will also add "as is the anaesthetist so is the surgery".

The second chief difficulty is, that patients come almost always in the very late stages of the disease. Other difficulties like getting cyclopropane, necessary instruments and appliances are only too well known. I am however glad to say that difficulties in getting essential specialised instruments like powerful rib-spreaders, (Fig. 30) electric suction apparatus ("Steidman's pump") etc., have been solved to a certain extent by getting local manufacturers to make them (Fig. 31). My grateful thanks are due to Mr. Murthy, an engineer friend of mine and to Mr. Sankara Iyer of the "Iron & Brass Industries", Madras.

We are lucky in one way in our place, in having a very efficient blood bank service.

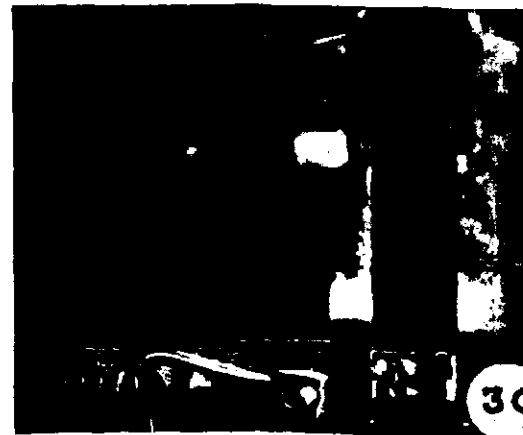


Fig. 30.

A Finochietto type of rib-spreader locally made.



Fig. 31. Two views of an electric suction apparatus made locally. The apparatus is intended to produce suction at low negative pressure and works smoothly for several days at a stretch.

CONCLUSION

We have had some successes by surgical treatment of bronchiectasis but the mortality rate still remains very high compared to the results in other countries. One of the main reason for this is the extremely debilitated condition in which the patients come for treatment and other causes that have already been mentioned.

My grateful thanks are due to all members of my team, senior and junior who have helped me wholeheartedly in the work, often-times under most trying conditions. My thanks are also due to Mr. Murthy & Mr. Sankara Iyer already mentioned, to Dr. Betts who kindly loaned the instruments as samples for manufacture, to Dr. Rebello and his team, of the blood bank service, to Dr. Daniel, the radiologist, to Mr. Anthony the artist and to all my colleagues — surgeons and physicians in the hospital (particularly Dr. K. S. Sankariv & Dr. R. Subramanyam) who gave me a measure of co-operation that always sustained me in his troublesome task and made it a pleasure.

BIBLIOGRAPHY

1. Brunn, H. B., Arch. Surg. 1929, XVIII, 490.
2. Lee Lander, F. P., 'Bronchiectasis' — Brit. M. J., Dec. 30. 1950 (pp. 1486-1488).
3. Nelson, H. P., Postural drainage of the lungs. Brit. M. J., Aug. 11. 1934 (pp. 251-255).
4. Osler, Sir William. Quoted by J. E. H. Roberts in Brompton Hospital Report 1936, p. 62.
5. Roberts, J. E. H. & Nelson, H. P., 'Pulmonary Lobectomy'. Brit. J. Surg. Vol. XXI.
6. Shenstone, N. S. & Janes, R. M., Canad. Med. Assocn. Journal, 1932. Vol. XXVII, 138.
7. Vest, James C., The Surgical Clinics of North America, Oct. 1950. Vol. 30, No. 5, p. 1299-1313.
8. Young, R. A., 'Advances in treatment of diseases of the Respiratory System' — The Practitioner, October 1934.

DISCUSSION — LUNG ABSCESS & BRONCHIECTASIS

C. S. PATEL (BOMBAY) said that he used mass ligature and tourniquet method for pneumonectomy and gave some details. He also used individual ligature, but has not used large quantities of blood. In his opinion, operative surgery is at present not necessary in lung abscess.

A. V. BALIGA (BOMBAY) showed x-rays of a case of lung abscess secondary to hydatid cyst of the liver. The pathologist had suggested the diagnosis of hydatid cyst from the examination of the sputum. He gave details of two cases of lung abscess treated with pneumonectomy and drainage and one case of lower lobe bronchiectasis treated with lobectomy. He used smaller transfusions.

K. PAW (VELLORE) gave some of his impressions on the surgical treatment of bronchiectasis and lung abscesses based on experience gained on the thoracic surgical service of Dr. R. H. Betts at the Christian Medical College Hospital, Vellore. All will agree that the only satisfactory treatment for well established bronchiectasis is pulmonary resection. Likewise in the type of pulmonary abscess that is seen by the surgeons in this country external drainage is being supplanted by resection with a marked diminution in morbidity as well as mortality. During the past two years and four months they had treated by drainage only three pulmonary abscesses, while during the same period they had resected part or all of a lung in 26 cases. In this same period a total of 107 resections were done for varying indications. 42 of these were for bronchiectasis and cystic disease of the lung.

Diagnosis

In reviewing the 68 cases of bronchiectasis and lung abscess they had found some common features regarding the symptoms. The following were the presenting symptoms noted:—

Cough:	Bronchiectasis	100%
	Lung abscess	100%
Expectoration:	Bronchiectasis	94%
	Lung abscess	100%
Fever:	Bronchiectasis	32%
	Lung abscess	50%
Haemorrhage:	Bronchiectasis	23%
	Lung abscess	50%
Pain:	Bronchiectasis	nil.
	Lung abscess	1%
Dyspnoea:	Bronchiectasis	nil.
	Lung abscess	1%

Thus cough and expectoration, usually associated with foul smelling sputum were the commonest complaints, then fever which was more common in lung abscess as was haemorrhage. Chest pain is an infrequent presenting symptom, but many admit chest discomfort on direct questioning.

They routinely did a bronchoscopic examination and bronchographic study on all cases where a diagnosis of bronchiectasis was suspected. Complete filling of all segments was necessary and special attention paid to the filling of all uninvolved segments. Usually a complete study can be done at one examination with only 20 ccs. of "Lipiodol." If any segments are not filled a subsequent examination is indicated. Bronchoscopy is done on all cases of lung abscess, but bronchography is not always necessary.

Preoperatively the patients were treated by bed rest, continuous postural drainage and, where indicated, chemotherapy in an attempt to get them in the best possible condition. In many of the abscess cases they have not been able to get them afebrile preoperatively even with all such measures plus repeated bronchoscopic aspirations.

Operation

Apart from the many technical points of the operation he would like to stress the following factors:

Position of the patient: They very much preferred the prone or face-down position and employed the Overholt-Comper operating table. Formerly they did not use this position for small children as they could not be stabilized on the Overholt-Comper table, but recently they had constructed two platforms that would fit on any table and had found it satisfactory. The youngest child operated upon in this position was one year and four months old. They preferred the prone position for the following reasons:

- (1) Gravity drainage of the secretions is toward the trachea and contra-lateral spill is less likely.
- (2) There is no restriction of excursion of the thoracic cage and diaphragm as in the lateral position.
- (3) Mediastinal swing is minimised.
- (4) Intrabronchial positive pressure is not necessary to maintain proper oxygenation.
- (5) The exposure of the posterior aspect of the hilum is facilitated and thus the bronchus can be tackled first and ligated in those cases with abundant secretion.
- (6) Cardiac irregularities including bradycardia and cardiac stand-still have been markedly diminished.

In this series of resections there had been only one instance of contra-lateral infection.

Blood: The routine use of a sufficient amount of blood as part and parcel of the operation was a necessity. For all resection cases 4 to 6 pints of blood were secured before the operation was

started. Though some patients do not require more than three pints, some, indeed most, of the patients need more. While the paravertebral block and endotracheal intubation were being done with local anaesthesia, they cut down on one of the ankle veins and a cannula was inserted. Blood transfusion was started as soon as the incision was made. The rate of the flow depended upon the pulse rate, blood pressure during the operation and the amount of blood loss. An attempt was made to replace the blood volume as rapidly as it was depleted. In one case they had to use 10 pints of blood during the operation though the whole procedure, a pneumonectomy, took barely three hours and there had not been undue haemorrhage during the course of dissection. They believed that some of their earlier fatalities were due to insufficient blood being used.

Postoperative Management

Oxygen therapy: Most cases of resection were given intranasal oxygen at the rate of 4-5 litres a minute for the first 12-24 hours.

Tracheo-bronchial aspiration: Introduction of a catheter into the trachea and bronchi after the manner of Haight was a simple procedure that was often life saving. Whenever the patient complained of dyspnoea, had diminished breath sounds or failed to cough and raise pulmonary secretions they carried out intrabronchial aspiration at once. They were convinced that in a number of cases the procedure had been life saving.

Intrapleural aspiration: In certain cases aspiration of fluid or air in cases of pneumonectomy has been a necessity. Many cases developed dyspnoea a few hours after pneumonectomy and on examination the trachea was found pushed to the opposite side and the patient was in acute distress. The aspiration of the pleural cavity removing either air or fluid immediately corrected the situation. In pneumonectomy cases that were not drained the intra-pleural pressure on the operated side had to be adjusted as indicated to maintain the mediastinum in the midline. The frequency of aspiration of air or fluid was determined by the rapidity with which the hemithorax fills with serum. Usually such cases will need aspiration at least once a day for the first three to four days.

Results

In the two years and four months since the first pulmonary resection was done on their service there had been a total of 107 resections carried out. The results in the first 26 of these cases had been reported previously. The mortality rate had been reduced in the latter part of the series as certain difficulties were surmounted. They believed the use of adequate amounts of blood had been the most important factor in improving their results. In the total series of 107 cases there had

been 14 postoperative fatalities, a mortality rate of 12.1%. This was a considerable reduction from the mortality rate of 19.2% for the first 26 cases. In the past 4½ months there had been 42 pulmonary resections with two deaths, a mortality rate of 4.8%. One of these fatalities was a case of very advanced cancer of the lung in which they were attempting a palliative resection which necessitated removal of part of the right auricle as the tumour had grown into the inferior pulmonary vein. The other fatality in this last series was a child of two on whom a pneumonectomy was done for multiple lung abscesses. In some manner which they were unable to explain the oesophagus was injured at the time of operation but was not recognised and the child subsequently died from this injury.

Considering only the bronchiectasis cases there were 42 patients with 6 deaths, a mortality rate of 14.3%. For lung abscess there were 26 resections with two deaths, a rate of 7.6%.

Adequate preoperative preparations, the use of local anaesthesia with intubation under cocaine anaesthesia, the employment of the prone position, adequate blood transfusions and meticulous post-operative care were, in their opinion, of utmost importance.

K. G. MUNSIF (BOMBAY) referred to a case where the cause of the lung abscess was a foreign body swallowed at the age of 2. The patient came to the hospital at the age of 17 with a history of haemoptysis. Tubercle bacilli were also found in the sputum; the case was treated with resection. He wished to know about post-operative pain and its treatment.

V. P. MEHTA (BOMBAY) referred to the use of intravenous procaine 10 c.c. of 0.1% solution, repeated if necessary, and said that it gave a comfortable anaesthesia. He gave as much blood as was lost (and a little over) estimating the blood loss by the gravimetric method. Phrenic crush has helped in diminishing movement and in filling up the empty space. In his opinion increased blood pressure is a sign not of increased vasoconstriction but of faulty oxygenation. The oxygen tent, he thought, was not comfortable for the patients and preferred the open catheter method.

B. N. SIRCAR (BOMBAY) spoke of the anaesthetic problems in connection with pulmonary surgery and referred to the use of controlled respiration to prevent paradoxical respiration.

B. RAMAMURTHI (MADRAS) wanted to know the percentage of brain abscess in pulmonary suppuration. He suggested routine ophthalmoscopic examination so that cases of brain abscess may not be missed.

R. MAHADEVAN (MADRAS) replying to the discussion, said "Dr. Patel said that he has operated several times soon after taking bronchograms and

that no complication like massive-collapse arose. All that I say is that he and his cases have been lucky, but that he will be well advised not to persist in operating soon after bronchograms. It is advisable to wait for 6 to 12 weeks after a bronchogram before a major thoracic operation is undertaken.

"Bronchograms of both lungs can be taken at a single sitting, but the shadows may overlap and cause confusion unless stereoscopic pictures are taken. If time permits, it is better to take skiagrams at two different sittings, the second side being done about a fortnight after the first. 20 c.c. of lipiodol is not required to bring out the bronchial tree. 12 to 15 c.c. is ample. "Neohydrol" being thinner gives better pictures than when "Iodotol" is used. Whatever solution is used it is better to warm it up before instillation.

"B.L.B. mask may be used in place of oxygen-tent, but the patients on whom I tried B.L.B. mask preferred the oxygen-tent, particularly the children. Where oxygen-tent or B.L.B. mask is not available, nasal catheter may be used. In that case, the catheter must be pushed up to the pharynx and oxygen must be given at the rate of 6 litres to the minute. Merely keeping the catheter just into the ala of the nostril — a thing which one sees all too frequently in the wards — and not giving oxygen at the rate mentioned cannot be expected to do any good.

"The "Overholt" face-down position has great advantages, but many patients did not feel quite comfortable in the position, possibly because of the improvisations that had to be made with the Albee-Comper orthopaedic table, as we had no "Overholt" table.

"I have had no experience with intra-arterial blood-transfusions.

"When I talked of rise of blood pressure as an indication of oncoming shock I wanted to draw attention to a phenomenon which sometimes occurs and which is not well known. It may not occur in every case.

"Where oedema of lung was suspected, bronchoscopic aspiration was done in addition to various other well known measures to deal with the complication. It was difficult to decide how far bronchoscopic aspiration helped, as no post-mortem could be obtained in the fatal cases where oedema was thought to be a contributory cause to the fatal issue.

"Post-operative Pain: Immediate post-operative pain may be allayed by morphine and allied group of drugs given in liberal doses short of causing abolition of cough reflex. In the later stages, if pain persists, particularly if it is of the nature of an intercostal neuralgia, an intercostal nerve might have been caught in sutures. Such pain may

be relieved by novocaine injections or more effectively by proctocaine. I have not used intravenous procaine and so can give no opinion as to its value.

"In the series of bronchiectasis or lung abscess cases under my care, there was just one case where a metastatic brain abscess was suspected. This was in a young girl admitted very ill with a large lung abscess of lower lobe. She had been ill at home for several weeks and was admitted in a drowsy state and had ptosis. She died soon after admission but autopsy could not be obtained."

S. J. MEHTA (BOMBAY) replying said that he did not agree with Dr. C. S. Patel that no surgical treatment for lung abscess was necessary, if antibiotics are used. In his series, 25 patients out of 69, would not have survived but for the surgical intervention. Antibiotics were used freely in all cases. The lesion was spreading, and life was in danger. Foreign bodies had to be removed. Acute putrid lung abscesses require drainage; chronic lung abscess required lobectomy or pneumonectomy.

He agreed with Dr. Baliga that a lung abscess after external drainage heals rapidly, the general condition of the patient showing a spectacular improvement. His (Dr. Baliga's) statement that large transfusions were only necessary when there has been a copious bleeding whilst tying the pulmonary vessels, was not true. In none of his lobectomies or pneumonectomies had there been either furious bleeding from adhesions, or any mishap in dissecting and tying the pulmonary vessels.

He agreed with Dr. Key Paw from Vellore that large transfusions have lowered the mortality of these operations. The suggestion from Dr. Mahadevan that pulmonary oedema may occur after large transfusions, is in his experience not correct.

"Patients requiring lobectomies and pneumonectomies with marked adhesions, are suffering from chronic sepsis; their vital capacity is very much lower, the operation may take a long time. Such patients behave much better in the post-operative period, if the blood pressure and pulse rate are maintained throughout the operation by transfusion.

"The amount of blood transfusion does not depend on the external blood loss, but on the blood pressure and pulse rate."

After pneumonectomy one of his cases had to be aspirated on three occasions for marked respiratory embarrassment as a result of a large collection of pleural fluid displacing the mediastinum and trachea.

Repeated tracheal aspiration is done as many times as necessary during the post-operation period.

He differed from Mr. V. P. Mehta in oxygen therapy by a nasal catheter. The oxygen gas impinges on the mucous membrane of the nasopharynx and may produce an ulcer. Accidents have been reported by the oxygen going into the stomach and rupture of the stomach occurring (Lahey Clinic). The old oxygen tent was cumbersome and the patients did not like them, but if the modern oxygen tent is available it is quite comfortable and beneficial. B.L.B. mask is very useful in the absence of a tent.

Mr. V. P. Mehta has misunderstood Mr. C. S. Patel about the use of procaine. He does use intravenously procaine in a saline drip.

"As regards the phrenic crushing, he has again misunderstood me; I never crush the phrenic in lobectomies for the reason given by me earlier.

"In pneumonectomies, it should be always crushed to diminish the space.

"As regards the percentage incidence of involvement of the brain in lung abscess, I have had only one case. Routine fundus examinations in this series have not been done."

CAROTID BODY TUMOURS

by D. SUNDARASIVA RAO and K. S. SAMPATH, Madras.

The rarity of carotid body tumours in Indian Literature is too well known to be stressed. Hence we like to put this only case of ours on record.

CASE REPORT

Mrs. S., aged 20 years was admitted on 29-3-'50 for a swelling on the left side of the neck, just below the angle of the mandible, of one year's duration. The swelling was gradually growing and causing no inconvenience to the patient except for the disfigurement. Local examination revealed a slightly irregular, firm, pulsatile, longitudinally situated tumour, measuring 4" x 2", deep to the upper part of the sterno-mastoid in the line of the carotid sheath. It was moveable from side to side and not longitudinally in the line of the big vessels. The tumour was slightly tender and expansile impulse was present. The pulsation diminished in intensity on proximal pressure on the carotid artery. A well marked 'bruit' was heard over the tumour. There was no evidence of pressure symptoms. Examination of other systems revealed nil relevant.

The clinical findings — namely expansile impulse, gradual increase in size, diminution of the impulse on proximal pressure and a well heard 'bruit' — were very well fitting for an aneurysm

but none the less, due to the irregularity of the tumour and the situation, carotid body growth was also thought of as a possibility.

On 25-4-'50 with a diagnosis of an aneurysm of the carotid artery, under general anaesthesia the left common carotid artery was ligated, by Dr. K. C. Nambiar. Convalescence was uneventful. At first there was a slight diminution of the size of the tumour with disappearance of pulsation; and 'bruit' for about five days. Later both pulsations and 'bruit' returned gradually to the pre-operative intensity in about a fortnight. Throughout, the tumour never decreased in size as assessed by measurements around the neck at the level of the tumour.

So the alternative diagnosis of a carotid body tumour was thought of and treatment planned accordingly. On 3-6-'50, under general anaesthesia, the tumour was removed by Dr. K. C. Nambiar. A vertical incision was made extending from the lobe of the left ear to one inch above the left sterno-clavicular joint. The tumour was found adherent to the overlying sternomastoid and platysma and the subjacent pre-vertebral muscles from which it was separated only with great difficulty. The internal jugular vein and the common carotid were seen entering the tumour at its lower pole. The tumour was completely encircling the big vessels. The sterno-mastoid had to be sacrificed for the complete excision. The tumour was removed and the wound was closed in layers. Convalescence was uneventful. After a course of



Fig. 1. Shows external appearance of the tumour removed.



Fig. 2. Cut section of the tumour showing the big vessels traversing the tumour longitudinally.



Fig. 3. Photomicrograph shows section from the tumour illustrating the carcinoid appearance. (x 50)

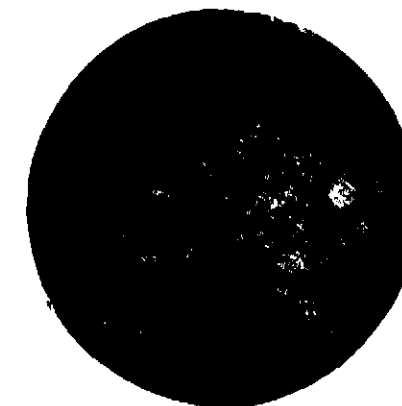


Fig. 4. Photomicrograph same as Fig. 3. (x 250)



Fig. 5. Photomicrograph shows section from the tumour showing the peritheliomatous arrangement. (x 50)

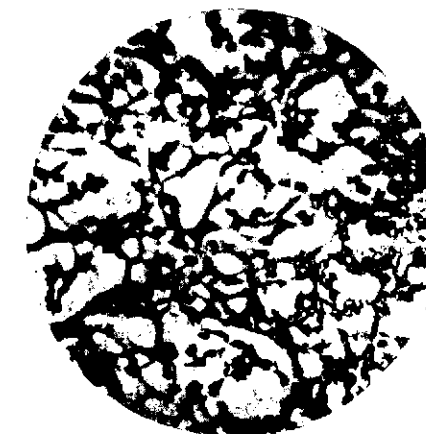


Fig. 6. Photomicrograph same as Fig. 5. (x 250)

deep x-ray therapy the patient was discharged in good condition on 1-8-'50.

Pathology Report by Dr. G. D. Velith. The specimen (Fig. 1) was an irregular, oval, lobulated and nodular firm tumour, weighing 54 gms. and measuring 5.5 cm. x 4.5 cm. x 2.5 cm. Cut section (Fig. 2) showed the vessels coursing through the tumour longitudinally. The cut surface, rather soft and vascular, showed greyish and yellowish white areas.

Microscopically, (Figs. 3, 4, 5 & 6) the tumour is very cellular and vascular. The cellular pattern is varied in different parts of the growth. The cells are poly-hedral with eosinophilic cytoplasm and round or oval nuclei. In some they are arranged in irregular groups separated by minute blood

vessels and fibrous stroma. In other areas the cell arrangement is more diffuse with blood vessels practically coursing between single rows of cells. No giant cells are seen. There is no evidence of chromaffin reaction.

Diagnosis: Carotid body tumour.

DISCUSSION

The carotid body was described by Von Haller in 1743 as *ganglion minutum*. Later Andersch¹ redescribed the same structure as *ganglion intercaroticum*. Luschka³⁰ gave the histological description and suggested the possibility of tumour formation from

the same. Riegner³⁹ was the first to remove a carotid body tumour, but the first concise description of the growth was by Marchnad³². Since then cases have been added on and reviews on the subject appeared from time to time, each author stressing on the rarity of the tumours, as they were often diagnostic riddles both to the clinician and pathologist. The most outstanding reviews were those of Keen²², Reid³⁸, Phelps, Case & Snyder³⁶, Bevan & McCarthy² and Gratiot¹⁸. Apart from these collective reviews every contributor on the subject made short reviews. MacComb³¹ estimates the total number of recorded cases as about 300 and adds ten of his own. Donald and Crile¹⁰ reported five cases. Lewison & Weinberg²⁹ added one more with familial incidence. Monro³⁴ adds five more proved cases. Thus the total comes up to about 326. The small total number of cases and the small series each observer has contributed brings out very well the rarity of these tumours. This is the second case reported from this hospital, the first record being by Krishnaswamy & Rao²⁶. Two cases were reported by Khanolkar²³ and Bhende³, both from S. G. S. College, Bombay.

Gross Anatomy: The carotid body is a greyish or reddish encapsulated glandular structure of the size of a rice grain or smaller, situated at or near the bifurcation of each common carotid artery. It is inconstant in the human body. Funke¹² found a carotid body in one out of eight fetuses dissected and that too on one side only. It grows up to 20 to 30 years. After that, the epithelial tissue gets replaced by fibrous tissue resulting in an atrophy of the structure. It is attached commonly to the external carotid artery by a vasculo-fibrous strand from which it derives its rich vascular supply. Venous drainage is into the lingual, pharyngeal and superior laryngeal veins. It receives its para-sympathetic from the glosso-pharyngeal and vagus, and sympathetic from the superior cervical ganglion.

Functions: The carotid body is not essential for life or good health. A variety

of functions which were attributed to these glands on experimental evidence in cats, rabbits, horses etc., have not been confirmed and are not conclusive. They are sensory or chemoreceptors and are stimulated by such changes as lowered oxygen tension, increased carbon dioxide concentration, decreased pH, increased blood temperature and certain drugs as cyanides, sulphides, nicotine, lobeline & papaverine. The physiological response is that of increased sympathetic and cerebro-cortical activity. This is in marked contrast with the function of the carotid sinus which responds mainly to the arterial pressure changes. On account of the chemoreceptor mechanism Goldberg¹⁴ suggests that the body may be a derivative of the gill cleft mechanism of fish. According to the Mayo-Clinic report of 1941 "the carotid body is no longer considered part of the internal secretory system and the function whatever it may be is negligible since both carotid bodies can be enucleated without any manifest symptoms."

Histology: The structure is a complex one. There are groups of large polyhedral epithelial-like cells with homogenous, pale, faintly granular eosinophilic cytoplasm. The nuclei of these cells are oval, eccentric and show a well marked nuclear membrane. These cells are arranged in cords or alveoli without lumina. The gland is divided into a number of lobules by fibrous septa penetrating from the capsule and carrying a rich vascular and nerve supply. The capillaries are lined by hyperplastic endothelium, which in areas form solid cords. Distributed among the epithelial-like cells and the endothelium are inconspicuous ganglion cells with nerve fibres which end in special end organs. This finding is not universally accepted. There is no evidence of internal secretion.

Embryology: Kohn²⁵ first described it as arising from the sympatho-chromaffin system. His view of the affinity of the cells to chromic salts has not been confirmed in human beings. According to Boyd⁵ the carotid body develops from the mesoderm

of the 3rd branchial arch and receives early connections from the arteries of that arch and neurectoderm of the glossopharyngeal of the same arch. Elements from the vagus and the sympathetic are incorporated later. Some hold that it develops from the epithelium of the pharynx and yet a fourth school thinks that it develops from the endothelium or adventitia of the carotid artery.

Pathology: The only pathological condition known, associated with the carotid body is a neoplasm. The commonest, involving the epithelial like cells, is called the carotid body tumour. Apart from the carotid body tumours, other neoplastic growths like neurofibromas (Goodsitt & Sudimack)¹⁶ and fibro-lipomas are also found associated with the carotid bodies. Macroscopically, these neoplasms are rounded, nodular and usually encapsulated, varying in size from 2—10 cms. in the largest diameter. The average weight is about 50 gms.; the largest on record being that removed by Reid³⁸ weighing 190 gms. The growth may encircle, partly be attached to or infiltrate the carotid arteries. They are usually unilateral. Multiplicity of these tumours is rare. Gratiot¹⁸ found five bilateral cases recorded. Recently three more cases of bilateral incidence were added by MacComb³¹, Donald & Crile¹⁰ and Lewison & Weinberg²⁹. Apart from bilateral tumours simultaneous occurrence of similar tumours in other areas is recorded. Cragg⁷ reports simultaneous occurrence of tumours in the organ of ZuckerKandl and the carotid body. Gilford & Davis¹³ described a carotid body tumour with a nodule in the liver resembling the same. Their diagnosis of the carotid body tumour itself is not accepted—Monro³⁴. Goodof & Lischer¹⁵ recorded a carotid body tumour with a histologically similar lesion in the body of the pancreas. Rosenwasser⁴¹ described tumours of the carotid body type arising in the left middle ear and mastoid process. Simultaneous chromaffin tumours of the right carotid body and left glomus jugularis were noted by Kipkie²⁴. In the

same year Le Compte et al²⁸ described a case of tumour of the carotid body type arising in the middle ear and considered their possible origin from the glomus jugularis as proposed by Rosenwasser. Tumours from aortico-pulmonary glomera in the mediastinum having an identical structure to that of the carotid body tumours were recorded by Bloom⁴ and Monro³⁵. Familial incidence of cases were noted by Chase⁶ and Lewison & Weinberg²⁹. The tumour varies in its extensions. It may reach the base of the skull as in the case reported by Ian Robin²¹, where the growth had to be chipped off the bone. The growth may be outwards and laterally when it would be obviously visible or it may grow into the pterygo-maxillary space and point towards the pharynx above or larynx below. In Donald & Criles¹⁰ series in one case the tumour filled the right tonsillar fossa and encroached on the uvula. The tumour pointed into the postero-lateral wall of the pharynx, the biopsy from which was diagnosed as epithelioma grade II, in a case reported by MacComb (loc-cit.).

The cut surface reveals a highly vascular grayish red or brown tumour with intersecting hyalinised fibrous septa. Microscopic picture varies in different areas. The tumour is composed of polyhedral cells arranged in alveoli or syncytial masses. The eosinophilic cytoplasm may be vacuolated or granular. Some of the nuclei are solid and basophilic while others are vesicular containing one to three nucleoli. Mitotic figures are not common. The fibrous tissue of the stroma is acellular and does not usually take part in the tumour formation. The capillary endothelium proliferates forming syncytial buds which may either project into the lumen or may grow into the surrounding tumour tissue. The stroma is highly vascular, at times the big sinusoidal spaces giving a cavernous appearance. Around the alveoli of tumour cells are scattered small undifferentiated cells known as sympathogonia. Ganglion cells are also described. Giant cells may be found occasionally. Chromaffin reaction is irregular and its specificity has been ques-

tioned. No epinephrine is found in these tumours. Degenerative changes are fairly common and affect both the stroma and the epithelium. Depending upon the cellular pattern, vascularity and hyaline changes in the stroma, Harrington et al¹⁹ divide them into two groups: (1) Alveolar type—where large islets of polyhedral cells are separated by vascular fibrous tissue and (2) Peritheliomatous—where the smaller and irregular cells are aggregated in small rests or columns in a radial fashion around the vascular spaces and separated by hyalinised stroma. Monroe³⁴ adds a third variety called the reticular type where the cells are spindle shaped and branching and are rearranged in sheets with intersecting vascular spaces. Once malignancy supervenes the cells lose their orderly adherence to pattern and run wild. Hyperchromatic nuclei and mitotic figures with occasional multinucleated giant cells may be seen. This anaplasia is the cause of their being mistaken for carcinoma occasionally.

Malignancy: The majority of the tumours are slow growing and benign. The recorded cases show a preponderance in males. Local recurrence rate is put up by various authors from 7% to 30%; the higher rates probably being due to long survival periods. Regional lymph gland metastasis has been accepted by all. Distant metastasis in verified cases are recorded; but few only. In this connection case I of Donald & Crile's¹⁰ series is of interest. The patient was operated on for a carotid body tumour confirmed histologically. Later he had two laminectomies on different occasions for obstruction due to similar tumour growths in the vertebral canal. There was a generalised metastasis present in ribs and manubrium with rarefaction and osteogenic lesion in the ileum. No autopsy was done. In view of the records of simultaneous occurrence of the chromaffin tumours in different parts of the body, it would be difficult to say whether this should be considered as generalised metastasis or only an example of the former. The case recorded by Prendergrass & Kirsh³⁷ of carotid body

tumour with secondaries in the liver, lungs and bones proved histologically on post mortem, is convincing of the true malignant nature of the tumour. In this particular case the tumour was mistaken for an aneurysm clinically. In MacComb's³¹ series of five malignant carotids, the malignancy supervened in tumours of short duration only—one to two years in four cases and 13 years in one where it was a bilateral malignant pharyngeal tumour. The ages of the patients varied from 20 to 52 years thus showing no age predilection for the onset of malignancy.

The aetiology of the tumour is unknown. Age incidence varied from 7 to 73 years. Wossnessenski⁴³ records a case in a child aged 6 months. The majority are between 25 and 60 years. Both sexes are equally affected though certain authors have reported a preponderance in males. Both sides are equally affected. Dickinson et al¹⁹ and MacComb³¹ recorded left sided preponderance—3 to 2 and 3 to 1 respectively in their series of cases.

Opinions regarding the histogenesis of the tumour are varied and this is reflected in the variety of names given to these tumours, namely—endothelioma, angiosarcoma, fibroangioma, perithelial haemangioma, haemangioma, neuroblastoma, sympathoblastoma, pheochromocytoma, pheochromoblastoma, hamartoma, sympathetic naevus, adenoma, hyperplasia of the carotid gland, paraganglionoma, carcinoid, cartoid body tumour etc. From the long list of names given it may be deduced that the tumour is supposed to arise from the chromaffin system, the neuroepithelium, the glomus type of structures and a variety of other precursors.

Clinical Features: The presenting symptom is commonly a painless slowly growing tumour in the neck. The duration extends over years, even over 30 years. Usually it is situated at or near the bifurcation of the carotid artery but may be even below the bifurcation as in the case of Rossing⁴².

Hoarseness of voice and dysphagia would be the presenting symptoms when the tumour grows into the pharynx and larynx as already stated. Repeated pharyngeal haemorrhages were the complaint in case IV of Donald's & Crile's series (loc-cit). Ligation of the carotid artery had no effect on these haemorrhages. The tumour is soft or firm, lobulated and gives a transmitted pulsation. Depending, however, on the vascularity and cavernous like condition, an expansile impulse and a 'bruit' may also be present. The expansile pulsation often associated with a systolic murmur is the cause of these tumours being mistaken for aneurysm as happened in our case. Horner's syndrome is a rare accompaniment.

Constitutional disturbances are uncommon. Cardio-inhibitory and vaso-depressor types of syncope have been recognised and are probably due to pressure on the carotid sinus and not a direct result of the tumour. The former is characterised by sudden vagal inhibition of the heart, with marked fall in blood pressure, resulting in a ventricular standstill. This is counteracted by atropine. The latter is marked by cerebral anaemia resulting in unconsciousness brought about by a marked lowering of blood pressure. This is treated by drugs like epinephrine and "benzedrine". A pure cerebral type without alteration of cardiac rate or blood pressure is described but not agreed upon by all authorities. Osteomalacia and diffuse yellow pigmentation of the skin are also associated with these tumours occasionally. Concomitant conditions like tuberculous glands (K'Swamy & Rao²⁶) or secondary carcinomatous glands also may be present.

Diagnosis: Comparatively more number of cases are diagnosed clinically nowadays. 25 out of 150 were diagnosed clinically according to Goldberg¹⁴. Four out of ten in MacComb's series were predicted correctly. Reid³⁸ recited the dictum "there is no other growth in the neck which catches, fixes and carries the carotid artery with it."

Apart from the commoner cervical tumours like secondaries, tubercular lymphadenitis, aneurysms etc., the most important to be differentiated are the branchial cyst, neurofibroma and an aberrant single thyroid. They are all, in common with the carotid body, single, mobile and laterally situated tumours. The branchial cysts are usually below the carotid notch and tend to bulge outwards and upwards. Aberrant thyroid is in front of the sternomastoid in relation to the internal jugular vein. Both these do not enlarge under the jaw. To differentiate a neurofibroma is rather difficult. Histological confirmation is the final authority. This is so important that Hertzler²⁰ insists on photo-micrographs being published along with case reports. The following clinical criteria may be of diagnostic value:—(i) A firm, oval, cervical tumour of long duration situated at or near the bifurcation of the carotid artery. (ii) The tumour exhibits a pulsation which may be expansile or transmitted. This is a very important characteristic feature which differentiates them, from other fluctuating swellings like cold abscesses and branchial cysts. (iii) Usually shows a free lateral mobility but mobility is limited in vertical direction.

Biopsy: Experience seems to be varied. Punch biopsy is definitely deprecated. Lahey et al²⁷ remark "malignancy is not easy to demonstrate in ordinary aspiration biopsies; it is imperative therefore that adequate biopsy specimens be secured for the pathologist". Arteriography helps only in excluding an aneurysm which is not certain clinically.

Prognosis: It depends on the extent and direction of growth of the tumour. Involvement of carotid vessels and malignancy add to the mortality rate. According to Goldberg¹⁴ the operative mortality is 15% without ligation and 30% when the artery has been tied. In this connection it must be remembered that age and length of history are no guide as to whether malignancy has supervened.

Treatment: The necessity for surgical intervention is well brought out by the following figures given by Monroe³⁴ in his excellent survey of the natural history of (223 cases) these tumours with a view to arrive at a plan of treatment to cover all eventualities. Death attributable directly to the progressive growth of the carotid body tumours treated inadequately or untreated is 30%. Death due to recurrence in cases where radical measures were undertaken was 7.5% and 3% in those with and without resection of the carotid fork respectively. Overall operative mortality is only 15%; hence the necessity for surgical intervention. The operative mortality of 6.5% in cases treated by simple dissection compared to 29% in those treated with excision of the carotid fork also makes exploration and simple excision of the tumour only, the operation of choice.

The risk of cerebral aftermaths following ligation or excision of the carotid artery is so high that the majority of surgeons prefer to leave the carotid alone. The white line of cleavage between the adventitia and the tumour can be made out easily with careful and patient dissection (Gordon Taylor¹⁷). Hertzler (loc-cit) came to the same conclusion after dissecting on operated specimens in the laboratory. In those cases where carotid excision is imperative due to malignant changes in the tumour as shown by biopsy, the possibility of an impending deficient collateral circulation can be predicted by electro-encephalographic studies, (Lambert Rogers⁴⁰) and by the method of Matas³³. Preoperative preparation of the patient is essential. Collateral circulation can be increased by gradually working up the patient to stand periodic, complete carotid compression for a period of ten minutes, thrice a day, without symptoms, (Matas³³, Lahey et al²⁷). The same partial preliminary occlusion of the carotid can be produced by a ligature tied over a fascial strip (Dandy⁸). If however the electro-encephalographic studies show a deficient collateral circulation and the tumour is inoperable at operation, Gold-

berg¹⁴ prefers x-ray therapy to radical surgery. Vascular anastomosis of the common carotid with the internal carotid after resection of the bifurcation (Enderlen¹¹) and venous grafting were tried with success; but are not to be preferred to the pre-operative methods already described to enhance collateral circulation.

The functional reserve of the collateral circulation is not enough in certain cases when the patient assumes erect posture early during the post-operative period. To lessen the incidence of ischaemic fatalities the patient must be nursed for the first week or ten days in a Trendelenburg position. Delayed hemiplegia due to thrombo-embolic phenomena, can be prevented by a routine administration of anti-coagulants to these patients.

Radiotherapy: It proved effective in so small a number of cases as to exclude its use as a routine treatment of choice. Its use should be restricted to those refusing operation or in inoperable cases as already mentioned above.

The management of an average case may be summarised as follows:—

1. Treatment is always operative.
2. Pre-operative treatment of the patient to establish and enhance carotid collateral circulation is essential.
3. Simple dissection of the tumour with preservation of the carotid fork is the method of choice.
4. Excision of the carotid fork in cases of malignancy may be done.
5. In those cases where collateral circulation is defective and the carotid resection is imperative, vascular anastomosis and venous grafting are to be done.
6. Post-operatively all cases should be nursed in Trendelenburg position and anti-coagulants should be administered.
7. Radio-therapy is resorted to only in cases of inoperable tumours or where operation is refused.

SUMMARY

1. A case of carotid body tumour in a female is recorded.
2. A brief review of the clinico-pathological and therapeutic aspects of the same is made.
3. Pitfalls in the clinical and histopathological diagnosis of the tumour are pointed out.

We are indebted to Dr. K. C. Nambiar, F.R.C.S. (Eng. & Edin.), Professor of Clinical Surgery, Stanley Hospital, Dr. G. D. Veliah, M.D., D.T.M., Professor of Pathology, Stanley Medical College, Madras for the very helpful criticisms and permission to use the material for the preparation of this paper. Our thanks are due to Dr. P. Arunachalam, M.D., M.R.C.P., T.D.D., D.T.M., Superintendent, Stanley Hospital and Dr. J. C. David, M.B.B.S., Ph.D., Surgeon General with the Govt. of Madras, for kindly according permission to publish the same.

REFERENCES

1. Andersch (1797). Quoted by Bevan, A. D. & McCarthy, E. R. 1929.
2. Bevan, A. D. & McCarthy, E. R.: Tumours of the Carotid Body. Surg. Gynec. & Obstet. 49: 764-779. 1929.
3. Bhende, Y. M.: Carotid Body Tumour. A case report with a short review. Ind. J. Surg. 9: 91-96. 1947.
4. Bloom, F.: Morphology of Aortic and Carotid Bodies. Arch. Path. 36: 1-12. 1943.
5. Boyd, J. D. (1935). Quoted by Bhende, Y. M. 1947.
6. Chase, W. H.: Familial and bilateral tumours of the Carotid Body. J. Path. Bact. 36: 1-11. 1933.
7. Cragg, R. W.: Concurrent tumours of left Carotid body and both Zuckerkindl bodies. Arch. Path. 18: 635-645. 1934.
8. Dandy, W. E.: Results following ligation of Internal Carotid Artery. Arch. Surg. 45: 521-533. 1942.
9. Dickinson, A. M. & Trevor, C. A.: Carotid Body Tumours. Review of literature with report of two cases. Am. J. Surg. 69: 9-16. 1945.
10. Donald, R. A. and Crile, G. Jr.: Tumours of the Carotid Body. Ibid. 75: 435-440. 1948.
11. Enderlen, E. (1928). Quoted by Monroe, R. S. 1950.
12. Funke, L. (1904). Quoted by Goldberg, H. M. 1947.
13. Gilford, H. and Davis, K. L. H.: Potato tumours of the neck and their origin as endothelioma of the Carotid Body, with an account of three cases. Practitioner. 73: 729-739. 1904.
14. Goldberg, H. M.: Carotid Body Tumours. Brit. J. Surg. 34: 295-301. 1947.
15. Goodoff, I. I. & Lischer, C. E.: Tumour of Carotid Body and Pancreas. Arch. Path. 35: 906-911. 1943.
16. Goodsitt, E. & Sudimack, G.: Neurofibroma of the Carotid Body. Am. J. Surg. 67: 131-133. 1945.
17. Gordon Taylor, Sir G. Carotid Gland tumours. Brit. J. Surg. 28: 163-172. 1940.
18. Gratiot, J. H.: Carotid Body tumours; Collective review. Internat. Abstr. Surg. 77: 177-181. 1943.
19. Harrington, S. W. et al.: Carotid Body tumours. Clinical and Pathological considerations of 20 tumours affecting 19 patients (one bilateral). Ann. Surg. 114: 820-833. 1941.
20. Hertzler, E. A.: Surgical Pathology of Diseases of Neck. J. B. Lippincot & Co., Philadelphia, Montreal & London. 1937. p. 98.
21. Ian, G. Robin: Carotid Body Tumour. Proc. Roy. Soc. Med. 38: 621. 1945.
22. Keen, W. W. & Funke, Y. J.: Tumours of the Carotid Gland. J.A.M.A. 47: 469-566. 1906.
23. Khanolkar, V. R. (1930). Quoted by Bhende, Y. M. 1947.
24. Kipkie, G. F.: Simultaneous chromaffin tumours of the carotid body and the Glomus Jugularis. Arch. Path. 44: 113-118. 1947.
25. Kohn, A. (1900). Quoted by Goldberg, H. M. 1947.
26. Krishnaswamy, C. R. & Ramachandra Rao, P.: Tumour of the Carotid Body. Ind. J. Surg. 3: 5-11. 1941.
27. Lahey, F. H. & Warren, K. W.: Tumour of the Carotid Body. Surg. Gynec. Obst. 85: 281-288. 1947.
28. Le Compte, P. M. et al.: Tumour of the Carotid body type arising in the Middle Ear. Arch. Path. 44: 78-81. 1947.
29. Lewison, E. F. & Weinberg, T.: Case report of bilateral Carotid Body tumours with unusual familial incidence. Abstracted in J.A.M.A. 143: 11. 1030. 1950.

30. Luschka (1862). Quoted by Bevan, A. D. & McCarthy, E. R. 1929.
31. MacComb, W. S.: Carotid Body Tumours. *Ann. Surg.* 127: 269-277. 1948.
32. Marchand, F. (1891). Quoted by Bevan, A. D. & McCarthy, E. R. 1929.
33. Matas, R.: Discussion on papers of Drs. E. L. Keen & Campbell. *Am. J. Surg.* 24: 692. 1934.
34. Monro, R. S.: The natural history of the Carotid Body tumours and their diagnosis and treatment with a report of five cases. *Brit. J. Surg.* 37: 445-453. 1950.
35. Idem.: The morphology of the Branchial Glomera and their tumours with a report of a case of Aortico-Pulmonary glomus tumour. *Ibid.* 38: 105-109. 1950.
36. Phelps, F. W. et al.: Carotid Gland — Primary tumours — review of 159 histologically verified cases — report of case. *West. J. Surg.* 45: 42-46. 1937.
37. Prendergrass, E. P. & Kirsh, D.: Roentgen manifestations in skull of metastatic carotid body tumour (paraganglionoma). Unusual case. *Amer. J. Roentgenol.* 57: 417-428. 1947.
38. Reid, M. R.: Adenomata of Carotid Gland. *Bull. Johns Hopkins. Hosp.* 31: 177-184. 1920.
39. Riegner (1880). Quoted by Gratiot, J. F. 1943.
40. Rogers, L.: Ligature of arteries with particular reference to carotid occlusion and the Circle of Willis. *Brit. J. Surg.* 35: 43-50. 1947.
41. Rossenwasser, H.: Carotid Body tumours of middle ear and mastoid. *Arch. Otolaryngology.* 41: 64-67. 1945.
42. Rossing, F. (1934). Quoted by Monro, R. S. 1950.
43. Wossnessenski (1923). Quoted by Gordon Taylor, Sir G. 1940.

TUMOURS AS A CAUSE OF INTUSSUSCEPTION TYPE OF INTESTINAL OBSTRUCTION*

by M. G. KINI, Bombay.

The causes of intestinal obstruction are many and the incidence of intussusception as a cause varies in different countries and also varies in type and in age incidence. In India, there are very few published records on this subject. One published record of intussusception deserves mention. It is from the Department of Pathology of the Grant Medical College, Bombay, and was published in *Medical Bulletin (Bombay)* 1940. Saldana¹² briefly analysed the specimens in the museum as given below.

Sex:

Males	Females	Unknown (not mentioned)	Total.
21	3	2	26

Causes:

(a) Congenital umbilical hernia	1
(b) Colic	1
(c) Round worms	1
(d) Tuberculous ulcer	2
(e) Mucous polypus	1
(f) Carcinoma	3
(g) Metastatic tumour	1
(h) Dysenteric infection	2
(i) Agonal	3
(j) Chronic	1
(k) Unknown	10
Total	26

Sporadic papers on intestinal obstruction of this type have been published from a few pathology and surgery departments. These do not give a reliable or comprehensive review of intussusception as a cause of intestinal obstruction in India. It is suggested that some post-graduates in different universities while submitting case records for their thesis before they appear for M.S. examination, may choose this subject to

*A paper read at the XII Annual Conference of the Association of Surgeons of India at New Delhi on 31-12-1950.

throw some light by analysing the specimens in their respective museums and from operation records of 10 years from the hospitals. These post-graduates later should publish their thesis on this subject in medical journals. Necessarily, at present, we have to depend upon information published from foreign countries.

The causes of intussusception are numerous. Perverted peristalsis associated with paralytic condition of the intestines which allows the prolapse of one portion into another was in many cases classified as idiopathic type of intussusception. With improved observation and improved methods of diagnosis and pathological examination, the idiopathic type of intussusception is becoming more and more an idea of the past. Perrin and Lindsay⁸ who had made an exhaustive study of 400 cases found intussusception more common in children, 78.5% being found in the first two years of life. Fitz Williams found 71.9% in children not more than 12 months of age. The percentage according to anatomical distribution of the intussusception is interesting.

	Nec-caecal	Ileo-colic	Enteric	Colic	Multiple & double
Perrin & Lindsay	46.5	37.6	10.1	5.6	
Lichtensterin	44.0	8.0	30.0	18.0	
Fitz Williams	60.8	25.8	nil	7.3	6.3

They have also stated that in many cases of children with intussusception there was marked inflammatory hyperplasia of the lymphoid tissue in the bowel and they believed that this was responsible for the development of this condition. It is possible to infer from the large incidence of ileo-caecal and ileo-colic types of intussusception recorded by them that the above-men-

tioned pathology may be a contributory factor. Fitz Williams tried to explain the mechanism of intussusception by stressing that the apex of the intussusception is a fixed point and does not change.

Some cases of intussusception are transient in type and have been noticed sometimes during abdominal operations under spinal anaesthesia. They appear and disappear. Retrograde intussusception is rare but one case deserves mention though it is not included in the series tabulated.

A young man who had some discomfort in the abdomen consulted a quack who gave him crude calomel which resulted in colic and vomiting. He was treated as an emergency and operated upon, the surgeon being unaware of the history of administration of crude calomel. On opening the abdomen multiple intussusceptions were found in the small intestines which were of the usual type along with a few of retrograde type. They appeared and disappeared. There being nothing organic, the abdomen was closed and a Ryle's tube was passed into the stomach and the contents aspirated and washed with soda bicarb. The patient made an uneventful recovery and, later, on careful enquiry the history of having taken crude calomel was elicited.

Inflammatory conditions due to known causes such as dysentery have been found to cause intussusception of the ceco-colic variety and of the colo-colic variety. These are not included in this series. Collins² reported a case of colo-colic intussusception due to dysentery. There were 6 cases of this type admitted and operated upon in which complete ileo-colectomy was done. On pathological examination the apex of the intussusception was seen to be formed either by an ulcerating condition with edema round about or an edematous condition of the mucous and sub-mucous area simulating a polypoidal tumor, a condition which can well be described as an amoeboma. Histological examination revealed amoebae in the sections. One case died and the history of this case is interesting. A young man aged 26 years was transferred

from medical side with colic and constipation. He gave a history of dysentery before and so he was treated first by a retention enema which later was evacuated and on examination of the mucus passed, it was found to contain amoebae. He was treated by emetine with relief of symptoms for a month. Again he developed colic and a tumour was found at the level of the umbilicus. Another course of bowel wash was done but the condition of the patient was getting worse and the tumour became more and more prominent and so he was operated upon as a ceco-colic intussusception. It was easily reduced by milking but there were enlarged mesenteric glands. Complete excision was deferred as the condition of the patient was not satisfactory. The cecum was anchored and an ileo-transversostomy was done for relief of symptoms, and he was started on a course of emetine. At the end of a fortnight again the symptoms recurred. The abdomen was again opened and ileo-colectomy was done. The specimen showed numerous ulcers in the caecum ascending and transverse colons and a large number of glands in the mesentery were found enlarged. Histological examination showed amoebae in the section. This was the first experience and the patient died about a fortnight after the operation due to uncontrollable diarrhoea. With this experience the later cases were treated with primary excision and all the cases survived. It is a noticeable feature that administration of emetine does not help in the resolution of intussusception even after short-circuiting operation and fixation of bowel. Emetine does help to cure the disease after excision.

Tumours as a cause of this condition are mentioned. Benign and malignant growths both primary and secondary are found in the intestines and they frequently cause intestinal obstruction of the intussusception variety. Cohn, S. et al¹ in an analysis of tumours in the intestines in the literature have stated that:—

(a) Ewing estimated that 3% of malignant tumours occurred in the gastrointestinal tract.

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Printed by Mr. G. Raghavan at The Huxley Press, 114, Armenian St., G.T., Madras, and
Published by Dr. U. MOHAN RAU, Secretary, Association of Surgeons,
207, Poonamallee High Road, Madras 7.

THE
INDIAN JOURNAL OF SURGERY
SUPPLEMENT

Vol. XIII

MARCH 1951

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**PROCEEDINGS OF THE XII ANNUAL CONFERENCE OF THE
ASSOCIATION OF SURGEONS OF INDIA**

The XII Annual Conference of the Association of Surgeons of India was held at New Delhi during 29th, 30th and 31st of December 1950 and on the 1st of Jan. 1951.

29-12-1950

The Editorial Board held its annual meeting at 8-30 p.m. under the Chairmanship of Dr. C. P. V. Menon. Eleven members were present. After some general discussions regarding the Indian Journal of Surgery, the financial position of the Journal was reviewed and steps were suggested to augment the income for the Journal and to minimise expenditure.

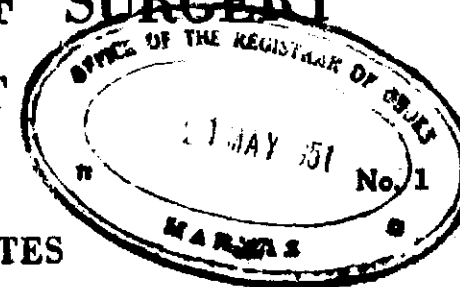
The members of the Governing Body and the Editorial Board were then entertained at an

enjoyable dinner at which Dr. and Mrs. S. K. Sen were the hosts.

The first Governing Body Meeting was held at 9-30 p.m. Fifteen members were present and Dr. N. S. Narasimhan presided. The members of the sub-committee for the formation of the College of Surgeons of India were present at this meeting by special invitation.

45 ordinary members and 6 associate members, proposed during the year, were duly admitted, and the resignations of 6 members were accepted.

The recommendations of the sub-committee for the formation of the College of Surgeons of India were then taken up for consideration. After a pro-



longed discussion, the meeting was adjourned to meet again on 30-12-1950.

30-12-1950

The inaugural function of the Conference took place on the 30th of December at 10 a.m. at the Central Hall, Parliament House. The large hall was packed to capacity. Besides the large number of delegates from all over India, several distinguished members of the central government, representatives of the defence services and other prominent personalities were present. Special mention must be made of Dr. J. K. Trumbo, who had specially come to attend the conference as the representative of the American College of Surgeons.

WELCOME ADDRESS

The day's proceedings began with an address by the Hon'ble Rajkumari Amrit Kaur, Minister for Health. After welcoming the delegates and visitors, she said: "From the proceedings of your previous meetings, I find that you are earnestly considering the question of establishing a Central College of Surgeons with the object of promoting post-graduate teaching and research in surgery and for holding examinations for granting post-graduate diplomas. I fully realise the urgent need for providing adequate facilities for post-graduate teaching and research in medical specialities. The Bhoré Committee in its report emphasised the idea of developing post-graduate training facilities in the vast field of medicine on a sufficiently large scale in order to enable the country to meet its own requirements. The Committee recommended that the steps taken to achieve this end should include (a) an overseas training programme whereby a certain number of selected men and women doctors can be sent abroad for training in different specialities, (b) the establishment, in the first instance, of an All-India Medical Institute for providing teaching and research facilities in all the major branches of professional education, (c) the provision, at a later date, of three or four similar institutions in other parts of the country and (d) the expansion of existing departments for special subjects in provincial centres with the help of the Central Government in order to enable these centres to function on an All-India basis. The first step in the direction of developing post-graduate training and research has already been taken by the Government of India by initiating the upgrading programme in accordance with the recommendations of the Upgrading Committee which was appointed by me in 1948. The overseas training programme has been pursued up to a point but has had to be temporarily suspended from last year owing to financial stringency. Nevertheless a fair number of doctors from India are being sent abroad for post-graduate training

through the help of international organisations like the WHO., UNICEF and the Rockefeller Foundation. The main recommendation of the Bhoré Committee, however, namely, the establishment of an All-India Medical Institute, though accepted in principle by the Government of India, has yet to be achieved. Where the State is unable to incur capital expenditure it is the privilege of philanthropy to come to its aid and I am not without hope that we shall be able to make a beginning in this direction in the near future. The Institute, when it is established, will certainly serve as the Central College of post-graduate medicine. While I keep an open mind in regard to your suggestion for the creation of a College of Surgeons which will necessarily be exclusively for surgical specialities, I would request you to consider whether it will not be more desirable and more beneficial in the long run to have one Central Post-graduate Institute not only for surgery but also for all the other medical specialities. After all, diplomas and degrees have little value unless adequate facilities are provided for instituting courses of training in the different specialities. It is the inherent worth of the individual, who has been able to utilise to the fullest extent all the opportunities given to him for gaining practical experience and knowledge, that should really count in deciding the qualification for a specialist. Until recently, the Royal Colleges in England were purely examining bodies. If the idea in your minds is to create College of Surgeons and Physicians modelled on the Royal Colleges of U.K. you will have to consider whether you may not have to run the risk of antagonising the Universities in India by encroaching on what they might consider their prerogative. On the other hand, if we concentrate our attention on providing facilities for the practical training of our doctors in the various medical specialities by establishing an All-India Medical Institute, our primary and fundamental objective in the field of a high standard of post-graduate training will be achieved. At a later state, we can also consider the question of instituting a limited number of the highest type of post-graduate diplomas of an All-India character. I strongly feel that we should concentrate our attention on canalising our energies and resources on the establishment of such an Institute. Associations like yours, composed of professional and scientific groups in the field of medicine, can materially help me in implementing this scheme in which I am deeply interested and I sincerely hope I may count on your active co-operation.

One of the important steps which the Government of India has taken towards the furtherance of post-graduate medical education and research is the creation of an All-India Post-graduate Medical Council whose main function is to prescribe standards of training in different specialities for the guidance of Universities. We must lay the

greatest emphasis on the maintenance of a high standard in medical education. The Council will, I hope, ultimately become a statutory body like the Indian Medical Council.

I am sure that the establishment of an All-India Medical Institute and the creation of a statutory body like the Post-graduate Medical Council will meet your demands as well as the anticipated demands from other associations like those of physicians and obstetricians in respect of the formation of separate Colleges for different specialities.

Over 15 years have passed since Lord Moynihan, the famous British surgeon, said, "The craft of surgery has in truth nearly reached its limit in respect both of range and of safety". Advances in the field of surgery during the period since Lord Moynihan made the statement have completely falsified his prophesy. During recent years surgery has definitely extended its range without impairing its safety and who knows how far surgical endeavour may still extend? The speed with which knowledge has progressed is true of course of all the sciences—not medicine and surgery alone. It has been rather aptly described by William J. Humphreys in the following words:—

"Take from the air every airplane; from the roads every automobile; from the country every train; from the cities every electric light; from ships every wireless apparatus; from oceans all cables; from the land all wires; from shops all motors; from office buildings every elevator, telephone and typewriter. Let epidemics spread at will; let major surgery be impossible—all this, and vastly more, would be the terrible catastrophe if the tide of time should but ebb to the childhood days of men still living."

Surgery has emerged from a dark mediaeval era into the light of modern advancement within the last fifty years. It was the sturdy individualist working single-handed that contributed predominantly to the surgery of the past. Today, however, the nature and method of work have completely changed. Scientific advances are being made and will be made in the future not by single individuals but by different teams or groups working together in different aspects of the same problem. Physicians, surgeons, pathologists, radiologists, bacteriologists and bio-chemists will have to work together in order to bring about better and quicker results. This is a potent argument for my contention that an All-India Medical Institute will provide much fuller scope for the all-round development of the entire range of medical science than separate specialised Institutions. Team work and the team spirit must be fostered for the enhancement of scientific research. Annual meetings of scientific workers such as this will certainly contribute a great deal towards bringing about co-operation among yourselves and the coordination of scientific research.

Specialisation may not be a desideratum as an end in itself. It has, however, become more and more necessary with the rapid advances made in different branches of medicine and it is an undoubted fact that the co-operation of specialists in innumerable overlapping departments has effected changes in the structure of medicine and surgery greater and more lasting than any previously known. By this same technique of co-operative specialisation, still greater changes will surely be brought about in the future.

Medicine and surgery depend for their very existence on improving the service they can give to the individual patient. The surgery of the future, just as was the surgery of the past, will be directed to the saving of lives and limbs and the promotion of human happiness. The dangers which threaten man and necessarily the surgery which is designed to meet them is modified from day to day by the progress of science. To-day's environmental changes determine what the morrow will demand from surgery. Living as we are in a scientific and a machine age there is no knowing what the surgeon of the future may be called upon to do. Many diseases which were essentially in the province of the physician have been passed on to him. He is well on the way to mastering the surgery of the brain and spinal cord, of nerves, of blood vessels, of the endocrine glands, of the autonomous nervous system and of even the heart. The same mastery over the clinical side of medicine has been and is being achieved by your opposite numbers, the physicians. Who knows how much surgery may even be eliminated by the newer and newer antibiotics and chemicals that are daily being discovered? However, inasmuch as perfection is never reached on this planet of ours, I have no doubt that the surgeon's knife will continue with ever increasing skill and efficiency to befriend man and deal with the failures of medicine or preventive medicine.

I am conscious of the fact that I have not given you the customary address of welcome in the customary manner. I have, however, welcomed you as a colleague—working in the cause of better health and as one who is a firm believer in modern medicine and grateful for all that it is doing to alleviate human suffering. I am glad of the opportunity I have had of sharing some of my thoughts with you.

On behalf of the Reception Committee and on my own behalf, I welcome you once again and I hope you will have a pleasant and profitable stay in Delhi. May I accord on behalf of all of us a special welcome to the surgeons from foreign lands who have come here. I am sure more would have come had the international situation not been so grave. We live in a world overshadowed by dark clouds of war. Medical science, par excellence, transcends all barriers of race, creed and clime. I hope this human outlook and the humani-

tarian work of the medical profession will make their contribution, as they should, to the cause of world peace for which we all yearn. Gentlemen, I wish you every success in your deliberations."

INAUGURAL ADDRESS

Inaugurating the Conference, the Hon'ble Pandit Jawaharlal Nehru, the Prime Minister, said the question was how could the people have the assurance that they would get medical treatment and that poverty would not come in the way. In various countries great progress had been made in regard to this problem. "I have no doubt we shall have to go in that direction in our own way. Otherwise it will become more and more difficult for rich surgeons to live in a world apart—on the one hand, looking after rich man's overfed body and on the other a large number of people having no proper attention."

He also told surgeons to lay greater stress on the preventive rather than the curative part of their work.

"In the modern world", Pandit Nehru continued, "not only had we to put up with conditions that produced disease but we go about doing things which actually maim, kill and destroy, such as war, and then send a hoard of doctors to try to heal those whom we have deliberately destroyed. This could only be explained, by the logic of approaching lunacy. We are living in a mad world, however much they might say to the contrary. Progressively we are doing things madder than at any time in the history of the world. We should not, therefore, be proud and may advance in one art or other but for every step we took towards progress, we were taking half-a-dozen steps backward."

Stressing the importance of ancient systems and their application to modern methods, Pandit Nehru said that while all the good in the ancient system of medicine should be taken in, the approach should be the "scientific yardstick of trial and error." To ask people to follow the works of Susruta or Nagarjuna and do nothing to develop it was "nothing but stark lunacy."

Pandit Nehru objected to the use of the terms "Indian systems of medicine and Western systems of medicine". Science he said, was universal though it might have advanced in some countries more than in some others. The so-called Indian systems of medicine, for example, meant the Ayurvedic and the Unani. The word Unani was an old word for ancient Greece and the Unani system of medicine was really the mediaeval system of medicine.

So far as ancient Indian medicine and surgery were concerned, progress in them stopped a long time ago and they had become stagnant. It was true there were "wonder remedies" as such and

it was no good "sniffing" at them or trying to ignore the fact. There were many things to be learnt from the long experience of a race that counted a lot. This accumulation of experience was an important thing that could be got from the Unani and Ayurvedic systems just as an old medical practitioner, without many degrees could do a lot because of his experience of human beings and diseases.

Pandit Nehru said: "Approach the Ayurvedic and Unani systems with all friendship and deference but approach it with all your critical faculties. Do not accept anything simply because Nagarjuna or anybody else had written it but because you understand it and by experiment you find it to fit into the scheme of things".

The Prime Minister remarked that to say the Ayurvedic and Unani systems were cheap while the modern system of medicine was expensive was no argument at all. There was loud laughter when he said "the cheapest thing is death itself. Kill them all and there is no expense afterwards."

"Our approach must be a scientific approach and not that kind of conceited scientific approach which thinks that what you are doing now is the last word on that subject", Pandit Nehru said.

He asked medical men and surgeons to apply that test and get as much as possible from the ancient Indian and modern experience and always search for true ways of solving the many riddles that accosted them.

PRESIDENTIAL ADDRESS

by N. S. NARASIMHAN

I am deeply grateful to the members of the Association for the opportunity given me to preside over its 12th Annual Conference. Since we met last in Madras, Dr. S. B. Gadgil, B.A., F.R.C.S., one of our past President has passed away (on 11th July 1950) and on behalf of our Association I express our heartfelt sorrow at the sad demise.

It is eight years since the Association met at Delhi but this is the first time we are meeting here since our country became a Sovereign Democratic Republic. We are grateful to our great leaders for their labour of love to the country and for their many endeavours to act upto the great principles laid down by the Father of the Nation, MAHATMA GANDHI.

The Value of Surgery to the Public and the State

The value of surgery in its usefulness to the public is not clearly realised by the Government and the administrators. The public in this country are amazed at the common causes of death, such as cholera, plague, malaria, smallpox, enteric group, dysenteric group, etc. The administrator is liable to become despondent by looking

at these groups of illness and to become sceptical of the value of hospital services which aim to cure a few and alleviate some.

It is my object to bring home to the administrator the value of good surgery. Surgery is of inestimable value from infancy to old age. Surgery has become very extensive in its scope and usefulness; there is no organ in the body where surgery is not practised. With the very great advances in physiology, pathology and anaesthetics, surgery is able to render valuable service. Only those parents to whose children an efficient surgical service is obtainable in times of need, will appreciate the value of timely surgical aid. Parents travel long distances and endure great hardships to get the help of surgery for their children and dependants. Imperforate anus (occurring 1 in 500 children) spina bifida (1 in 1000 children), atresia of the oesophagus, atresia of the duodenum, hypertrophic pyloric stenosis of the stomach, harelip, cleft palate and talipes are conditions treated by surgery in the new born and infants.

With the help of the school medical services, many eyes are saved by timely refraction testing and supply of glasses; many ears are saved from becoming deaf by timely treatment of the tonsils and the ears.

Many deformities due to rickets, malnutrition and anterior poliomyelitis can be prevented by timely advice and treatment. Operations on the heart have become common. With modern drugs patients suffering from syphilis and gonorrhoea can soon be rendered free from infecting others. This is a great public health achievement and the recent knowledge on this subject should be fully utilised. Sprains, fractures and dislocations can be properly treated. Many stiff joints can be prevented. Traumatic surgery has been specialised now into many different specialities so that surgeons are able to give the best possible aid to the injured man. Emergency surgery is practised for many urgent conditions such as tracheotomy, perforations of ulcer of stomach or duodenum and typhoid ulcers. Many infectious diseases like measles, smallpox, enteric, dysentery, whooping cough and influenza require the services of surgeons to treat the complications as they arise and to prevent serious crippledness as defects in eyes, ears, enlarged glands, stiff joints, etc., and empyema in the chest.

Surgeons take a long range view in trying to prevent cancer by removing many non-malignant tumours and by looking after other pre-cancerous lesions.

The operations done on the chest to obliterate tuberculous cavities discharging tubercle bacilli and operations on the lung by removing the diseased lung are effective steps in the prevention of spread of tuberculous disease. Some typhoid

carriers require operation. Surgery thus helps the public health authorities. Surgery is valuable in the treatment of certain types of mental diseases. Pre-frontal lobotomy is performed on schizophrenics.

Surgical aid is invaluable in leprosy cases where the foot joints have to be saved. Sterilisation is done by operations in cases of highly infective leprosy and the mentally unfit.

Many lives are rendered bearable and useful by many surgical procedures on tuberculous diseases of bones and joints, operations for diseases of breast, gall-bladder, stomach and intestines. Bronchiectasis, abscess lung and cancer lung are now amenable only to surgical treatment. Medical officers who recruited personnel for the army and the auxiliary services were aware how far the health of a large majority of the population was below standard. Obvious deformities led to a rejection of 10%. It is this sub-standard of health which opened the eyes of several Governments and made them introduce farsighted health schemes and ameliorative services. The service of surgery is required in otherwise healthy people to cure them of hydroceles, elephantoid scrotum, herniae, stone in the bladder, piles, fissure and fistula-in-ano and to make them fit for service. These surgical services are availed of by a large number of the poor people who have begun to appreciate the value of surgery.

It has been computed that acute appendicitis alone now claims an annual mortality of 2000 in the United Kingdom. The mortality was 4,000 twenty years ago. This country should be losing 40,000 people in the prime of their life due to appendicitis. I shall recall only one instance of a case of acute appendicitis benefited by operation. By a timely operation for acute appendicitis the life of Mahatma Gandhiji was saved and he was able to serve the nation for a long period of 25 years after this operation.

Surgery has been able to prevent infection in the wounded—whether it is at one's own home or farmyard or on the road or battlefield. The full benefits of such preventive measures are not still available to our masses. Fingers and hands can be saved from mutilation, deformity and removal. The value of traumatic surgery is magnificent; the worker or the soldier can return to his work quickly; the value of trained technicians and personnel is too high to be lost sight of.

The surgery of the diabetics, who are common in this country, has improved enormously in the last twenty years. Many a diseased organ is removed. Some diseased parts are replaced. Cornea is transplanted. Bone is replaced by grafts. Skin defects are remedied. Plastic surgery has come into great prominence.

Great progress has been made in the treatment of cancer. There is a fair proportion of cases of

cancer, who live 5 to 10 years after treatment. Diseases of old age such as enlarged prostate require operations. Fractures of neck of femur in the old are treated by operation and they are able to get out of their bed and move about in a week or two after operation.

Thus surgery has become more extensive in its scope and in the opportunities it provides for recovery and for restoration to economic usefulness of mankind. It is the ambition of the members of the Association that full surgical services should be available to all sections of our people.

The Story of Ancient Indian Surgery

Indian Surgeons are very proud of the great heritage left by Susruta. Susruta's original work was improved and supplemented by Nagarjuna, the celebrated Buddhist Chemist. Candrate (9th century A.D.) revised the book. There are several commentaries. The book has been edited several times since 1835. The book was translated into English by N. C. Dutta, 1883, A. Chatopadhyaya, 1891 and Hoernle, 1897. It was translated into Latin by Hessler and into German by Vullurs. The book was translated into Arabic before the end of the 8th century A.D. It is called "Kitab-Shawshool-al-Hindi."

Charaka's book has been edited several times since 1877 and it was translated into English in 1897; it was rendered into Arabic in the beginning of the 8th century; it was done into Persian (987 A.D.). There are several commentaries.

Ancient Indian Surgery spread far and wide but it fell into decay. The causes of the downfall were:

- (1) The Hindus from a very early period gave up the dissection of human bodies.
- (2) The interference of the priests as in Europe and Egypt became great.
- (3) Fear because of the absence of anaesthetics.
- (4) The Hindus neglected surgical operations.
- (5) Buddha ordained against operation and the rapid spread of Buddhism arrested surgery.
- (6) Hindus held the works of Charaka and Susruta as "revealed" knowledge and this knowledge became stereotyped. No one dared to question the validity of the statements. A similar state of affairs existed in Europe where Galen held sway for 2000 years.

By Asoka's edict, hospitals and Punyasalas were instituted all over India including the South in the Chola, Pandia and Kerala kingdoms. In the 4th century A.D. there was in Pataliputra a house of alms. Similar foundations came in Europe only much later, the first was opened in the 7th century in Paris.

Buddar Das ordered a physician for every 10 villages on the high road and built hospitals for the crippled, deformed and destitute.

Susruta advised dissection of the human body and anatomical knowledge was insisted on. Greek medicine did not allow human dissection and the anatomical knowledge of Hippocrates was derived chiefly from the dismemberment of animals, experience in slaughtering and sacrifices and from the observation of surgical cases. The study of anatomy received its first impetus from the Alexandrian School. Anatomy and surgery began to decline during the Buddhist era and finally all vestiges of the science became lost during the Mohammedan rule.

Whatever might have been the greatness of our medicine and surgery in the 6th and 7th centuries, A.C., anatomical dissections ceased after that.

Our ancients were progressive and they were incorporating newer knowledge from all over the world as is evident from the growth of our knowledge in chemistry and the utilisation of mercurial preparations in our pharmacopoeia. But owing to the various causes mentioned above, the indigenous systems became stagnant in conception and practice as is testified in the Chopra Committee Report.

Many European and Indian practitioners have tried their best to study, evaluate and write on the ancient books for over a century. The Government of India and various State Governments have appointed committees in the past fifty years to encourage and thoroughly study the various pharmacopoeias and many reports have been published as a result. When we realise that the British Pharmacopoeia has radically changed within the last 40 years, to suit the needs of modern medicine, it is deplorable that both money and energy should continue to be expended on the revival of the indigenous systems of medicine which in spite of several attempts in the past have proved to be unworkable.

Two wars intervened when the country was faced with shortage of drugs and no indigenous drug replaced anything of value. The public did not demand the indigenous medicines. They vociferously demanded the modern remedies.

In China and Japan a moratorium extending to a definite period of years was declared after which the practice of indigenous systems in those countries was not recognized. The indigenous systems of medical treatment were nowhere recognised in the Soviet Union.

Government Policy on Medical Relief

The policy of the Ministry of Health with regard to the Chopra Committee's report has disheartened a bit a large number of members of the medical profession in this country. Attempts are made in

various States to introduce the indigenous systems in many ways such as a combined course with modern medicine, and the recognition as a separate group of practitioners of those who had been practising indigenous medicine for some years. Thus a large number of over 12,000 in every State become enrolled as practitioners of medicine under executive authority.

While the Government passed a Dentist Act (1948) prohibiting unqualified practice in future even though facilities for dental training are non-existent in many States, it is strange that the attitude of Government to scientific medicine and surgery is strangely anomalous.

Population Distribution in India

State Governments have realised that the majority of people live in villages. Our country is poor, with a large population and with a poor stamina of health; more than 75% of the population live in villages. The different population ranges of the towns and villages in our country are as follows:—

Over	100,000	—	49
50,000	to 100,000	—	87
20,000	to 50,000	—	277
10,000	to 20,000	—	607
5,000	to 10,000	—	2,367
	below 5,000	—	5,59,062

The villages that are 50 and below in population and the villages above 50 but below 500 in population form about a fourth in number. It is not possible to give a doctor to each village at any time. The organisation of medical and surgical relief in advanced countries in the world is through Cottage Hospitals for group areas.

Unless the Governments realise that a village doctor singly placed anywhere is of no real use to the community unless he has bacteriological and pathological services, anaesthetist and modern drugs at his disposal, his presence will not in any way improve matters of health.

Suggestions for Immediate Action

The Organisations of the Kasturba Memorial Trust and the Gandhi Memorial Fund which are doing highly useful work in our villages should be enabled to render efficient surgical service also.

Village Communications

The making and maintenance of third class roads, i.e., the vital village communications which are in a deplorably bad state at present are left over by the Nagpur Committee to the District Boards whose finances are very inadequate. Very little progress in laying new roads was made last year and Government are now proposing reimposition of tolls to finance the schemes. On the

other hand this should be taken up as the most important item of rural reconstruction work. This will improve the economic condition of the people, will enable the villager to get out of the village by quick transport for medical aid and will enable doctors to reach the villages in time. The provision of village roads, public telephones in all the post offices, ambulance service and the utilisation of the present bus services to rush surgical aid to the villager or remove the patient to a nearby surgical centre are all matters requiring attention.

Presiding at the 9th session of the Bengal Provincial Medical Conference, Dr. A. D. Mukerji said that there were about 12,000 qualified doctors in West Bengal with a population of about 25 millions. About 9 million people live in 93 towns in West Bengal and the rest in 34,249 villages. The ratio of doctors to population works out as 1 to 2,000. Yet the services of qualified medical men could hardly be utilised by the people in general because of lack of communications. Unless transport facilities are improved, the water supply bettered, education extended, and the economic condition of the people raised, the production of a large number of doctors would not in itself solve the problem.

Provincial Public Health Boards

States have appointed Public Health Boards for co-ordinating medical and public health work. Under this scheme, sanitary inspectors are to be trained in large numbers for vaccination and inoculation work and for public health work in malaria, cholera, plague and smallpox, and for festival or famine duty. A policy of unified control of leprosy and venereal diseases is sought to be established by entrusting the curative and preventive work to the Public Health Department. This policy is to be preferred to the village vyadhi scheme as the sanitary inspector can be relied upon to encourage the patient to go to the nearest hospital and take correct advice and treatment.

Basic Medical Education

The under-graduate medical education on scientific lines has not yet been kept at a high level. The President and the Executive Authorities of the Indian Medical Council find it difficult to maintain the standards. Those who can speak with authority express their anxiety at the lowering of standards.

There is a great dearth of suitable teachers for anatomy, physiology, bio-chemistry, biophysics, pathology and bacteriology. There are no evidences of much co-operation of clinical and non-clinical teachers in many places.

In his address before the All-India Medical Conference at Allahabad Dr. Chamanlal Mehta said:

"The present day college laboratories and hospitals are not adequately equipped for even the routine teaching of under-graduates. Our teaching hospitals do not possess requirements of daily use in the treatment of patients, leaving aside the present day training of under-graduates. Some of the private charity hospitals and nursing homes are better equipped and are more up-to-date than the medical colleges and teaching hospitals."

Unless under-graduate instruction is provided on sound lines, it is difficult to build up post-graduate schools. The post-graduates are handicapped in many ways when they have to pursue post-graduate studies.

These drawbacks result in deterioration of every day work and under-graduate teaching and in the utter impossibility of building up of post-graduate work. The post-graduate medical education can never attain a high standard unless the basic medical qualification which is under the direct supervision and control of the Medical Council of India comes up to the correct standard. The word "research" is often used. There are no facilities for doing daily work well and satisfactorily. There are fewer people to guide young graduates in research work.

Age of Entry of Students

In the past few years it has been observed that candidates for admission to medical colleges join at a higher age than 17 as many of them take additional general educational qualifications. These candidates naturally qualify at a later age and become dissatisfied with their lot and are unable to pursue further post-graduate medical qualifications and training. While therefore the possession of additional general academic qualifications becomes valueless to such candidates, it is also a loss to the profession in that they enter the medical career at a later age and they do not, for financial or other reasons, prosecute higher studies in medicine.

Importance of Anatomy

There has been loose talk regarding the teaching of anatomy in Indian medical colleges, in the great number of hours spent and in the details taught and studied. Such loose talk has greatly discouraged the professors of anatomy. It would be better to associate members of surgical and medical staff with professors of anatomy both in teaching and in examinations. The thorough grinding received in anatomy plays no small part in the later clinical acumen and successful bedside teaching.

Indian Research Council

The financial basis of the Indian Research Council must be truly laid; young students with a

yearning for research must be suitably selected when they are in their college careers. They should become associated early in their career with research workers. If the present method of award of prizes during the student career based on the results of marks obtained in examinations is changed and the award is made on the basis of a candidate's original observations, it is possible to encourage young students to become research-minded.

Refresher Courses

Next in the scheme of improvement is the great endeavour to be made in the refresher course teaching of the general medical practitioner. Refresher courses in every day surgery and in the early diagnosis of the surgical conditions requiring specialised treatment should be arranged.

Medical journals published in the United Kingdom contain in each of their issues, articles in the form of a refresher course and these articles naturally benefit the profession. As compared with the United Kingdom, medical journals published in this country are few in number. It is necessary that the number of journals should be increased and the journals should be subsidised by the Government.

Formation of College of Surgeons

It has been our ambition from the beginning to bind ourselves together and to ask for a Charter for the promotion of a College of Surgeons of India. It is high time that this is organised. The Royal Colleges of Surgeons of Ireland, Glasgow, Edinburgh and England have had an uphill task in the United Kingdom in effecting the separation of the surgeons from their predecessors of unqualified practitioners and in organising proper teaching, both under-graduate and post-graduate. Many of our Universities with their multifarious academical activities and territorial jurisdiction have found it difficult to organise intensive post-graduate courses and teaching. The available research fellowships in the Universities have not been utilised. The endowment lectures have often not been published. To overcome these difficulties, there should be a College of Surgeons where the surgeons might bind themselves to build up a fine museum, and undertake post-graduate teaching and where there should be at least one centre for experimental surgery. It is high time that the younger members of our profession become trained in experimental surgery. The Central Government may with great benefit send abroad young men for training in experimental surgery who in their turn can organise and train other workers in the various medical colleges so that experimental surgery can be practised all the time. The students will then be brought up in a right atmosphere. "Surgery engrossed in scientific investigation reserves insignia of greatness for

those who find their satisfaction in service and in the search for elusive secrets which benefit mankind".

I make an earnest appeal to the members of the Association to start a voluntary fund which will be a nucleus for the College. Then we should appeal to the public philanthropists, insurance companies, trade unions, industries and co-operative societies because every section of the population will be benefited by the silent and unostentatious work of the College.

At present there is no agency except the Central Government to invite exchange professors from other Universities, as Canada, America, Britain, Australia and nearer home, Ceylon. Their presence and work in our midst would lead to exchange of ideas, stimulate and sustain our daily work. This is an imperative necessity. Our clinical material is great and I have no doubt foreign surgeons would gladly welcome such invitations. Meanwhile exchange of workers in India from one place to the other also is of great value and should be the first step in the right direction. This is of great importance as it will foster mutual esteem and remove local jealousies.

It is those who obtained qualification from the Royal Colleges in the United Kingdom that expanded and modified the course of surgery in North America (i.e., the United States of America and Canada). The American College of Surgeons has organised the inspection of the hospitals of their country, has insisted on training programmes in traumatic surgery throughout the country. It has also organised the sarcoma register, the cancer control and its prevention and treatment and has laid down standards of training for interns and surgeons.

It is our ambition that our Association and the proposed College of Surgeons should work on similar lines for the benefit of the people of this country.

Our Association has had fraternal feelings with similar associations of the United Kingdom, Australia and America.

American and other Colleges of Surgeons

The American College of Surgeons was founded in 1913 and since then it has begun to grant Fellowships. In 1940 the College raised the period and nature of the training required for its Fellows.

The forum on fundamental surgical problems was instituted by the Board of Regents of the American College of Surgeons and the first session was held in Boston in October, 1941. This was meant to provide an opportunity especially to the younger surgical group for the presentation of the results of original clinical and experimental research. This was suspended for 5 years during

the war period and it was revived in the Cleveland Session in 1946.

Others felt that all those who proposed to specialize should be forced at an early stage in their graduate training to demonstrate to a Court of Examiners that they were proficient in the principles of surgery and in the allied basic medical sciences. From this arose the American Board of Surgery and the Boards of various surgical specialities, to which the College elects representatives.

The American College insists on minimum periods of apprenticeship, evidence of high moral and ethical attainments and the proof that the candidate has shown ability in practice. It concerns itself with the raising of the standards of the hospitals in which its Fellows would study and work, and with the advanced surgical education. It is now engaged in what may prove to be its greatest effort, the establishment of adequate graduate training.

The Board of Regents of the American College has outlined more sharply the periods of hospital training that is required. It requires the candidates to pass a searching examination to ensure that they have an adequate knowledge not only of the arts of surgery but of the basic sciences without which no man can be a true surgeon.

The University of Toronto started 18 years ago, its programme of graduate training. The Graduate Training Board of Toronto visited more than 50 medical schools in the United States of America and Canada and has instituted its present standards.

The Australian College of Surgeons and the Surgical Society of France have done good work in their countries.

While efforts of individual surgeons in India may rank very high, the generality of surgeons are handicapped in their work by the general malnutrition of the patient, difficulty of access to the patient (i.e. difficulties in transport) and want of correct advice in the early stages of an accident or surgical affection etc.

Need for Specialisation of Surgery

General surgery is an important speciality. This is a basic speciality on which only the other sub-specialities in surgery should be recognised after an adequate and prolonged training.

The functions of a specialist are:

- (1) He should practice his speciality adequately and teach it successfully.
- (2) He should exercise his increased experience in order to save the one case in a thousand from disaster.
- (3) He should assist the general practitioner and not necessarily take over the diagnosis and treatment of a case.

(4) He should collaborate with other specialists.

(5) He should acquire and disseminate knowledge which is of use to the general practitioner of medicine and hence to mankind in general.

As long as the practice of medicine was an art without much background of scientific knowledge, there was little or no need for specialisation. With the advancement of knowledge due to the accumulation of scientifically proved facts, the need for specialisation has arisen. Specialisation is necessary, because accurate scientific knowledge of both diagnosis and treatment is essential for modern practice.

It has become the practice of the American Academies of Surgeons to introduce important programmes of instructional courses for the members of the academies. The specialist needs in addition to the new acquisitions in his own field up-to-date information from basic sciences. Definitely organised non-clinical programme for national conventions and clinical programme for the non-clinical academic conventions are also arranged by the academies.

As it is proposed to introduce compulsory internship for one year before licence is granted to practise medicine and surgery, it is essential that a correct programme for the training of the interns during this period should be drawn up, in order that the interns may become efficient general practitioners.

Formation of a Central Society of Medicine

At present the various specialists' associations of India, (as those of obstetricians and gynecologists, otorhino-laryngologists, veneral specialists, ophthalmologists, physicians, pathologists, psychiatrists, tuberculosis workers, anaesthetists, anatomists, physiologists, bio-chemists, radiologists, radiotherapists, and dentists) have no building or library of their own. It would be better if they were to combine into a society on the lines of the Royal Society of Medicine in the United Kingdom, but keep their activities separate. They can pool their resources and their knowledge for common benefit. The number of workers in any field in this country is still few. It should be our endeavour to learn from each other and work together for the solution of common problems. Though the medical section of the Indian Science Congress has till now afforded a common platform, it is essential that we should have a society of the kind suggested, as more intense, personal and frequent contacts are necessary for the progress of modern surgery.

Laboratory Service

Laboratory service is an important part of preventive and curative medicine. The diagnosis of fevers like enteric in the villages is now based on

clinical guess. The Widal reaction test is not enough at present for diagnosis on account of the greater acceptance of preventive inoculation by the masses. Culture results only will give the correct diagnosis; early cases of cholera and dysenteries can only be diagnosed by microscopic examination. Diphtheria epidemics can be prevented by timely smear and culture examination and isolation.

At present facilities exist for surgico-pathological and histological examinations only in the teaching hospitals. The pathologists are handicapped by want of suitable staff, frequent changes in staff and deficient equipment. Staff is required for complete indexing and cross indexing of slide files. This is the basis for any special research. There must be an experimental laboratory under the direction and control of the pathologist where all members of the staff may be able to work on the problems as they arise. A twenty four hours' service of a clinical and bacteriological laboratory is essential. An immediate laboratory investigation on all urgent cases will unconsciously infuse a spirit of conscientious work. Post-war reconstruction effort in the United Kingdom has ensured enlarged laboratory service all over the country so that correct diagnosis can be arrived at early. Epidemics can be prevented in this country only by such service. An intimate integration of a bacteriological laboratory with a surgical service is essential.

Autopsy Act

An Autopsy Act should be passed so that in every death inside a public hospital the cause can be verified. The Coroners in the United Kingdom now-a-days insist on autopsies on all possible occasions. Many revealing factors have come to light such as duodenal ulcer perforations in elderly people in the eighties.

Pathologists should be attached to the mental hospitals and proper autopsies would give valuable information and impetus in the proper treatment of these patients some of whom are benefited by surgery.

Extended pathology service is the only true and correct way of helping the practitioner, making him exact and scientific.

An Autopsy Act on the model of the rules of German hospitals is essential. The hospital authorities should be given permission to have an autopsy done on bodies of patients dying in a public hospital.

Vital Statistics

The collection of vital statistics is very defective in this country. Positive programmes for the prevention and treatment of many surgical conditions are not at all possible unless returns come up to

a standard like the reports of the Registrar-General of the United Kingdom.

The mortality statistics that are published now do not show any surgical conditions in the returns. Teachers of surgery are not able to show the importance of surgery in alleviating the death rate of the population.

There should be a classification to show the deaths from surgical conditions; infections like erysipelas, tetanus, anthrax, gasgangrene, septicaemia, burns, multiple abscesses, diabetes and its complication, strangulated hernia and intestinal obstruction, appendicitis, gall bladder diseases, tuberculous disease of bones, joints, kidney and lymph glands, carcinoma and sarcoma, perforations due to gastric, duodenal, dysenteric and typhoid ulcers, liver abscess and other complications of amoebic dysentery, bronchiectasis, abscess lung, carcinoma lung, enlarged prostate, stricture urethra, thyroid disease and road accidents could be correctly classified in the mortality returns of all big cities and towns where medical certification should be compulsory. This classification would help to some extent in formulating schemes of relief.

Cancer Act

The Cancer Act was passed by the English Parliament in March 1939 authorising early diagnosis, adequate treatment and assessment of results. A similar act should be passed in India to make provision for the treatment of cancer, to authorise the Minister of Health to lend money to the various radium centres, to prohibit certain advertisements relating to cancer and cancer cures and for purposes connected with the matters aforesaid. Similar acts may with advantage be passed in respect of advertisements relating to the treatment and cure of tuberculosis and venereal disease.

With the exception of cardio-vascular disease, cancer is the most frequent cause of death in the English speaking countries. The treatment of each individual case should be carried out in close co-operation between the surgeon, the radiotherapist and the pathologist. The available knowledge on cancer is not utilised at present. The deaths from cancer are on the increase. Any clinic which deals with the diagnosis of cancer must be equipped to diagnose non-malignant conditions. The patient should pass through the ordinary out- and in-patient departments of a General Hospital so that the students are benefited by seeing the cases at all stages of the disease. The patients also get the benefit of a general medical and surgical service.

On May 22, 1913, The American Society for the control of cancer was formed. Similar active societies exist in most non-asiatic countries.

These societies have become influential bodies aiming primarily at the widest possible dissemination of the salient facts of the cancer-problems, the clear recognition on the part of the public of the supreme importance of the earliest possible diagnosis and the correct treatment of the disease in its initial stages. Education of the community has given good results in the United States of America and New Zealand. The early diagnosis depends on the medical profession being educated on the interpretation of the biopsy results. The general practitioner is the first line of defence and must be an integral part of the scheme. He should be kept informed of the work at the various cancer centres and the results achieved.

The surest method of early diagnosis is that the patient should be suspected of suffering from the disease until the contrary is proved. This implies the highest histological skill of pathologists and all the resources of a large polyclinic will be necessary. A radio-therapeutic centre can be economically busy if the centre serves a population of 2 to 4 millions. The general practitioner must be able to send his patient at the specified times to the concerned centre and join in the consultation of the surgeon, radiotherapist and pathologist. This would increase the interest of the general practitioner in the cancer campaign and follow up.

Blood Transfusion Service

Blood Transfusion service is now popular in India and there should be a National Blood Transfusion Service Headquarters where the available material with regard to blood groups in the Indian population should be studied and analysed.

Language Problem

To keep up our knowledge it is vital to know the English language. All the languages of the European and American continents have the same script. To my knowledge there is no text-book on any medical subject in any Indian language. The attempt made at the Osmania University to translate in Urdu the English medical books is not successful from the students' point of view. The Central Government has to outline a correct policy regarding the learning of the English language. It will be impossible for us to keep up any good standard of modern medicine and surgery if the English language is cut out.

The Inter-University Board that met at Nagpur in August, 1950, has recommended a gradual and cautious removal of English. Japan in her medical journals has always a section of it for English abstracts of the articles published. The English speaking world is wide. We should not on any false patriotic move cut ourselves from the English language. The national language, the regional mother tongue and English have to be learnt compulsorily.

In his speech the President of the Indian National Congress held in Nasik on the 21st September of this year said "Hindi has become the property of the people of the country. They will increasingly have a hand in shaping it. Its vocabulary and literature will thus grow and its usefulness will become more widespread. In view of the existing conditions the Constitution has given precedence to the English language for 15 years. But it rests with our own countrymen to give by their farsightedness, effort and love greater respect to their accepted official language than to a foreign tongue even before the expiry of the fixed time limit".

I have not seen or heard of any constructive efforts in writing up of medical books in Hindi. Fifteen years will fly in no time. The various States have their own programmes with the regional languages. The Centre should define its policy correctly. This Association would vote for the study of English language as assiduously as now.

Manufacture in India of Surgical Instruments and other Requisites

The Health Minister in her message to the Scientific Exhibition at our 11th Annual Conference at Madras stated that the Ministry for Industry and Civil Supply is investigating the possibility of organising the surgical instrument industry on a sound basis. No information is as yet available as to the progress made in this direction. The industry requires high-grade steel for making good instruments. The manufacture of good, usable common surgical instruments should be the first item of the programme.

Priority should be given for the manufacture of plaster of Paris and adhesive plasters of good quality, anti-tetanic, anti-diphtheritic, and anti-gasgangrene sera.

The Drugs Industry of India

The operation of the Drugs Act and the Pharmacy Act will be able to deal with all aspects of importation, manufacture etc. of drugs. The Central Drugs Laboratory will go a long way in fixing standards.

The Indian Chemical Manufacturers Association and the Pharmacists Association should take on themselves an active part in manufacturing common drugs and necessities of the correct standard.

The development of the chemical industry, glass industry, and textile industry and the cultivation of medicinal plants and cinchona are all departments which will give help to the drug and allied industries of value to surgery.

Indian Army Medical Officers

It is good the Indian Army Medical Officers have a college of their own for refresher and post-graduate work. Surgically minded officers should be enabled to keep up-to-date by association with civil hospitals at the various centres. This will secure for our army personnel the requisite surgical efficiency. Army surgeons in the mofussil out of the way stations may be provided facilities to do surgical work. This will carry surgical relief to the villages adjacent to the places where they are stationed and will keep the Army Medical Officers in a state of efficiency. The Army Medical Officers should have special training in spinal injury centres, hand clinics, foot clinics, orthopaedics, fractures and plastic surgery. The liberalisation of the rules of Universities as regards the eligibility of the Army Medical Officers to appear for the M.S. Examination is a welcome gesture.

The Army Artificial-limb Centre at Poona is now open to poor civilian amputees, so that full employment, work and experience will be available at the amputee centre. It is suggested that it should be made compulsory for under-graduates and post-graduates to spend some time at this centre.

Library

Medical libraries are costly. The Indian Library Association has compiled in 1936 a list of Libraries. The information is valuable but it does not give much help with regard to Medical books. Some information for the Government of India is being collected regarding ancient medical books.

The Central Government in co-operation with the Government of West Bengal has opened the National Library at Calcutta in the former Viceregal buildings. The Library has been well equipped and fitted.

I find that the catalogues of many of the libraries are out of date. In some, the cataloguing stopped at 1938 presumably on account of the last War. There are many big and small libraries all over India and in the headquarters of the Part B States viz., Mysore, Baroda, Bikaner, Gondal etc. It is important that the books in them must be saved, kept in good order, and catalogued.

Two thousand medical periodicals are published every year in the United Kingdom and there are in that country a large number of libraries which are pooling their material for loan service, microfilm service and photostat copies. There are also large museums of comparative anatomy, physiology and pathology with well indexed reference catalogues. There is the large Welcome Historical Museum with a Medical Library in London.

The cumulative index of the United States of America has been replaced by the monthly cata-

logued index; references to the whole cancer literature are being published monthly.

Earnest attempts should be made to compile a catalogue of medical books and periodicals available at the various libraries in India for the information of members. This attempt can be made without much cost. A catalogue of this kind will be useful with the aid of microfilm service to members.

Microfilm Service Units set up by the Indian Research Fund Association at the Central Research Institute, Kasauli, and the Tata Memorial Hospital at Bombay are the two centres in India where at micro-film copies can be made. All Medical Colleges and Associations should equip themselves with a reader and join these Micro-film Service Units.

Medical Films

There are over 8,000 medical films now in the United Kingdom and the United States of America. In 1897 Braune and Schuster made cinema study of abnormal gait. Disney made a number of health films. Cartoon films by Giles "on the value of first aid to prevent sepsis" were produced for the British Ministry of Health. At present the British documentary film unit, the Kodak and the Imperial Chemical Industries are producing films of value. The Ministry of Health Information series (the United Kingdom) for educating the public on "your children's eyes, ears etc." are a great contribution from the preventive aspect. These films are highly appreciated by the medical profession and arrangements should be made for obtaining these films and exhibiting them.

Employees' State Insurance Corporation

The Union Government are to be congratulated on their decision to introduce an insurance scheme for employees. The Employees' State Insurance Corporation is the body appointed by Government to give effect to the Scheme.

The Hon'ble Minister for Health is the Vice-Chairman of the Corporation. The Indian Scheme (the first of its kind in Asia) was to have been introduced first in Delhi, Kanpur, the East Punjab, Bombay and Ahmedabad by April, 1951. But this has been postponed. The Scheme envisaged will cover to the extent of nearly two-thirds of the employees in India within the next two years.

The Act and the Scheme are both based on the tripartite principle i.e., the responsibility being shouldered by Governments (Central and States), employers and workers. In regard to medical care and treatment, the entire responsibility vests in State Governments.

It was decided to employ the panel system as accepted by the World Medical Association. The

Corporation did not approve of the recommendation of the Medical Benefit Council made in April, 1949 that the allopathic system should be adopted during the first five years. The Corporation recommended that the indigenous system of medicine also should be provided for if the workers desired it in appreciable numbers. This decision is to be regretted as many people's lives and their efficiency can only be guaranteed by up-to-date medicine, correct treatment and rehabilitation measures. Two millions of employees and eight thousand employers are involved in the Scheme all over India. Those who have experience of working the Workmen's Compensation Act know how efficient workmen become crippled and helpless as a result of wrong advice and incorrect treatment. This crippledness can certainly be prevented even with our existing resources by resorting to correct treatment. The proper method would be to sufficiently equip the workmen's hospitals with "hand clinics", orthopaedic centres and X-ray units for mass radiography. The extent of the usefulness of mass radiography to workers can be seen from the following example. In Victoria Hospital, London, 7,600 employees were examined in the mass radiography section. In one unit where 4,768 employees were working 7.1% were found to be abnormal cases. In another unit of mill workers, 16.2% were abnormal. All these abnormal cases would be examined by chest specialists. Two-thirds of the compensation is paid for hand injuries. Experience of "hand clinics" during the war has shown their great value to workmen.

105 millions out of 150 millions of the population of the United States of America are already covered by Sickness Insurance Scheme of one sort or other and the medical profession of the United States of America is studying the working of National Health Service in England.

The working of the National Health Service Scheme in England may change in some ways but it points out to us in what direction our services should expand if real benefit were to accrue to the people.

Social Security Scheme

There are many agencies in America who operate under social security schemes for the benefit of the public. They are all helpful in the propagation of correct under-graduate medical instruction and correct teaching to nurses, midwives and a large number of lay social workers. Our organisations like leprosy, tuberculosis worker's association, Guild of Service, Red Cross, St. John Ambulance and other similar associations have a great part to play in the dissemination of correct scientific news and advice to the public. These organisations should be helped by the profession.

If medical men would not think of environmental hygiene of the patient, the profession

Public Health Engineering, Rural Water Supply
and Draw Wells

Aims and Achievements of the Association

Due to the indefatigable efforts of a large number of enthusiastic members of our Association and the distinguished services of the past presidents who are still actively guiding us, the Association has been gaining strength. The *Indian Journal of Surgery*, which is the organ of the Association is being regularly published owing to the sustained efforts of the editors, the various secretaries and other members.

Among the objects of the Association are :—

- (1) Improvement of specialisation and research in this country.
- (2) Education of the public in measures for the saving of life and avoiding human waste.
- (3) Promotion of higher education of the medical profession and provision of facilities for better post-graduate education.
- (4) Formation of an Indian College of Surgeons.
- (5) Supervision of the higher surgical examinations in this country.
- (6) Development of centres of higher surgical study which will attract surgeons from abroad.
- (7) The utilisation of the Association purely as a scientific body engaged in the uplift of surgery in India.
- (8) The provision at an early date of a central office, a central museum and a central library.

is just a nucleus, post-graduate facilities have not been organised, the extension of correct surgical relief to the villages has not been planned, and there is no arrangement for bringing to the knowledge of general practitioners and the public recent advances in surgical treatment. We should try to chalk out a future programme of action to achieve the objects of the Association.

The quality and the extent of medical service for the people depend upon the sum total of medical knowledge, the education of doctors and the application of medical science and skill to the people through the doctors of medicine.

The distribution of medicine depends largely upon an adequate number of doctors and upon the facilities available to practise good medicine and to carry it to all the people.

"Vigour and abundance of voluntary action outside the citizen's home both individually and in association with others, for bettering his own and his fellow's lives are the distinguishing marks of a truly free Society."

In conclusion, the future of surgery in this country depends upon the future of this Association. This Association should take an active, alert and decisive action. Members should go out of their way to develop the speciality to the greatest possibilities. Members may exert their influence through teaching or writing. We require that active and energetic participation of every one of our members in practice, research and teaching.

"The day is short and the work is great; it is not incumbent upon thee to complete the work but thou must not therefore cease from it."—From *Talmud*.

Dr. S. K. Sen then read out messages from several distinguished surgical societies and surgeons, who wished the Association and the Conference all success.

Dr. J. K. Thrumbo, who addressed the gathering next, conveyed to the Conference the greetings and good wishes of the American College of Surgeons.

With a vote of thanks by Dr. S. K. Sen, the meeting came to a close.

TECHNICAL EXHIBITION

The members then adjourned to the Lady Hardinge Medical College, where the technical exhibition was being held. Requesting Shri H. K. Mehtab, Minister for Industries & Commerce, to declare the exhibition open, Dr. N. S. Narasimhan said: "Since forty years the cult of Swadeshi has been preached in our country. During and after the first World War, efforts were made in

our country to manufacture some drugs and splints. Either due to competition or lack of quality, much headway was not made. During the Second World War, our country had to rely largely on its own efforts and more attempts were made in Punjab, Bombay, Madras and Calcutta. to make surgical instruments.

I understand that our great steel industry of Tatas has been making forty varieties of stainless steel, some of which are very good for surgical instruments. While the surgeons complained of the lack of good quality of Indian made instruments, the manufacturers complained of lack of enthusiasm and even effort on the part of the Indian surgeons to try Indian made goods and to point out their defects. Error and effort are inevitable before improvements are made. The steel industry is prepared to give its best help in this connection. The metallurgists in our universities are very anxious to help. Our technical labour is good. Hence it behoves the manufacturing industry to make further good use of these opportunities.

The factories at Pillalur, Jullundur, Meerut, Bombay, Calcutta, Madras and many small engineering establishments at different centres may be given all facilities and technical advice and help to manufacture the common essential surgical instruments of good quality as scalpels, dissecting forceps, artery forceps, etc. May I suggest that it is better to concentrate at first on these common surgical instruments and goods? I feel that it may be advisable to continue to import for some more years complicated precision instruments like microscopes, X-ray apparatus, etc. Good quality rubber tubes, catgut, plaster of Paris and anti-sera are some of the other essential items. Almost 80% of our gypsum requirements comes from Rajputana and this can be used to manufacture first rate quality of plaster of Paris. I request the surgical manufacturing firms to form into an association, take technical advice, and do planned work.

The Hon'ble, the Minister for Health, in her address to the exhibition at Madras last year, was kind enough to say that the Ministry of Supply is preparing a working scheme for immediate execution for the manufacture of surgical instruments in India. I am confident that the Ministry of Supply under the Hon'ble Shri Hare Krishna Mehatab will bless such a planned expansion of this essential industry. Above all, I request our own members to give all the encouragement to our Indian goods without any prejudice to the welfare of our patients. I request the foreign firms who have been our mainstay for a long number of years to help our industry in making these essential goods here in India."

Declaring open the Exhibition, Shri Hare Krishna Mehatab said: "Our people are accus-

tomed to the old method of distribution of medicines. The *kaviraj* or *vaid* used to move round the villages and patients of a particular village used to come to him while he was staying in the house of the village landlord.

"Today we have our dispensaries. The buildings and life around them is such that villagers are not encouraged to take advantage of them."

The Minister emphasized that a change in the attitude of doctors towards patients in villages was also equally necessary. It was curious that they compared themselves with the U.K. and the U.S.A. where science and wealth had developed to a considerable extent and not with other poorer countries. India was a poor country and it was time they adjusted their programmes keeping in view the economic condition of their country. It would be better if dispensaries were used for surgical purposes and doctors moved round villages to render general medical assistance to people on the spot. Such an arrangement would be more convenient, to the people.

Dealing with the question of production of surgical goods in India, Mr. Mehatab said: "As soon as we produce our basic needs such as steel it will be time to meet our other requirements. I do not think there will then be any difficulty in manufacturing surgical instruments in India. We can proceed step by step and fix priorities of articles which are to be manufactured here. Personally I think we will not be violating the spirit of swadeshi if we use surgical instruments manufactured abroad during this transitional period."

The staff of Dr. K. N. Sharma's Nursing Home were the hosts for a very enjoyable lunch to all the members and delegates attending the Conference.

The members reassembled at 2-30 p.m. in the Lecture Hall of the Lady Hardinge Medical College. Drs. R. Mahadevan and S. J. Mehta presented their respective papers on 'Bronchiectasis' and 'Lung Abscess'. Several members took part in the discussion that followed.

The same evening the members attended a reception by Shri Rajkumari Amrit Kaur at the Government House. The very large and colourful gathering and the artistic surroundings made this a very delightful and happy function.

The Annual Dinner of the Association was held that night at 8-30 p.m. at Hotel Imperial. Covers were laid for over 280 guests. Shri Rajkumari Amrit Kaur, Their Excellencies Mr. & Mrs. Loy Henderson of America, Their Excellencies Mr. & Mrs. H. R. Gollan of Australia, His Excellency

Mr. W. Chipman of Canada, His Excellency Mr. Coomarswamy of Ceylon, Representatives of the Defence Services and other distinguished citizens of Delhi graced the occasion with their presence. The toast of the Country was proposed by Dr. N. S. Narasimhan, the President; Shri Rajkumari Amrit Kaur proposed the toast of the Association, and Col. B. K. Sheorey proposed the toast of the guests. His Excellency Mr. Loy Henderson suitably responded to the toasts on behalf of the guests.

It was a grand finish for a very busy day.

31-12-1950

From about 9 a.m. the members were taken round the various hospitals and nursing homes for demonstrations of surgical operations.

At about 12-30 p.m. the day's Scientific Session started with the following short papers:—

1. Volvulus of the caecum by Dr. B. N. Banerji, Laherisarai.
2. Perforation of hollow abdominal viscera by Dr. J. Sen, Calcutta.
3. Place of jejunostomy in the surgery of peptic ulcer by Dr. R. Mahadevan, Madras.
4. Perineo-abdominal lithotomy by Dr. M. V. Kamath, Akola.

The staff of late Dr. N. C. Joshie's Nursing Home were the hosts for a sumptuous lunch that afternoon.

At 2-30 p.m. the Scientific Session was resumed. Drs. R. A. Irani and A. E. DeSa' presented their papers on 'Intestinal obstruction in children'. The discussion that followed was very useful.

After light refreshments at 5 p.m., films on (i) Gastric ulcer with surgical treatment and (ii) Spinal anaesthesia, were projected for the benefit of the members.

The adjourned Governing Body Meeting re-assembled again at 5-30 p.m. on 31-12-1950. 12 members were present. Drs. R. N. Cooper and A. V. Baliga (members of the sub-committee) were also present by invitation.

The discussion of the report of the sub-committee for the formation of the College of Surgeons of India continued and finally it was decided that it was not desirable to ask for a charter at present. It was also decided to concentrate on the establishment of a Fellowship of the Association of Surgeons of India as early as possible.

1-1-1951

From an early hour in the morning, the members were kept busy by demonstrations of operations in the various hospitals and clinics.

Commencing from 11 a.m. the following short papers were presented:—

1. Giant Cell Tumours in unusual places by Dr. A. K. Basu, Calcutta.
2. Surgery of intractable pain—leucotomy, by Dr. B. N. Balakrishna Rao, Gwalior.
3. Club Foot by Dr. T. J. Agarwal, Delhi.
4. Some peculiar types of tumours causing intussusception in small and large intestines by Dr. M. G. Kini, Bombay.
5. King's operation by Dr. S. G. Joshi, Bombay.

Besides these, Dr. R. Kalamegham showed a short film on "Early Ambulation" and Dr. M. V. Sant exhibited a film on "Rehabilitation of severely handicapped with special reference to paraplegics." With demonstrations of some "unusual cases", by Dr. H. C. Gupta, Delhi, the Scientific Session for the morning came to a close.

The members of the Reception Committee were the hosts for a nice lunch that afternoon.

The afternoon Scientific Session consisted of papers by Drs. S. K. Sen and V. P. Mehta on "Sciatic Syndrome". An interesting discussion followed.

After tea by M's. Phillips Electrical Co. Ltd., the members reassembled at 5-30 p.m. for the Annual General Body Meeting.

XII Annual General Body Meeting

This was held at the Lady Hardinge Medical College. Dr. N. S. Narasimhan presided; 91 members were present.

After the President's opening remarks, a condolence resolution on the deaths of Dr. S. B. Gadgil of Bombay, Lt.-Col. A. Denham White of Alipore, Dr. M. A. Parthasarathy of Ramnad, Dr. G. R. Narayanaswami of Madras, Dr. K. S. Ray of Calcutta, Lt.-Col. B. S. Nat of Simla and Dr. Shivram Chopra of New Delhi, was passed, all the members standing, and the Hony. Secretary was requested to convey to the members of the bereaved families, the Association's deep sorrow at the demise of these members.

The Minutes of the last General Body Meeting, Annual Report for 1950 and the audited Balance Sheet for the year ended 31-12-1949 were then presented by the Hony. Secretary, and were accepted by the House.

The Hony. Secretary then informed the House that the Governing Body, after prolonged discussions and in view of Shri Rajkumari Amrit Kaur's speech, had decided not to press for a College of Surgeons of India at this juncture. The General Body then requested Drs. R. N. Cooper, S. R. Joglekar and A. V. Baliga to continue on the sub-committee for another year in order to finalise the proposals regarding a fellowship of the Association of Surgeons of India. It was decided to consider the proposals for fellowship of the Association of Surgeons of India at the next (XIII) Annual General Meeting at Calcutta.

The following resolution was then passed by the House:—

"It is unanimously resolved at this Meeting of the General Body of the Association of Surgeons of India held on 1-1-1951 at New Delhi, to request the Authorities concerned that a railway concession, during the session of the Conference, be granted to the members of the Association of Surgeons of India, the concession being a single fare for the journey to and fro".

The venue for the next Conference was the next item on the Agenda. There were two invitations, (i) from Dibrugarh, Assam and (ii) from Calcutta. In view of the repeated invitations from Calcutta, it was decided to hold the next Annual Conference at Calcutta during December 1951. Dr. A. K. Basu was unanimously elected as the Local Secretary.

The House then elected Drs. A. E. DeSa' of Bombay and S. P. Srivastava of Agra to fill up the two vacancies in the Editorial Board.

The President then read out the nomination papers submitted for the Presidential election. There were two names, viz. Dr. G. D. Kapur of Dibrugarh, and Dr. S. J. Mehta of Bombay. After a secret ballot, Dr. Kapur was declared elected as President for 1951.

After the President's concluding remarks, Dr. S. K. Sen, the Local Secretary, proposed a vote of thanks to all his colleagues, friends and student volunteers (from Lady Hardinge Medical College) who had so willingly helped to make the Conference a remarkable success. The Hony. Secretary then thanked Dr. Narasimhan for presiding over the affairs of the Association and the Conference so efficiently. On behalf of the Association, he conveyed to Dr. S. K. Sen and the other members of the Reception Committee and to the volun-

teers the sincere thanks of all the delegates for the excellent arrangements made and the hospitality and kindness bestowed on every one of them.

Amidst acclamation, the new President, Dr. Kapur was then led to the chair, by the retiring President; the meeting then came to a close.

The second Governing Body meeting was held at the same place soon after the General Body Meeting was over. Dr. G. D. Kapur, the new President, presiding.

12 members were present.

The admission of 7 ordinary members proposed during the Conference were confirmed.

From the list of subjects presented at the General Body Meeting, the following three subjects were selected for discussion at the 15th meeting to be held in 1953:—

1. Experiences in the Surgery of Portal Hypertension—

Opener: Dr. A. K. Basu, Calcutta.

Seconder: Dr. A. K. Datta Gupta, Calcutta.

2. Surgery in the treatment of Sequelae of Poliomyelitis—

Opener: Dr. K. S. Grewal, Amritsar.

Seconder: Dr. B. Mukopadhyaya, Patna.

3. Tumours of the Jaw—

Opener: Dr. R. Nigam, Nagpur.

Seconder: Dr. S. P. Srivastava, Agra.

With a vote of thanks by the Hony. Secretary, the meeting terminated.

That night Dr. Sen and Col. B. K. Sheorey were the hosts at a Cocktail party at Delhi Gymkhana. The elite of the City were present. The extreme cordiality and the lavishness of the reception, the members vying with one another to thank the hosts and the other members of the Reception Committee—all these made it a memorable finish to a grand and extremely successful Conference.

OBITUARY

Dr. G. R. Narayanaswamy was born in Ganapathi Agraharam in Tanjore District in January 1903. He joined the Madras Medical College in 1924. Completing his course of studies at the Madras Medical College, he took his L. M. & S. Degree in the year 1930, and joined the late Dr. Rangachari's Nursing Home as his assistant soon after. He was groomed into shape by the revered doctor and after Dr. Rangachari's sad demise came on in 1933, Dr. Narayanaswamy carried on the humanitarian work after the ideals and model of service set by his chief. For a period of over fifteen years since then he gave his unstinted aid to the afflicted and secured the admiration and attachment of the public. He was an active member of the local branch of the Indian Medical Association and did yeoman service on its behalf. He joined the Association of Surgeons of India in 1939 and was taking keen interest in its activities. He met with a premature death on 2nd of October 1950.



Dr. S. R. Chopra was born in 1903 at Gujranwala (now in Pakistan). After his early education, he secured admission in M.B.B.S. class in 1924 in King Edward Medical College, Lahore and qualified in 1928. He started his private practice at Simla. He attended the Ripon Hospital, Simla, where Lt.-Col. N. M. Wilson, I.M.S., Chief Medical Officer spoke very highly about his capabilities. In the same year he was selected as an Honorary House Surgeon, Mayo Hospital, Lahore, where he served for one year.



Dr. Chopra quitting Lahore, came to Delhi in 1929 and established himself there. He started his practice in a central locality on Egerton Road, and was a popular surgeon of Delhi with complete up-to-date equipments of Operation Theatre, X-Ray plant and Nursing Home, etc. In 1938 he was appointed as an Hony. Clinical Assistant and in 1940 as an Hony. Asst. Surgeon in which capacity he served for a period of four years upto 1943. He was also Hony. House Surgeon at the Civil Hospital at Delhi and an Hony. Treasurer of the Medical Association of Delhi. He used to visit Jain Anath Ashram once a week and gave free medicines to the patients there. In 1930 he helped the National Movement by attending to the wounded in several

civil disobedience campaigns. He died of sudden heart failure on 10th December 1950 at the age of 46 at Ambala.

Dr. Kumud Sankar Ray was born in 1892 in Calcutta. He passed the Entrance examination of the Calcutta University in 1907 and the First Arts (science) in 1909. He went to Edinburgh in 1911 and obtained the M.B.Ch.B. (with honours in Medicine) B.Sc. and M.A. degrees of the Edinburgh University. He then took up the appointments of the assistant superintendent of the Ochil Hill Sanatorium, Scotland, and came back to India in 1918.



On his return to India he joined the R. G. Kar Medical College as the assistant professor of Zoology. He was also the Visiting Surgeon of the Sambhunath Pandit Hospital and the Alipore Hospital, Calcutta. Since his return from England, Dr. Ray had been associated with various social and political activities in this country. He was a pioneer in the field of tuberculosis in India, and it was entirely due to his indomitable energy and his outstanding personality, that the Jadabour T.B. Hospital (now renamed as Kumud Sankar Ray T.B. Hospital after his demise) has risen to the eminence of a full-fledged modern T.B. Hospital with 460 beds. This hospital had a very humble beginning with 4 cottage beds and is now the biggest institution of its kind in India. Dr. Ray was a foundation member and the secretary and the superintendent of this hospital from 1922 till his death. This institution removed a long-felt want of the province of Bengal. It was also due to the untiring efforts of Dr. Ray, that a branch of this institution known as S. B. Day Sanatorium with 60 beds has been established in Kurseong (Darjeeling). He was also the superintendent of this sanatorium.

In 1921 Dr. Ray joined the non-cooperation movement at the call of Mahatma Gandhi and Deshabandhu C. R. Das. As a part of the non-cooperation programme, the National Infirmary and the Jatiya Ayurbijnan Parishad was founded by Deshabandhu and Dr. Ray became the chief steward. The Jatiya Ayurbijnan Parishad was later converted into the Calcutta National Medical College by amalgamating with the Calcutta Medical School. This non-official institution is now a full-fledged medical college affiliated to the Calcutta University. This institution also owes its eminence to the organising ability of Dr. Ray. Before his death he was elected the President of the Governing Body of this institution. Dr. Ray was the chairman of the medical section of the

ASSOCIATION NOTICES

Bengal Civil Protection Committee founded to organise medical relief during the air raid and famine of 1942-'43, from its very inception. It has since been taken over by the Govt. of West Bengal.

In 1925 Dr. Ray was elected a member of the Bengal Legislative Assembly when he was a prominent member of Deshabandhu Das' group. Subsequently he was a member of the Legislative Council of Bengal for six consecutive years. In 1926 he was elected a Councillor of the Calcutta Corporation and an Alderman in 1929. In these spheres also he made notable contributions. He was one of the few members of the profession who actively took part in politics.

Dr. Ray was the main architect of the Indian Medical Association, the national organisation of the medical profession of India. He was the General Secretary of the association since 1928 for a continuous term of 8 years and subsequently elected President of the Association which position he held for two years with credit. He was the Editor of the journal of the Indian Medical Asso-

ciation and held the position with conspicuous ability for nine years till his death. Dr. Ray had been connected with the Medical Council of India since 1933 as a member of the Council and became its President in 1949. Though he was a builder of many institutions he never craved for fame but was a model of silent and selfless work. His sincerity of purpose, his charming personality, his indomitable energy attracted every one who came in contact with him.

Of late Dr. Ray had been suffering from heart disease, but he was so much concerned with his duties that he went to the point of being indifferent to his own failing health, and did not take proper rest which was so urgently needed. He was to attend the meeting of the Medical Council of India at Madras on the 27th and 28th October and the Working Committee meeting of the Indian Medical Association at Coimbatore. He went first to Vellore to learn the latest development in the surgical treatment of tuberculosis. While at dinner at the house of his host at Vellore, on the night of 24th October, Dr. Ray complained of heart trouble and expired shortly after.

ASSOCIATION NOTICES

Subjects for discussion at future meetings

No. 4538-TC. New Delhi, Dated 27-1-1951.

12th Meeting:

1. Hydrocephalus—

Opener: Dr. A. E. DeSa', Bombay.
Seconder: Dr. R. Nigam, Nagpur.

2. Prolapse of the Rectum—

Opener: Dr. K. G. Munsif, Bombay.
Seconder: Dr. S. N. Mathur, Lucknow.

3. Tuberculosis of the Hip Joint

Opener: Dr. A. K. Basu, Calcutta.
Seconder: Dr. B. N. Sinha, Lucknow.

14th Meeting:

1. Surgical Treatment of Hypertension—

Opener: Dr. A. V. Baliga, Bombay.
Seconder: Dr. V. P. Mehta, Bombay.

2. Strictures of the Urethra—

Opener: Dr. H. Y. Khwaja, Bombay.
Seconder: Dr. U. Mohan Rau, Madras.

3. Tuberculosis of Lymph Nodes—

Opener: Dr. D. S. Iyer, Madras.
Seconder: Dr. S. K. Sen, New Delhi.

Railway Concession

Herewith is a copy of the Communication received from the Secretary, Railway Board, New Delhi:—

Dear Sir,

Sub.: Railway Concessions.

With reference to your letter dated 2-1-1951 received through the Ministry of Health, I am directed to state that the matter has again been carefully considered by the Railway Board, who regret that they are unable to include your Association in the list of All India bodies entitled to rail concessions.

Yours faithfully,

(Sd.)

For Secretary, Railway Board.

Copies of the Indian Journal of Surgery

As we have had several requests from Medical Libraries for copies of the back numbers of the Indian Journal of Surgery, will members, who can spare copies of the Indian Journal of Surgery, kindly send it to the following address:—

The Hony. Secretary,

Association of Surgeons of India,
207, Poonamalle High Road,
Madras 7.

NOTICES

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(b) Rankin and Mayo reported up to 1929, 55 cases of carcinoma in the small intestines as against 4597 in the large intestines and 4335 in the stomach.

(c) Raiford found 8.9% of the tumours in the small bowel and they were mostly of the adenomatous variety.

(d) King in 1917 collected 45 cases of leiomyoma in the intestines.

(e) Lipomas, haemangiomas and carcinoid tumours are rare and the last mentioned are so small as to be of no significance.

Raiford¹⁰ while reviewing 35 cases of benign tumours found that adenomata occurred in 11 cases, myomata in 11 cases, fibromata in 6 cases, lipomata in 2 cases, hemangiomata in 2 cases, cystadenoma in 1 case, adenomyoma in 1 case and osteochondroma in 1 case.

This paper reviews 9 personal cases along with one from a colleague and the following analysis gives the type of tumours and the location of intussusception.

Situation of intussusception	No. of cases	Age	Type of tumour found
Ileo-ileal	4	13, 16, 30, 50	Polypi 3/13, 4/16, 10/50* Sarcoma 5/30.
Ileo-cecal	2	3, 4	Lympho-sarcoma 1/4* Suspected lympho-sarcoma 2/3
Ileo-colic	1	26	Specimen lost 7/26* no pathological report available.
Ceco-colic	3	30, 45, 55	Polypi 8/30, 6/45, 9/55*

*Note:—The numerator in the column Type of tumour found, shows the numerical number of the case tabulated and the denominator gives the age of the case.

The provocation for writing this paper is not only the number of cases of one type in personal surgical experience but also the interesting histological description of the majority of tumours because they are described as akin to nasal polypus. The current view of rhinologists regarding nasal polypus is that it is a fibroma. It is well known that the polypoidal outgrowth of the nares lacks the histological feature of an autonomous growth. Sometimes it consists of nothing more than localised edematous areas of mucous membrane rendered protuberant by mechanical means. Once this becomes established they become subject to various grades of hyperplasia, leading ultimately to polypoidal growths with characteristic core of fibromatous tissue with a hyperplastic mucous membrane and these are classified into the following types:—

1. Simple fibro-edematous polypus.
2. Adeno-fibromatous polypus.
3. Fibro-cystic edematous polypus.
4. Fibro-haemangiomatous polypus (rare).

In the intestines generally polypi are found in the large bowel either single or multiple. They are usually adenomatous or fibromatous and are benign but are likely to undergo malignant change of a carcinomatous nature. Saint¹³ had stated the frequency to be as 4 is to 1 between the large and the small intestines. In the personal series there were 4 cases of polypi resembling nasal polypus in the small intestine of which one had undergone sarcomatous change. In the large intestines chiefly in the cecal area there were 3 polypi of this type. These tumours were $\frac{3}{4}$ " to $1\frac{1}{2}$ " in diameter. In most cases the pedicle was short. On section a central core of fibroblastic tissue was seen with inflammatory reaction and haemorrhages. Wardill¹⁵ had stated that in some of his cases the segment of bowel distal to the tumour formed the apex of the intussusception. In one case (Major Sheppard's case No. 10) the tumour was dumbbell shaped with the big part of dumbbell inside the

lumen of small intestines and a smaller part protruding on the peritoneal surface. It is peculiar in these cases that the mucous membrane instead of being hyperplastic was stretched and, in some cases, had definitely ulcerated on the surface. It is quite possible that these polypi which occur in the ileum and caecum are of inflammatory origin and started in the region of the lymphoid patches which ultimately after repeated inflammation became so big as to lose its identity. The clinical course in most of these cases has been of a chronic nature. It is presumed that these tumours which are described by the pathologist as structurally like the nasal polypus first produce discomfort and partial obstruction and later lead to the formation of intussusception with complete obstruction.

TREATMENT

A perusal of the history of the cases shows the chronic nature of the disease and when the cases sought admission to the hospital they were in such a bad state that operative interference was done at great risk to the patient's life. In the majority of the cases in the small intestines a resection with end to end anastomosis has given very satisfactory results and on follow up they are found to keep very good health. In the cases of ileo-caecal intussusception due to polypoidal tumour a wide resection was done suspecting it to be due to a malignant tumour seeing the enlargement of glands in the mesentry. In one case cholecystectomy was done along with ileo-colectomy for intussusception. The patient did very well for 10 days but later developed intractable diarrhoea, ultimately had a perforation at the anastomosis a month later and was operated on a second time and it was found that the large bowel was studded with small shallow ulcers in the proximal and distal part of stoma as well as in the stomal region, of which one had perforated and caused the leakage. He died on the third day after operation (case No. 6). In the other case where a wide resection was done the patient died of shock 48 hours

after the operation (case No. 7). He was a poor risk.

SUMMARY

10 cases of intussusception are reported in this series. All these occurred in males at the ages of 3, 4, 13, 16, 30, (2 cases) 45, 50 and 55. Of the 6 cases which were polypoidal in nature 3 occurred in the small bowel (ileum) and 3 in the large bowel (caecum). They resembled nasal polypi in structure. One other case though it resembled a polypus proved to be sarcomatous. Of the two children who suffered from intussusception one child aged 4 years suffered from lympho-sarcoma which formed the apex of an intussusception of the ileo-caecal type; in the other child it was suspected to be a similar condition but could not definitely be proved, as the specimen was lost.

(2) Excision of the intussusception with end to end anastomosis in the small bowel and excision of the distal 6" of ileum and the large bowel up to the proximal half of transverse colon with lateral anastomosis has given good results in cases of ileo-caecal, ileo-colic and ceco-colic types of intussusception.

(3) Amoebic dysentery as a cause of intussusception has been mentioned, but cases are not tabulated. This does not react to emetine treatment and bowel washes. Even after fixation by a short circuiting operation emetine administration is useless as the intussusception recurs; the results are more satisfactory after complete excision of the distal 6 inches of the ileum and the whole of the ascending colon and the proximal part of the transverse colon with lateral anastomosis.

(4) There were 5 deaths after operation. Case No. 1 and 2 were poor risks and though a complete excision was done in case No. 1 the patient died 3 days after operation. In case No. 2 it was impossible to excise as the intussusception had become gangrenous and ileostomy was done to relieve the obstruction. The child died

within 24 hours. Case No. 5 was recurrent fibroma of the leg with a hemothorax on the left side, and was operated on for intestinal obstruction due to intussusception of the small bowel. The intussusception was excised and on histological examination proved to be sarcomatous in nature. Case No. 6 is interesting because the gall bladder had dark patches on its peritoneal surface along with the intussusception and the abdomen contained bile stained fluid. Cholecystectomy and ileo-colectomy were done at the same time. He died a month and 10 days after operation due to a perforation at the site of the anastomosis following intractable diarrhoea. Case No. 7 died of shock. It is unfortunate that the specimen has been lost and no pathological report is available.

CASE REPORTS

(1) Hindu male child aged 4 years was admitted for chronic intestinal obstruction of 2 months' duration. The mother of the child gave a history of a swelling in the abdomen which was changing its position from the right lower part of the abdomen to the pit of the stomach and was accompanied by acute periodic colicky pain relieved by vomiting 5-6 hours after meals. On admission the patient was found to be very emaciated, anaemic, tongue slightly coated, teeth dirty. A sausage shaped tumour was found in the epigastric region. It was smooth, not very clearly defined and visible peristalsis was found above the tumour. Plain x-ray talsis was found above the tumour. Plain x-ray examination showed an obstruction in the small intestines. Under local anaesthesia supplemented with ether, the abdomen was opened through a right paramedian incision and an intussusception of the ileo-caecal type was found. The intussusception was partially reduced by milking and resection was done of the distal 6" of the ileum resection was done of the distal 6" of the ileum ascending colon and proximal half of the transverse colon with the enlarged lymphatic glands and an ileo-transversostomy was done and abdomen closed in layers. The patient died 3 days after the operation; the pathological report showed a lympho-sarcoma forming the apex of the intussusception. No post-mortem was allowed to find out the cause of death. The specimen removed has been lost.

(2) Hindu male child aged 3 years was admitted with a history of chronic intestinal obstruction of one month's duration. The child was admitted in a bad state with a tumour on left side of the abdomen with a feeling of emptiness in the right iliac fossa and a ladder-like pattern in the supra-umbilical region and marked periodic colics. On rectal examination the apex of the intussusception

could be felt with anchovy coloured discharge on the examining finger. He was operated on the same day under local anaesthesia supplemented by ether towards the end. A right paramedian para-umbilical incision was used for opening of the abdomen. An intussusception was found on the left side with emptiness in the right iliac fossa. The intussusception was adherent all round the

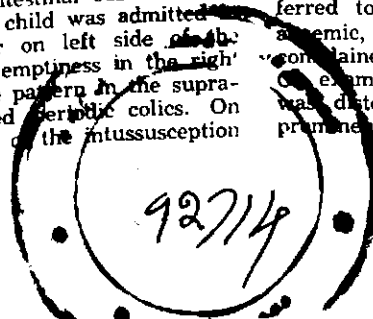


Fig. 1-a.

Shows segment of the small bowel with the tumour sectioned.

neck and the mesentric vessels were found thrombosed. It was difficult to reduce the intussusception as the bowel wall appeared to be gangrenous. As a life saving measure ileostomy was done and the abdomen was closed in layers. The child died and post-mortem was not permitted by the parents to determine the cause and the type of intussusception. It is presumed however that it was an intussusception of the ileo-caecal type due to a tumour, same as in case 1.

(3) Hindu male boy aged 13 years was admitted for colic of one month's duration. He stated that severe pain and colic started 3 weeks before admission with distension of the abdomen. He had constipation and he developed vomiting every time within half to one hour after taking of food. He was admitted on the medical side first and transferred to the surgical side. He was emaciated, anaemic, no jaundice, tongue coated and dry; he complained of thirst and dryness of the mouth. On examination it was found that the abdomen was distended, the coils of intestine stood out prominently in ladder like pattern. A lump could



be felt in the region of the umbilicus. His respiratory and circulatory systems were found normal and a plain x-ray was taken which showed obstruction of the small intestines. He was operated on under local anaesthesia using a right paramedian incision. On opening the abdomen an intussusception of the ileo-ileal type was found and the intestines proximal to the obstruction were found ballooned out. The intussusception was partially reduced by milking but having found it difficult to completely reduce the intussusception an enterectomy was done with end to end anastomosis and the abdomen closed in layers. The patient had slight lung signs after the operation but recovered. The wound healed by first intention.

Pathological Report: The intussusception was found to be due to a granulomatous polypoidal growth ulcerated on the surface which formed the apex of the intussusception. The mucous membrane was found undermined by the extension of the granulomatous tissue for some distance. The vessels of the muscular coat showed marked endothelial hyperplasia and swelling with sparse perivascular lymphocytic infiltration and showed myxomatous degeneration with oedema and inflammatory cell infiltration. The patient reported 2 years after the operation and was found keeping fit. (Figs. 1-a, 1-b and 1-c.)

(4) Hindu male aged 16 years was admitted with colicky acute pain of 28 hours' duration. He stated that the pain started as a dull aching pain round the umbilicus. A month before admission he used to get occasional distension and gurgling noises, later he found that the pain got more and more acute until 2 days before admission it was

very acute. On examination the abdomen was found rigid and tender; the small intestines stood out in ladder-like pattern when the colicky pains were acute. He had no vomiting. His respiratory and circulatory systems were found to be normal. But his haemoglobin was 55% with ankylostoma ova in stools. Barium meal examination showed obstruction in the small bowel. He was operated on under local anaesthesia using a right paramedian incision. The whole of the small intestine was found very much distended and had to be emptied by means of a trocar and canula before any further exploration could be done. After emptying the proximal distended coils, an ileo-ileal type of intussusception was found 4 feet proximal to caecal junction. The intussusception was partially reduced and as there was a tumour which prevented complete reduction a resection was done taking 6" of the bowel above the site of the growth and 4" below the growth and end to end anastomosis was done. The patient had an uneventful recovery. Pathological report showed a polypoidal growth which formed the apex of the intussusception. On section it showed numerous young capillaries mono-nuclear lymphocytic infiltration into oedematous fibrous tissue typical of inflammatory polypoidal growth resembling a nasal polypus. The patient has reported that he is keeping perfect health. (Figs. 2-a, 2-b, 2-c and 2-d.)

(5) Hindu male aged 30 years was admitted for a fibro-sarcoma of the right leg with peroneal paralysis. Two days after admission he was found breathless and suffering from acute colic. On examination it was found there was a tumour on the right side of the leg below the knee which had recurred after removal 5 months before admission

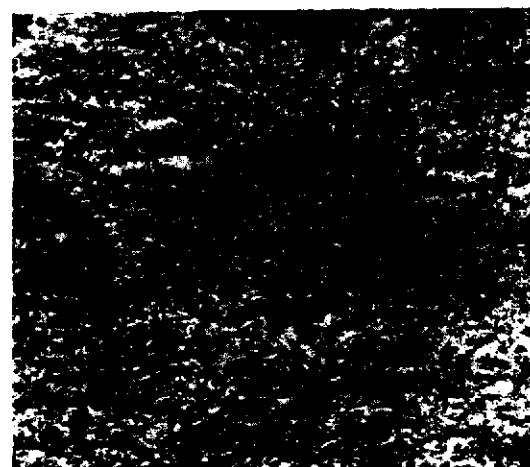


Fig. 1-b.

Figs. 1-b & 1-c are microphotographs showing the fibroblastic structure with myxomatous degeneration.

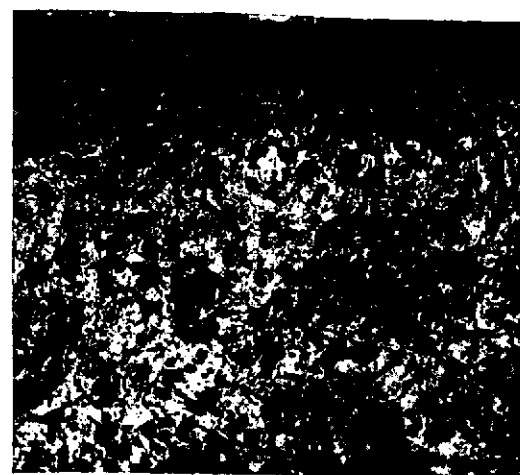


Fig. 1-c.



Fig. 2-a.

Photographs of the specimen showing the nature of the tumour.



Fig. 2-b.



Fig. 2-c.

Figs. 2-c & 2-d are microphotographs. The histological picture is the same as in Figs. 1-b & 1-c.

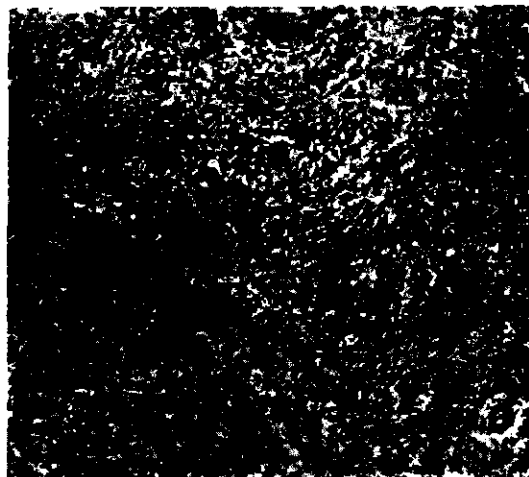


Fig. 2-d.

with peroneal paralysis. He had dyspnoea and on examination it was found that he had dullness in the left side of the chest with loss of breath sounds, and displacement of the heart. On examination of the abdomen, the intestines were found to stand out in ladder-like pattern with acute colic coming on at intervals of half an hour. Intestinal obstruction was diagnosed in addition to the effusion in the chest and under local anaesthesia the abdomen was opened and on opening the abdomen an ileo-ileal type of intussusception was found in the middle of the ileum. By milking the reduction of the intussusception was partially possible, but not completely. So it was excised and end to end anastomosis was done. The patient stood the operation well in spite of the displacement of the heart, but died 3 days after operation, probably of heart failure. No post-mortem was allowed but pathological report showed a small growth with degeneration which formed the apex of the intussusception. On section it was found to be sarcomatous in nature. (Reported in Indian Journal of Surgery, Vol. 5, No. 3.)

(6) Hindu male aged 45 years was admitted with acute colic and pain and a moving mass in the right iliac and lumbar regions. He gave a history of filarial fever and enlargement of glands in the groin 15 years before admission. 25 days before admission he had an attack of fever which lasted for one day, to recur 7 days later with some nausea. Later he developed abdominal pain mostly above the umbilicus and more intense on the right side. The mass moved from the right to the middle line of the abdomen. He had a daily motion prior to 3 days before admission. Subsequently he had constipation with borborygmi. On examination his abdomen was found moving freely on respiration and slight tumidity of the right

lumbar region was seen. No visible peristalsis was observed. A mass was found in the right lumbar region which extended up to the right hypochondriac region. His respiratory and circulatory systems were found normal and rectal examination showed nothing abnormal. Under local anaesthesia supplemented by gas and oxygen the abdomen was opened by a right paramedian incision. On opening, bile stained fluid was found in the peritoneal cavity and the gall-bladder was found to be distended oedematous with dark patches over the surface. On further exploration an ileo-caecal intussusception was found. Firstly cholecystectomy was done and later the ascending and transverse colon was mobilised and the distal 6" of ileum and the whole of the ascending colon with the glands in the mesentery and proximal half of the transverse colon were removed and lateral ileo-transversostomy was done. The posterior part of the abdomen was carefully peritonised. The abdomen was closed in layers with two drains, one in Morrison's pouch and one in the right flank draining the right para-colic gutter. The drainage was removed and the wound healed by first intention. 10 days after the operation the patient developed diarrhoea and a month later the patient had an acute perforation with leakage through the drainage area draining Morrison's pouch. The abdomen was opened under local anaesthesia and the perforation found in the region of anastomosis was closed. It was found that the leakage was due to small ulcers one of which had perforated. The patient had very bad teeth with marked pyorrhoea alveolaris and a foul smelling mouth.

Pathological Report: Gall-bladder shows chronic inflammatory changes in the submucous layer with oedema of peritoneal coat. Pathological report of the tumour of the colon:—A fibromatoid polypus showing a good deal of oedema and cell infiltration, a number of unstriated muscle fibres were present at the base of the growth. Lymph gland showed an acute catarrhal lymph adenitis. The patient died a month after the first operation and 4 days after the second operation due to marked wasting due to uncontrollable diarrhoea, even after administration of emetine. Emetine was administered though the motions were negative for entamoeba histolytica. (Fig. 3.)

(7) Hindu male aged 26 years was admitted for pain in the abdomen, duration one week. Vomiting and passing of blood in stools. Patient stated that he had fever and pain in the abdomen, the pain started in the right iliac fossa and was of intermittent colicky type. The day after the pain he had several vomitings and the vomits contained blood. This happened the day before admission. On admission he was found emaciated, temperature 100, pulse 84, respirations 24, his abdomen moved with respiration. On palpation there was a sausage shaped swelling to the right of the umbilicus which got more prominent during the attack of acute colicky pain. He was operated on



Fig. 3.
Specimen removed from Case No. 6.

as an emergency 4 hours after admission using a right para-umbilical incision. On opening the abdomen an ileo-colic intussusception was found. The intussusception was reduced partially but could not be further reduced and so excision of the distal 6" of the ileum, the whole of the caecum transverse colon and proximal half of the transverse colon was done; an ileo-transversostomy was performed and the abdomen closed in layers. The patient had rapid pulse at the end of the operation and shock and he died the next day. As the specimen has been lost no pathological report is available.

(8) Indian Christian male aged 30 years was admitted for colic and constipation of 4 days' duration. There was vomiting and passing of blood in the stools. On examination it was found that he had a palpable tumour in the epigastrium which increased in size during colic. The severity of the symptoms was of 12 hours duration. He was operated upon and a caeco-colic type of intussusception was found. After milking out partially ileo-colectomy and ileo-transversostomy were performed. The patient had an uneventful recovery and was returned to the Military Hospital in 10 days' time. The pathological report is as follows:—Polypoid mass was found 3" from the lower margin of the caput caecum. The mucous mem-



Fig. 4.
Specimen from Case No. 8.

brane is raised by the blood clot about the size of an almond. Section report:—Submucous haemorrhage with infiltration with polymorphs and eosinophiles in a polypoid structure. (Fig. 4.)

(9) Hindu male aged 55 years was admitted for treatment of intermittent pain round the umbilicus of three weeks' duration with vomiting of one week's duration. For a month before the onset of this trouble the patient stated he had bleeding two times during defecation; later, he developed intermittent pain with gurgling sensation in the lower abdomen. Since vomiting started he suffered from constipation and hiccup, and lost weight. He was operated on as an emergency for intussusception under local anaesthesia. On opening the abdomen a firm sausage shaped mass was found lying almost transversely in the abdomen at the level of the umbilicus. With the milking process it was partially reduced and ileo-colectomy and ileo-transversostomy were done. Pathological report:—A cellular fibroma undergoing myxomatous changes which formed the apex of the intussusception was found arising from below the ileo-caecal opening. This patient on follow up had gained 20 lbs. in weight. (Fig. 5.)

(10) A Mohammedan male age 30 years was admitted for intermittent pain in the epigastrium



Fig. 5.

Specimen removed from Case No. 9.



Fig. 6-a.



Fig. 6-b.



Fig. 6-c.

Figs. 6-a, b, & c are photographs of the specimen removed from Case No. 10. Note the dumbbell-shaped nature of the tumour.

which gradually became persistent. The pain usually came on soon after meals and lasted a short time. A week after admission the pain was more persistent and was followed by vomiting. Though he was constipated his appetite was good. There was no history of blood or mucus in his stools. On examination an indefinite moving mass was felt in the epigastrium. The abdomen was opened a week after admission and an intussusception of the ileo-ileal variety was found. Complete reduction was not possible owing to the size of the tumour which formed the apex of the intussusception and due to the oedematous condition of the caecum. Excision of the intussusception was done and ileo-transverse colostomy was performed. The patient was discharged cured. Pathological report:—The tumour is dumb-bell shaped and is situated in the small intestine with the bigger part of the dumb-bell inside the lumen of the small bowel and the smaller part of the dumb-bell outside on the peritoneal surface. Microscopic section shows numerous young capillaries and oedematous fibrous tissue resembling a nasal polypus. (Major F. A. B. Shephard's case—Figs. 6-a, 6-b and 6-c.)

REFERENCES AND BIBLIOGRAPHY

1. Cohn, S., Landy, R., & Richter, M.: Tumours of small intestines. *Arch. Surg.* 39. No. 4. 647.
2. Collins, F. M.: A case of Colo-colic intussusception due to dysenteric ulceration. *Brit. J. Surg.* 27. 1939. 144.
3. Groper, M. J.: Retrograde intussusception. *Ann. Surg.* 112. No. 3. 344-348.
4. Golden, T. and Stout, A. P.: Smooth muscle tumours of gastro-intestinal tract and retro-peritoneal tissues. *Surg. Gynec. & Obst.* 73. 784. 1941.
5. Kini, M. G. and Venkoba Rau.: Acute Abdomen. *Antiseptic.* June 1938.
6. Kini, M. G.: Intussusception of the small intestines due to polypoidal looking mass which proved sacromatous in nature. *Ind. J. Surg.* 5. No. 3. 1945.
7. Kini, M. G., Rau, V. S., and Rau, A. R.: Problem of acute abdomen in general and appendicitis in particular. *Journal of Indian Medical Association.* 20. 1st Oct. & Nov. 1950.
8. Perrin, W. S. and Lindsay, E. C.: Intussusception—a review of 400 cases. *Brit. J. Surg.* 9. 46. July 1921.
9. Raiford, T. S.: Tumours of small intestines—their diagnosis with special reference to the x-ray appearance. *Radiology.* 16. 253-270. 1931.
10. Raiford, T. S.: Tumours of small intestines. *Arch. Surg.* 25. 123-175. 1932.
11. Rankin, F. W. and Newell, C. F.: Benign Tumours of intestines. *Surg. Gynec. & Obst.* 37. 1933. 501.
12. Saldana, J. A.: Transactions of teaching pathologists Medical Bulletin. Vol. 8. No. 1. Jan. 1940.
13. Saint, J. H.: Polypi in intestines. *Brit. J. Surg.* 15. July 1927.
14. Shepphard, F. A. B. (Major): Personal communication.
15. Wardill, W. E. M.: Polypi in Bowel causing intussusception. *Brit. J. Surg.* 18. July 1925. 158.

BLADDER STONE PROLONGED AND IMPACTED IN THE PROXIMAL URETHRA — 'PERINEO-ABDOMINAL' LITHOTOMY*

by M. V. KAMATH, Akola.

The difficulties and complications attendant on the removal of a bladder stone which has got prolonged into the proximal urethra to a variable distance and got tightly impacted have not been sufficiently stressed in books on operative surgery. That such a stone exists usually means that the condition has been there for quite some time and that it has been neglected. Usually these cases are from the poorest classes and suffer from malnutrition, anaemia and, perhaps, also other complications such as chronic malaria. The physical presence of the stone in addition to causing obstruction to the passage of urine and giving rise to back-pressure effects on the bladder, uterus and kidneys (including variable degrees of renal failure) is also a constant source of irritation to the trigone; it also keeps the internal bladder sphincter, (and, as in Case No. 3, the sphincter of the membranous urethra as well), stretched and opened out. The result is there is an almost constant painful incontinence of urine and if infection is superadded, as is not unlikely, the patient's lot is miserable; and one is forced by these patients who are almost driven to the point of suicide to interfere much earlier than the state of their general health would warrant.

The removal of such a stone by a suprapubic route alone is attended by considerable trauma to and bleeding from the trigone, the bladder-neck and the prostatic urethra, since it is not easy to dislodge the tightly impacted rough stone even with an assistant's finger in the rectum. There is also a certain amount of shock in the already not-too-well patient; as a remote effect it is possible that such trauma may give rise to bladder-neck obstruction or stricture of the proximal urethra as in Case No. 1 below.

Below are described briefly three cases in the first two of which the stone was removed through the bladder, and in the third a combination of perineal and suprapubic lithotomy was done with complete success.

CASE No. 1.

P. G. Wayari — age 25 years. Admitted into the Main Hospital, Akola on 23-3-50 with a history of difficulty in passing urine, dribbling with sudden stoppage of urine of about 21 months' duration and haematuria off and on. 15 months previous to admission a quack had passed a rubber catheter for relief of stoppage of urine, but while pulling out a portion of the catheter remained in the bladder. No history or evidence of gonorrhoea was obtained. The X-Ray report read "foreign body? (probably catheter) in the urethra at the posterior part in kinked position. A uniformly rounded area along the catheter might be calculus" (Fig. 1).



Fig. 1.

(Case 1). The shadow of the rubber catheter can be seen in relation to the stone.

Suprapubic lithotomy on 1-4-50. The bladder could not be distended as no rubber or metal catheter could be passed beyond the stone impacted into the prostatic urethra. There was a piece of rubber catheter 4 inches in length coiled up in the bladder, the stone being partially built round it and it was also found that the stone was impacted in the prostatic urethra. The stone was removed with much difficulty piecemeal after breaking it with the help of the finger of an assistant in the rectum. The postoperative course was marred by sepsis of the wound with wide gaping of the bladder incision and soaking of dressings. There developed a stricture of the membranous urethra which had to be periodically dilated. A secondary suture of the wound had to be done. He also developed a right sided epididymo-orchitis which, however, subsided with penicillin. Nearly two months after the operation he could hold some urine but only in small quantity. There was still leakage of urine from the suprapubic fistula which closed after a further three weeks. At the time of discharge he could hold 8 ozs. of urine in the bladder.

CASE No. 2.

N. Deosingh — aged 21, admitted into the Main Hospital, Akola on 5-4-50, with difficulty in micturition and pain while passing urine with occasional haematuria all of 5 years' duration. On rectal examination a large stone was felt in the prostatic urethra — confirmed by sounding. Skiagram revealed a large stone in the bladder with a prolongation down the urethra. There was no renal or ureteral stone.

On 8-4-50 after filling the bladder through the urethra the bladder was exposed through a suprapubic midline incision. There was a large thin walled diverticulum of the front and upper wall of the bladder to which a coil of small intestine was adherent. There was a recent perforation of the diverticulum into the peritoneal cavity through which some of the boric lotion had flown into the peritoneal cavity while the bladder itself was tightly contracted over the stone 2½" x 2" which was also impacted into the urethra. The bladder was incised and the stone removed piecemeal with the help of chisel and hammer and an assistant's finger in the rectum. There was a fair amount of bruising of the urethra which was unavoidable, and brisk oozing for some time, and as the condition of the patient was getting low, intravenous continuous drip infusion of glucose-saline was started and kept on. The bladder wall was stitched in two layers with suprapubic drainage, but as the patient's condition was getting worse nothing radical was done to the diverticulum, the hole in which could not be closed as the tissues round about were very thin and friable. This portion of the wound was packed with vaseline gauze and left alone for peritonisation. In spite of penicillin, urinary antiseptics, proteins and vitamins the

wound became very septic (although the peritoneal cavity had got shut off) and there was constant escape of urine. He gradually became worse and died on 26-5-50 — 18 days after operation.

CASE No. 3.

P. aged 20 years, admitted into the Main Hospital, Akola on 21-6-50, complaining of burning during micturition of 3 months' duration and passing urine in drops almost continuously day and night for two months. There was no haematuria. On examination there was no urethral discharge, but there was a hard lump in the region of the bulb of the urethra, which on rectal examination was found to be continuous upwards with a hard swelling in the membranous and prostatic urethrae completely destroying the prostatic gland substance. A sound passed per urethram could not be passed beyond the hard mass which was confirmed to be a stone. Skiagram revealed an L-shaped stone starting from above the symphysis pubis reaching down to the perineal urethra with a second rounded stone perching on top of it. (Figs. 2 & 3.) The urine was alkaline and contained ammonium urates and phosphates and epithelial cells. On 1-7-50 under spinal anaesthesia with the patient in the lithotomy position a vertical median incision exposed the lower end of the stone as it lay in the bulb and perineal portion of the urethra. With a drill, chisel and a hammer, as much of the stone as could possibly be removed per urethrum under direct vision was removed. The urethra was found to be dilated to a dia-



Fig. 2.

(Case 3). The sound is in the penile urethra.

*A paper read at the XII Annual Conference of the Association of Surgeons of India at New Delhi on 31-12-1950.



Fig. 3.

(Case 3). The sound is kept in a different position. Note the laminated appearance of the lower end of the stone as it is seen end on.

meter of about $\frac{3}{4}$ of an inch at the site previously occupied by the stone. The wound was temporarily packed and the patient's legs straightened out on the table.

Through a median suprapubic incision the bladder was exposed and incised. The free rounded stone was easily removed, but the remaining portion of the impacted stone had to be removed piecemeal with the help of a chisel and hammer. The bladder and urethra washed out, bladder completely closed in two layers and the wound closed with drainage to the cave of Retzius. A large self-retaining catheter was passed into the bladder through the perineal opening and the other end of the catheter was brought out through the external meatus. The perineal wound also was completely closed in layers. Unfortunately, on the 9th day when sutures were removed there was disruption of both wounds with dribbling of urine through the perineal wound. After doing immediate suture paravaginal vitamin C and penicillin were started with proteins and vitamins by mouth. The upper wound healed completely but the lower wound developed into a fistula which took about a month to heal. A cystogram done on 30-8-50



Fig. 4.

(Case 3). Cystogram. Note the hydroureters (see text).

(i.e. 2 months after operation) with penis clamped and patient straining shows the sodium iodide up both ureters which are still in dilated condition showing complete loss of the valvular mechanism at the uretero-cystic junction but the proximal urethra is not seen much dilated (Fig. 4). He was discharged cured on 12-9-50, with ability to hold about 8 ozs. of urine.

Considering the size and situation of the stone and its extension right down to the perineal urethra in case 3, the removal of the stone was attended with practically no bruising of the parts or bleeding, and but for the unfortunate wound disruption on account of hypovitaminosis and malnutrition, convalescence should have been quite uneventful. It would seem advisable in future that in many of these cases a combined route is followed; in those cases where the stone is not extending beyond the prostatic urethra and in which most of the prostatic glandular substance is destroyed (as in Case No. 1) an approach similar to the one employed in perineal prostatectomy may perhaps be used in conjunction with a suprapubic approach, and if as in Case No. 3 above where the stone actually reached down to the bulb and beyond, a combination of urethro- and suprapubic lithotomy may be used.

SUMMARY

1. Some of the complications and difficulties attendant on removal of bladder stone prolonged to a variable extent down the urethra as exemplified by two cases are discussed. In one case the post-operative stricture of the membranous urethra and epididymo-orchitis were presumably due to the trauma inevitably caused by removal of the stone through the bladder.

2. A third case is presented in which a combined 'perineo-abdominal' route was followed.

3. A plea is made that a combined route be followed in such cases, the perineal part being modified according to the downward extension of the stone.

ACKNOWLEDGEMENT

My thanks are due to Dr. S. C. Mitra for help rendered in the preparation of this paper, to Dr. G. S. Nakade, Radiologist for the skiagrams, and to the Director of Health Services, and the Government of Madhya Pradesh for permission to publish this paper.

PRIMARY CARCINOMA OF THE FALLOPIAN TUBE

by D. J. REDDY, Madras.*

Malignant disease of the fallopian tube is rare. Upto September 1949, only 450 cases have been reported. Since then a few isolated reports have appeared. Only one case of primary carcinoma of the fallopian tube was found among 1,607 malignant growths of the female genitalia reported by Diddle (1950). It is said to form 0.45% of female genital cancers. Martzloff (1940) puts it forming less than 1% of female genital cancers. This low incidence of tubal cancers is probably due to the lining epithelium of the tube being comparatively inactive and not subject to periodic hyperplasia and desquamation at menstruation and pregnancy, like that of the uterus.

None of the reported cases bears the pre-operative diagnosis of carcinoma of the tube. Even at laparotomy, it is not distinguishable from chronic salpingitis. Only histologic study will reveal the carcinomatous nature of the swelling. Cases reported by Mohler *et al* were not recognised till routine histological examination of segments, clinically unsuspected, was done. Many gynaecologists are said to have gone through their career without seeing a single case or at any rate, without recognising one.

Credit goes to Reynaud who in 1847 recorded the first case of primary carcinoma of the oviduct. The pathologic picture of the same was given by Rokitansky in 1861. Orthmann in 1888 was the first to give a complete and authentic description of the lesion.

Women at the climacteric, most commonly suffer from carcinoma of the fallopian tube (75% of the cases), though cases are recorded of its having occurred at 18 and over 70 years of age.

The etiology of primary carcinoma of the fallopian tube is disputed. A good number of the reported cases were sterile. Many

have attributed tuberculous or other forms of chronic salpingitis as causal factors. Their co-existence with primary carcinoma of the tube must be regarded only fortuitous. Pathologists and gynaecologists recognise that chronic salpingitis is a common lesion and frequent reports of tubal carcinoma are to be expected, if chronic salpingitis was a pre-disposing factor.

Primary carcinoma of the fallopian tube is bilateral in a third of the cases. The affected tubes may vary from normal to greatly distorted shapes. They may be large and palpable. In a few cases reviewed, no palpable mass was felt. Sectioned surface of the growth reveals greyish friable excrescences filling the lumen. These growths may present simple papillary adenocarcinomatous or alveolar patterns in single or multiple sections of the growth. The papillary type is considered to be an earlier stage of the lesion, while the alveolar pattern is a later stage in the evolution of the lesion. In primary carcinoma of the tube the lining epithelium is replaced by tall folds of columnar cells. The nuclei of these cells are of varying sizes. Mitotic figures are seen. Very rarely primary carcinoma of the oviduct invades the muscle wall. Invasion of the serosa and muscle wall by neoplastic cells is frequently seen in the case of secondary deposits in the oviduct. McGoldrick *et al* have described papillary and infiltrative types of primary tubal carcinoma. There are cases where connective tissue stroma is seen to wall off papillary adenocarcinomatous nodules from one another. The pathologist is often forced to use the non-committal word carcinoma of tube when clinical data are inadequate, as unrecognisable primary growths other than ovarian or uterine may produce confusing secondary disease of the oviducts. In these cases the provisional diagnosis of tubal carcinoma has to be invariably confirmed by a thorough searching necropsy.

PRIMARY CARCINOMA OF THE FALLOPIAN TUBE

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Fallopian tube carcinoma is very malignant as only 0.4% of the cases survive a 3 year period without Roentgen therapy.

789 malignant growths of the female genitalia were spotted in 7,620 obstetrical and gynaecological biopsy specimens examined at the Pathology Department, Medical College, Madras during the years 1949 to 1950. This works out to one case of malignant disease for every ten obstetrical and gynaecological biopsies examined. There were eight cases of primary tubal carcinomas for the period under review and they form 1% of female genital malignant tumours. 378 fallopian tubes were histologically studied and 2.1% of them showed primary carcinoma.

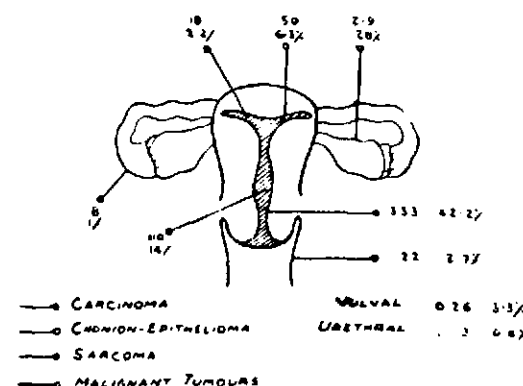


Fig. 1.

Showing total and percentage distribution of malignant growths of the female genitalia. (Pathology Department, Medical College, Madras, 1940-1950).

CLINICAL HISTORY AND BIOPSY REPORT

Female, aged 25 was admitted under Dr. M. K. K. Menon, Govt. Women and Children Hospital, Madras, in December 1949, for pain in the lower abdomen, dysmenorrhoea and leucorrhoea. Was married five years ago. Never conceived.

Pelvic Examination: No mass felt. Uterus retroverted.

Clinical Diagnosis: Retroverted uterus. Panhysterectomy was done.

Post-operative Diagnosis: Retroverted uterus with cystic ovaries.

Morbid Anatomy and Histology: The uterus showed neither gross nor microscopic lesion. The right ovary showed follicular cysts.

Distal two-thirds of both the fallopian tubes were nodular and enlarged to the size of the ring finger. They were firm. The serous surface was smooth.

Cut Surface: The lumen of each tube was filled with greyish white papillary excrescences.

Sections under the microscope showed marked proliferation of the lining epithelium which was thrown into several folds. Columnar cells lining these epithelial folds showed well marked stratification. (Photomicrograph 1.) Nuclei of the lining



Fig. 2.

Photomicrograph showing marked proliferation and stratification of cells of lining epithelium of fallopian tube. Nuclei are deep stained. (x 100)



Fig. 3.

Photomicrograph showing circumscribed cystadenocarcinomatous nodule with papillary processes infiltrating the tubal wall. (x 100)

*From the Department of Pathology, Medical College, Madras.

cells were hyperchromatic. Circumscribed cystic spaces lined by single or double layered columnar cells with papillary processes dipping into them, were seen in the muscle layer of the tubal wall. (Photomicrograph 2.) These cystadenomatous spaces were separated from one another by stromal tissue. None of the sections examined showed tuberculous or other cellular evidences of chronic salpingitis.

Biopsy Diagnosis: "Infiltrative type of papillary adenocarcinoma of the fallopian tube".

CONCLUSIONS

1. Biopsy examination of obstetrical and gynaecological specimens carried out at the Pathology Department of the Medical College, Madras, for 1940—1950 revealed that 1% of malignant genital tumours are contributed by primary carcinoma of the fallopian tube. This is in agreement with Martzloff's findings. The practice current in the Pathology Department of the Medical College, Madras, of routine histologic study of the fallopian tubes (clinically suspected or unsuspected ones for cancer) is worth the trouble.

2. Clinical recognition of primary tubal carcinoma is not possible when based on the sparse findings of lower abdominal pain, leucorrhoea, history of sterility and no mass being felt by pelvic examination.

3. Detailed histological study of tubes is warranted, when one finds that they are nodular (specially distal 2/3) although not appreciably enlarged.

4. Although cytological evidence of malignancy was not a feature in the case

reported, the histological patterns of the lining epithelium and the infiltration of the tubal wall by the growth, are unequivocal points in favour of malignant disease. Study of multiple sections showed no inflammatory cellular reaction.

ACKNOWLEDGEMENTS

My thanks are due to my teacher, Prof. Dr. D. Govinda Reddy, M.D. for his valuable advice and permission to report the case, Prof. V. R. Naidu, M.B., M.R.C.P., M.S., D.T.M. & H. (Eng.), F.A.S.C.P. for his opinion on the specimen, Dr. M. K. K. Menon, B.A., M.D. for the clinical notes and to Dr. D. Bhasker Reddy, M.B.B.S. for help rendered.

BIBLIOGRAPHY

1. J. E. Ayre, et al.: *Am. J. Obst. & Gynec.* 50. 2. 197-202. 1945.
2. Rabinovitch, et al.: *Am. J. Obst. & Gynec.* 21. 5. 689-694. 1931.
3. M. E. Kahn, et al.: *Am. J. Obst. & Gynec.* 28. 3. 393-402. 1934.
4. Mitchell & Mohler: *Am. J. Obst. & Gynec.* 50. 283. 1945.
5. B. D. Stern, et al.: *Am. J. Obst. & Gynec.* 516-523. 1939.
6. W. O. Johnson, et al.: *Ann. Surg.* 1208-1213. 1931.
7. H. Charche: *Ann. Surg.* 103. 290-295. 1936.
8. R. R. Greene, et al.: *Arch. Path.* 48. 362-365. 1949.
9. Martzloff, K. H.: *Am. J. Obst. & Gynec.* 40. 804. 1940.
10. Willis, R. A.: *Pathology of Tumours.* 1948.
11. Diddle: *Am. J. Obst. & Gynec.* June 1950.
12. Nevak, E.: *Gynaecological & Obstetrical Pathology.* 1947.

REVIEW OF RECENT PROGRESS

WATER AND ELECTROLYTE BALANCE IN THE SURGICAL PATIENT

by U. MOHAN RAU, Madras.

During the past fifteen years the fundamental laws governing the water and electrolyte balance in human beings have been established by the research efforts of Van Slyke, Gamble, Marriot, Darrow and others. The material to be presented hereinafter is almost entirely a reflection of their work.

Disturbances of electrolyte metabolism can be broadly divided into two large groups (Gastineau)⁹:

- I. Those associated with disturbance of water balance;
- II. Those characterised by changes in the hydrogen-ion concentration (alkalosis and acidosis).

It is proposed to deal with the first group of disorders only in this paper.

In health, provided the intake of salt and water is sufficient, the kidneys can so regulate their output that an exact water and electrolyte balance is maintained. Considering the wide variation in kind and quantity of the food and drink taken each day by the normal individual and considering the fact that more than 1000 litres of water pass in and out of the human body per year, the constancy with which this is achieved is remarkable.

However, the balance will be disturbed if the intake of water or salt is grossly deficient or grossly in excess. The range between the extremes of shortage and excess during which health can still be maintained will largely depend on the efficiency of the kidneys. If these are impaired by disease of their own substance, or by obstructive lesions of the lower urinary tract, or by general ill-health of the patient or by extremes of age, then the body as a whole will become increasingly sensitive either to a deficiency or to an excess of

intake (Edwards⁷). The balance will also be readily upset if there is a large and continuous loss of water and electrolyte as a result of vomiting, gastric suction or discharges from alimentary fistulae. In the post-operative period, owing to the non-excretion of chlorides and sodium by the kidneys the fluid balance may be adversely affected. These are the conditions where a prevention and a correction of these water and electrolyte upsets are so essential.

BASIC CONCEPTS

A brief review of the basic concepts in water and electrolyte metabolism is necessary for a proper appreciation of the recent progress.

BODY WATER: Water comprises approximately 70% of total body weight (about 85 pints or 50 litres for 11 stone weight) and as the universal solvent for electrolytes, crystalloids and proteins, is located in two major compartments which are designated as *intra-cellular* and *extra-cellular*. Extra-

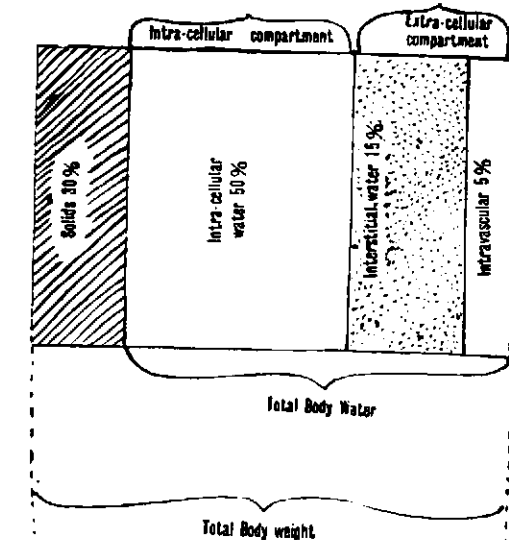


Fig. 1

cellular fluid is distributed between two components of primary importance (i) that lying within the vascular tree and (ii) that lying in the interstitial space. The relationship between these three components are diagrammatically expressed in Fig. 1. In the course of body fluid study and parenteral therapy, only one compartment viz. the intravascular compartment is dealt with directly and the effects upon the other compartments, though very real, are in a sense wholly indirect (Child)³.

Water moves freely back and forth between the intra-cellular and extra-cellular compartments in direct response to osmotic forces exerted mainly by intra-cellular potassium ions and extra-cellular sodium and chloride ions. The cell membrane is practically impervious to ions so that no exchange of electrolytes between the cell and its environmental tissue fluid is possible. However, the capillary walls separating the two components of the extra-cellular compartment are freely permeable to all the electrolytes in the extra-cellular fluid except the very large plasma protein molecules.

Water Requirements :

(A) "Obligatory" requirement: It is important to realise that as long as the organism survives there is a relentless loss of water from the body, which must be replaced. Whether water is available for other purposes or not, this continuous loss of water takes place and hence it has been termed "obligatory" or "basal" loss.

This loss takes place through four routes:
(a) 300-500 c.c. as water in the expired air;
(b) 300-500 c.c. as insensible perspiration;
(c) 100 c.c. as water content of faeces; and
(d) about 1200-1500 c.c. excreted by the kidneys.

Thus the approximate basal requirement per day, comes to about 2000 to 3000 c.c. of water. In health nearly 2200 c.c. of this is supplied along with solids and liquids ingested orally and about 300 c.c. is obtained within the body as water of oxidation.

(B) *Abnormal requirements of water* may be demanded;

(i) To meet increased basal needs which may take place under conditions like febrile states, hot external environment etc. In these conditions the water lost by vaporisation may increase from 1200 to 1500 c.c. to as much as 2500 to 3000 c.c. per day.

(ii) To replace water that may be lost from the body by continuous gastro-duodenal suction, in persistent vomiting, or acute diarrhoea etc.

Water loss in children: Butler and Talbot¹ noted that in children there is a greater water loss per kg. of body weight than in the adult. In the infant, insensible water loss by evaporation from the skin is 1.3 c.c. per kg. per hour; in an adult, under similar conditions the loss is 0.5 c.c. per kg. per hour. The urine volume per kg. of body weight and the metabolic rate have also been found to be greater for the infant than for the adult. McLance and Young have reported that in the infant the ability of the kidney to concentrate urine is limited and hypotonic urine is excreted. Thus children secrete large amounts of dilute urine, they have to excrete more catabolites and they lose considerable amounts of water by evaporation. It is evident that failure to ingest water will cause a more rapid depletion of body water and a greater upset in children than in adults. If there is dehydration pre-operatively, children not only withstand the operations poorly but have a stormy convalescence with hyperpyrexia, restlessness etc. post-operatively.

BODY ELECTROLYTES: Intra-cellular and extra-cellular fluids all contain highly significant amounts of electrolytes. In the intra-cellular fluid positively charged potassium and magnesium ions and the negatively charged phosphate, sulphate and bicarbonate ions are the main electrolytes.

Extra-cellular fluid, as regards its dissolved constituents is mainly composed of salt, i.e. of the positively charged sodium ion and the negatively charged chloride ion.

Small amounts of calcium, magnesium, bicarbonate, phosphate, sulphate, potassium and organic acids are also present.

For calculations regarding water and electrolyte balance, extra-cellular fluid is generally regarded as very nearly isotonic saline. In the majority of the studies undertaken so far, the governing factor in electrolyte administration appears to be primarily in a consideration of this extra-cellular salt (sodium and chloride).

Source of Electrolytes: All the main electrolytes in the body fluids are supplied from the external environment, either combined with foodstuffs and/or by addition during cooking.

Electrolyte Requirements :

(A) *Basal needs.* Healthy non-fasting men habitually eat 2 to 10 gms. of salt daily, depending on their habits, taste etc. Hence it has been felt that an individual should receive anything between 2 to 5 gms. of salt daily, in order to maintain his salt balance.

(B) *Abnormal needs* of electrolytes occur in the surgical patient primarily as a result of vomiting during pyloric obstruction or by gastro-duodenal suction or via enteric fistulae. Gamble⁸ has shown that in vomiting besides chloride loss there is also an associated sodium loss amounting to almost half of that of chloride ion.

It must be stated in passing that the concentration of an electrolyte is better expressed in milli-equivalents per litre than in milligrams per litre. The use of the former unit facilitates the expression of the total amount of cations and anions in the body fluids. For instance, plasma contains 155 milli-equivalents of cations and an equal quantity of anions. The formula for calculating milli-equivalents of any electrolyte is as follows:

$$\text{Milliequivalent} = \frac{\text{mgm. per litre}}{\text{atomic weight}} \times \text{valence.}$$

CLINICAL STATES OF ACUTE WATER AND ELECTROLYTE IMBALANCE

The clinical states in which water and salt balance may be affected can be broadly grouped as follows:—

- I. Retention of water and electrolytes (overhydration).
- II. Depletion of water and electrolytes (dehydration).

I. RETENTION OF WATER AND ELECTROLYTES — OVERHYDRATION

Generalised fluid retention is dangerous especially because of the tendency to pulmonary oedema. As oedematous tissues heal badly and have a greater liability to wound infection, the operative risk and the post-operative morbidity will be correspondingly greater.

Causes of fluid retention (Marriott¹³):

(a) *Simple water retention:* This may occur, for instance, after excess administration of a pituitary extract containing the anti-diuretic hormone. This rare condition will not be further considered in this article.

(b) *Water retention secondary to salt retention:* This occurs:

- i. Following excess of saline administration (particularly intravenously).
- ii. When the kidneys are so damaged that salt excretion is impaired e.g., in nephritis and in prolonged lowered blood pressure.
- iii. Due to excessive administration of adrenal cortical hormone or of deoxycorticosterone acetate (DOCA).

"Whenever salt is retained, water is also retained to the extent of approximately a litre per 6.7 g. of sodium chloride. This appears to be because priority is given to maintenance of the electrolyte concentration of the extra-cellular fluid. The body tolerates even gross fluctuations in the volume of this fluid better than changes in

its concentration. Preservation of isotonicity is the paramount necessity".

(c) *Abnormal shift of fluid from the intra-vascular compartment into the interstitial spaces*: In all the capillaries of the body, fluid is continuously extruded from the blood into the tissue spaces. This takes place in the proximal (arterial) parts of the capillary loops under the influence of the hydrostatic ("blood") pressure generated by the heart. At this stage the hydrostatic pressure is greater than the osmotic pressure exerted in the opposite direction (i.e. from the tissue spaces into the intra-vascular space) by the plasma proteins.

In health, an equal amount of fluid is reabsorbed from the tissue spaces into the intra-vascular compartment, this re-absorption taking place in the distal (venous) parts of the capillary loops where the osmotic pressure of the plasma proteins exceeds the largely expended hydrostatic pressure.

Any imbalance in these pressures that determine the continuous to and fro exchange of fluid between the intra-vascular and interstitial spaces, will result in oedema. Oedema is thus a common clinical manifestation of: (i) Cardiac failure with venous congestion, where there is increased hydrostatic pressure, (ii) Hypoproteinaemia where there is a decrease of intra-capillary osmotic pressure.

Treatment of Overhydration: The rational treatment is obviously to prevent or remedy the cause.

Oedema due to excess saline administration is prevented by avoiding excessive and indiscriminate saline therapy. This point will be further dealt with when the treatment of dehydration is discussed below. In hypoproteinaemia, restoration of plasma proteins to normal levels, will cause a disappearance of the oedema. Excess administration of extract of adrenal cortex or of "DOCA" should be avoided. It is not proposed to deal in this paper with the treatment of oedema in essentially medical conditions like nephritis and cardiac failure.

II. DEPLETION OF WATER AND ELECTROLYTES — DEHYDRATION

This occurs in many surgical conditions.

Causes of dehydration and clinical types: The investigations and observations of Marriott and others have shown that dehydration may be brought about either by insufficient intake of water, or by loss of bodily secretions from the alimentary system or from sweating. In lack of water intake, the body becomes depleted of water only, whereas in secretion losses the depletion is of water and salt.

There are three types of disturbances of physiology and consequently of the clinical picture in dehydration: (Marriott¹³)

- Simple water depletion or primary water depletion;
- Pure salt depletion with secondary water depletion;
- Mixed water and salt depletion.

(a) *Simple water depletion*: This occurs when water is not available or when water cannot be drunk due to great weakness, unconsciousness or from dysphagia due to some local cause. As a consequence of water depletion, the extra-cellular fluid becomes hypertonic and the sodium and chloride concentrations rise (Black, McCance and Young², 1944). The hypertonicity causes water to move from the cells to the extra-cellular fluid. Hence, the water loss is borne by both intra-cellular and extra-cellular fluids so that there is no marked fall in the volume of the latter. This affects the clinical features because the blood volume is not much shrunk, and so shock symptoms are not prominent.

The first and most persistently dominant symptom is *thirst*, which becomes worse and worse. Dryness of the mouth soon follows. The urine volume falls and the urine becomes very concentrated; but it contains chlorides. Weakness is not marked till three or four days have passed but there is a feeling of malaise and headache. The patient looks ill, but there is not much

laxity of the skin. Disorientation and mania are seen fairly often. Ultimately the patient subsides into a low delirium before death.

(b) *Pure salt depletion with secondary dehydration*: This form of dehydration is common at the present time and is seen in patients who have been vomiting or who have been submitted to continuous gastric aspiration and have thus lost a considerable amount of alimentary secretions. To combat these losses, they have ingested water freely. This type of dehydration may also occur in "heat exhaustion" in tropics, when a considerable amount of water and salt are lost in excessive sweating but only the water is replaced in quenching the thirst.

"A few words may be devoted especially to salt depletion arising from prolonged gastric or gastro-intestinal aspiration by Ryle or Miller-Abbott tubes. These therapeutic procedures can be of great value but they can also be lethal if the removed electrolytes are not replaced. Barlett, Bingham and Pedersen (1938) produced severe chloride depletion in normal volunteers by gastric aspiration. Lyall and Nicol (1939) found that gastric aspiration, prolonged over six days, caused removal of 93 g. of chloride (expressed as sodium chloride). This is more than half the total amount in the body. When aspiration is being practised, close attention should be directed to maintaining electrolyte balance. Quite a good plan is to filter all aspirated fluid and reintroduce it per rectum" (Marriott).

The main effect of salt depletion is loss of total osmotic pressure of the extra-cellular fluid which, in consequence, proportionally loses volume as the kidneys excrete water in an attempt to preserve isotonicity. The extra-cellular fluid tends to become hypotonic and, therefore, there is no withdrawal of water from the cells — rather the reverse. The whole burden of the water loss falls on the extra-cellular fluid, which consequently becomes much reduced; this

contraction of the extra-cellular fluid volume causes the symptoms of oligæmic shock to be prominent at an early stage.

The symptomatology of pure salt depletion is as follows. Weakness is experienced early and progresses to extreme lassitude, apathy and, finally, coma. Headache is often present and is much worse on sitting up or standing. Giddiness and fainting also tend to occur on standing. The urine volume, if water is being freely supplied, may be normal or even increased until a late stage; but the urine does not contain chloride. Thirst is absent and water may be repugnant. Soon anorexia develops and goes on to nausea and vomiting which are present in almost all severe cases. The whole alimentary tract apart from the sphincters, becomes flaccid and there may be acute dilatation of the stomach and intestinal ileus. There is consequent general abdominal distention. Since fluid loss is from the extra-cellular fluid there is early desiccation of the lax subcutaneous tissues and the patient's skin becomes too large for him so that it wrinkles, and pinched up folds do not return in the normal way immediately on release. Muscular cramps are marked, especially on any attempt to move muscles. Mental confusion is almost invariable and the patient is in a lethargic, muddled daze.

More characteristic of all the later manifestations of secondary dehydration, due to salt depletion, are those of peripheral circulatory failure due to contraction of the blood volume. There is generalised skin pallor and coldness of the extremities due to the vasoconstriction. This maintains the arterial blood pressure in the early stages but later this blood pressure declines until it may ultimately be unrecordable. There is parallel deterioration of the quality of the pulse until it becomes impalpable. When the arterial blood pressure falls below 70 mm. Hg., anuria usually occurs.

(c) *Mixed water and salt depletion*: This is most commonly seen in surgical practice. It arises when there is loss of secretions but water intake is *not free*, for e.g. when there

is severe vomiting which precludes a liberal ingestion of water.

Clinically, the patients present a mixture of the symptoms of water, and of salt and water depletion. They are thirsty, have dry mouths and secrete a scanty amount of high specific gravity urine. They are also weak, apathetic and show signs of oligæmic circulatory failure. Anorexia, nausea and vomiting may be present. Chloride is absent from the urine.

How to assess the qualitative needs of a dehydrated patient?

It is important to ascertain whether a dehydrated patient is suffering from a depletion of water only or from a depletion of both salt and water. Help in this direction can be obtained from:

- (a) The history of the patient;
- (b) The clinical state; and
- (c) Laboratory procedures.

(a) *The history of the patient*: This if correctly given, helps considerably. For example, if there has been an inability to ingest water for several days then obviously the patient has depletion of body water; if, on the other hand he has been persistently vomiting, then obviously he has been losing both water and salt in his vomitus. The total duration of the illness and the approximate amount of urine secreted during the course of the illness or in the preceding twenty four hours may also help.

(b) *The clinical state of the patient* in various types of dehydration have been dealt with already.

(c) *Laboratory Procedures*: The following tests are commonly used:

- i. Estimation of plasma chlorides;
- ii. Haemoglobin percentage and haematocrit index;
- iii. Estimation of plasma proteins;
- iv. Estimation of urinary chlorides;
- v. Estimation of plasma sodium.

i. *Plasma Chloride*: Owing to the relative ease with which the levels of plasma chloride can be obtained, undue clinical importance was attached to the plasma chloride level in assessing the electrolyte needs of a patient. This is unfortunate because:

(a) Moderately or seriously ill patients maintain a somewhat lower chloride level than do normal patients, the total body chloride being adequate (Maddock¹²). Hence, unless there is a definite history of chloride loss the moderately lowered plasma chloride level does not necessarily indicate a lack of chlorides.

(b) A plasma chloride level is not a good indicator of hyperchloremia because in excessive chloride administration the water and electrolytes pass promptly from the vascular tree into the interstitial space and plasma chloride level may not increase at all.

(c) Plasma chloride levels may be well below the normal when, for instance, there is an increase in the bicarbonate ion secondary to respiratory malfunction or when water has been taken in great excess of sodium chloride, the total body chlorides being unaltered (Child).

(d) In circumstances of protein deficiency plasma chlorides are useless in indicating the body's total salt content because of oedema.

Thus the commonly performed plasma chloride determination does not constitute a valid basis for estimation of the kind or amount of fluid that should be employed to correct dehydration. Child and others have even suggested that as a medical laboratory test of dehydration estimation of plasma chloride levels might well be abandoned.

ii. *Haemoglobin percentage and haematocrit index*: Marriott and his associates have shown that in experimental sodium deficiency states there is no definite correlation between the changes in the extra-

vascular salt water volume and the haemoglobin and haematocrit index alterations. This is more especially true the more slowly the salt water deficit is contracted and the longer it exists.

iii. *Plasma proteins*: The concentration of plasma proteins is also a poor test. In many instances of known sodium salt deficit, the total circulating protein diminishes at approximately the same rate as the volume of plasma and the extra-vascular and extra-cellular fluids do. Consequently the plasma protein concentration may not be above normal, even though a dangerous degree of extra-cellular salt water depletion may be present (Moyer¹⁴).

iv. *Urinary chlorides*: The commonly used test for estimating chlorides method is "Fantus Test", carried as follows:

With a fountain-pen filler pipette, drop ten drops of urine into a small test-tube. Add one drop of 20% potassium chromate solution and then add, drop by drop, 2.9% Ag. NO₃ solution until the whole mixture turns yellow to brown. Shake the tube after the addition of each drop of Ag. NO₃ solution. The number of drops of silver nitrate solution needed gives the gms. per litre of chloride expressed as Na Cl. in the urine e.g. 3 drops — 3 gms. per litre, 10 drops — 10 gms. per litre.

Though useful on certain occasions, it has been found that in severe dehydration the kidneys are called upon to retain sodium. Chloride however, may be excreted. Thus this test may fail to indicate the exact sodium needs.

v. *Plasma sodium*: The recent developments of the flame photometric method of estimating accurately the plasma sodium level may give considerable help; but as yet the technique appears to be too cumbersome for a rapid and economical evaluation of plasma sodium.

Hence the laboratory procedures that are in common use cannot be depended upon to give us an accurate and mathematical estimation of the water and electrolyte needs of the body. Further developments of the flame photometry may help us in the

future. Till such time, the needs of the patient have to be assessed mainly on the history and on clinical signs and symptoms. The laboratory procedures may be used as additional aids only and too much reliance should not be placed on them.

Assessment of the quantitative needs of the dehydrated patient

Here again, no completely reliable help can be obtained from the laboratory. Several authors have however, given several clinical guides.

I. **MARRIOTT**. In dehydrated patients who manifest evidences of water deficit, Marriott has given the following rough quantitative correlation between clinical manifestations and the degree of water deficit.

i. *Early dehydration*: Thirst definite but other effects not yet present; deficit approximately 2 per cent of body weight or 1½ litres in a 70 kg. (11 stones) man.

ii. *Moderately severe dehydration (three or four days without water)*: Marked thirst and dryness of the mouth, oliguria, weakness, ill appearance slight personality changes, still capable of fair mental and physical performances, deficit of approximately 6 per cent of body weight or 4.2 litres in a 70 kg. man.

iii. *Very severe dehydration*: All the above manifestations plus mental and physical collapse: deficit of 7-14 per cent of body weight or 5-10 litres in a 70 kg. man.

Similarly, an approximate quantitative correlation between the clinical manifestations and the degree of salt deficit is as follows (Marriott):

ii i. *Slight to Moderate Salt Depletion*: Absence of chloride in the urine with lassitude and, may be, giddiness and faintness on standing; deficit equivalent of 4 litres of isotonic saline in a 70 kg. man.

i ii. *Moderate to Severe Salt Depletion*: Absence of chloride in the urine, lethargy, giddiness, faintings, anorexia, nausea and

possibly vomiting, fall of blood pressure but systolic pressure above 90 mm. Hg. — deficit equivalent of 4 to 6 litres of isotonic saline in a 70 kg. man.

iii. *Severe to Very Severe Salt Depletion*: Absence of chloride in the urine, stupor, vomiting, blood pressure below 90 mm. Hg.—deficit equivalent of 6 to 10 litres of isotonic saline in a 70 kg. man.

Thus an approximate assessment of the patient's needs can be made depending upon his clinical state.

II. Darrow⁵ has estimated that in marked dehydration about 1/3 of the extra-cellular electrolyte is lost and that for restoration, an amount of salt contained in 70 c.c. of physiological solution of sodium chloride per Kg. of body weight is required. Thus if the patient is very severely dehydrated and his original weight was about 70 kgms. he would need $70 \times 70 = 4,900$ c.c. of isotonic saline solution for correcting the dehydration.

III. A recently recommended formula for assessing electrolyte replacement is that of Lockwood and Rendall¹¹ (1949), reproduced in part here :

Parenteral Fluid Replacement :

	Dextrose Water.	Dextrose Saline.	Sodium Lactate.
Gastric	33%	67%	
Small			
Intestine	20%	70%	10%
Ileostomy	10%	75%	15%

If it is estimated that the loss has been primarily gastric, the repair solution should be 33% dextrose and water and 67% dextrose and saline and so on. These solutions are employed for volume for volume replacement of calculated losses. Basal intake of fluids should be 1500 to 2500 c.c. with not more than 500 c.c. of normal saline.

Route of Administration

Having thus decided upon the quantity and the quality of water and electrolyte to

be administered, the route of administration has to be selected. It is still a very safe rule that wherever possible, oral route is to be preferred.

In simple water depletion, water is indicated and should be given as such or in the form of beverages and drinks.

If salt depletion exists, saline administration is necessary. $\frac{1}{2}$ N. saline (0.425%) has very little saltiness of taste and may be given flavoured, by mouth. If there is difficulty in drinking, fluid may be introduced into the stomach through a thin tube passed through the nose. In marked salt depletion, however, oral administration may be ineffective. In this latter group and in people vomiting and having obstructive lesions of the oesophagus, stomach and upper intestines, water or saline may be given by other routes e.g. per rectum or into the subcutaneous tissues or intramuscular tissues or bone marrow or peritoneal cavity. Though there are advocates for each of these methods, in a case of severe water or salt depletion, intravenous administration is the most widely used alternative method.

What Fluid Intravenously?

If the patient needs water for restoring his water and electrolyte balance, then isotonic glucose solution (5%) is the best. The glucose is utilised by the body and water serves for rehydration. If it is decided that salt and water depletion exists, then saline should generally be administered. Till recently the saline solution employed was isotonic (0.85% Na Cl.) solution, but greater experience with the use of this solution has shown that patients receiving this saline tend to retain sodium and chloride to a greater extent than water and in consequence may later become oedematous; this danger is greater not so much pre-operatively as post-operatively. Hence, while isotonic saline may be used in the pre-operative stage, the tendency today is to recommend an isotonic solution of glucose-saline (0.425% sodium chloride and 2.5%

glucose) for adults (Lichtenstein¹⁰), particularly in the post-operative stage.

The rate of transfusion

As a routine the rate for water or saline by any route, should be a litre every 6 to 8 hours. However, in very severe dehydration a faster rate may at first be used to save the patient's life. "In such cases the first litre can be given in 1 to 2 hrs. the second litre in another two to three hours and the third litre in a further 4 to 6 hrs. Whenever there is any doubt it is wiser to err on the side of slowness" (Marriott).

It should be stressed here, that when a rapid rate of infusion is employed or a large volume of fluid is given, repeated auscultation of the chest, examination of the neck veins and of the lumbar regions posteriorly should be done. If pulmonary rales appear or if the veins of the neck become distended and tense, or if there is persistent oedema in the lumbar region, the infusion should be temporarily discontinued and restarted later at a much slower rate.

How to measure the adequacy of Intravenous Water and Electrolyte therapy

There are no very accurate laboratory methods available. Considerable help and guidance can be obtained from a routine measurement of urine volume and chloride content.

In most instances and usually in all mild cases of dehydration it is satisfactory to judge the adequacy of the fluid therapy progress upon the basis of urinary excretion per 24 hrs.

Generally, it is safer to measure the volume of urine secreted and its chloride content every 8 hrs. Urine volume should not be less than 500 c.c. (approximately 20 oz.) per 8 hr. period. The aim for urine chloride should be 2 to 4 gm. per litre in an adult and 2 gm. per litre for an infant.

In very seriously ill-patients e.g. burns, even this interval may be unsafe and in these patients a continuous catheter drain-

nage of the bladder should be carried out. Only in this way can the rate of urinary excretion be followed closely enough to detect early any evidence of inadequate fluid therapy.

Estimation of plasma sodium and chloride and other blood investigations may help but are generally too cumbersome or unreliable for routine adoption.

CHRONIC WATER AND ELECTROLYTE DEFICIT

Several chronic surgical disorders particularly in the aged patient may produce this state. For instance, a patient who is suffering from a gangrene toe, because of prolonged pain and sleeplessness, may have a poor appetite and may not have the desire and the inclination to ingest adequate amounts of water and electrolytes. Similarly a patient who has a growth low down in the colon, may have been ill for several weeks with a partial colonic obstruction. In the absence of any persistent vomiting or prolonged diarrhoea, any acute deficits of water and electrolytes are unlikely; but due to his illness, low grade sepsis, vague abdominal colics etc. he may be suffering from a chronic water and electrolyte deficit. These and other similar types of patients withstand poorly any form of trauma or operation.

To ascertain the existence or otherwise of such a state, the simplest move is to place such an individual upon daily measurements of fluid intake and urinary output. If during the first 24 to 72 hours, this patient's daily fluid intake (both as solid food and drink) has amounted to approximately 3000 c.c. and the urinary output to 1500 c.c. or more, then little concern need be felt regarding the status of intra-cellular and extra-cellular water and electrolyte. If on the other hand, during this period the fluid intake has amounted to practically the minimum necessary to cover the obligatory or basal loss and if the urinary output has been about 500 c.c. then probably, not only does a chronic water deficit exist but also

the body's store of electrolytes has also been depleted.

Correction of this state requires the administration of isotonic or even hypertonic saline solution. In general, if a patient is encountered who has a chronic water and electrolyte deficiency, then owing to the causative illness and the consequent starvation, the body's stores of proteins have also been depleted; this must be rectified before a correct water and electrolyte balance can be restored.

INTERNAL LOSS OF WATER AND ELECTROLYTES

So far only the obvious routes viz. vomiting, diarrhoea or enteric fistulae etc. by which the body may be depleted of its water and electrolytes have been considered. The less obvious but on certain occasions equally important mechanism by which the availability of water and electrolytes is compromised may be designated as *internal*. The experiments of Underhill, Kapsinor and Fiske¹⁶ have demonstrated that soon after an injury to any part, there is a rapid shift of fluid and electrolytes into the injured area from the rest of the body — a redistribution of water and electrolytes within the body itself without any external loss. This fluid does not leave the injured area and enter the extra-cellular compartment in appreciable amounts for 48 to 70 hours. This imprisonment of the fluid and electrolytes in the injured area actually constitutes a functional loss of salt and water from the body and this amount of water and electrolytes becomes unavailable for maintaining circulatory blood volume.

These distributional shifts are associated with clinical conditions like crushing injuries, fractures of the femur or pelvis, major operative procedures, scalds and burns, peritonitis due to duodenal or gall-bladder perforations etc. (Moyer).

This internal loss of water and electrolytes should be considered in any fluid and electrolyte therapy soon after any major

trauma. After the first 48 hours have elapsed, the return of this fluid back into active circulation must be remembered; otherwise, this amount together with the other fluids already vigorously administered may result in fatal circulatory overloading. A good indication of this trapped electrolytes and water overloading the circulation is given by an increase in the rate of urinary secretion.

POST-OPERATIVE DEMANDS

Wilkinson¹⁹ and co-workers from Edinburgh, found that in all patients after operation the urinary excretion of chloride was depressed irrespective of the amount of salt given. The time of onset of this depression of urinary excretion varied but in most cases the fall was abrupt on the day of operation. It lasted for five to ten days. The total urinary chloride fell below 1 gm. daily in 13 out of 27 patients. There was no relation between the onset, duration and degree of depression of urinary chloride excretion and type of post-operative treatment. The period of reduced chloride excretion coincided with one of reduced sodium excretion.

It seems that retention of sodium chloride after injury or operation is related to the inflammatory reaction to injury as there is evidence that not only is there accumulation of increased quantity of sodium and chloride in damaged tissues after injury but of mobilisation from other undamaged tissues.

Renal excretion of water and salt in patients undergoing major surgery is apparently quite different from normal. Because of this, intravenous infusions should not be pushed during the immediate post-operative period. Although frequently no ill effects are observed infusion may increase the degree of pulmonary oedema, wound oedema, cardiac failure and water intoxication in the mal-nourished chronically ill elderly patient. Logical handling includes sufficient 5% glucose to cover the calculated insensible water loss and blood transfusion to replace blood loss.

How much of the fluid administered in the immediate post-operative period should be isotonic saline has been a much discussed subject. The consensus of opinion today (Coller et al⁴) seems to be that neither sodium nor chloride should be given for the first two days post-operatively, unless specifically indicated in order to replace definite losses of alimentary secretions. Others feel that no harm will be done if not more than 500 c.c. of saline are administered during the first two post-operative days.

As the post-operative days progress, the measurement of the daily urinary excretion and the total daily quantity of any abnormal loss from the alimentary tract are of the greatest importance. The first of these will be a useful guide regarding the general progress of treatment; on the second is based the additional amount of isotonic saline necessary. Since for practical purposes alimentary secretions are almost isotonic with saline, a volume for volume replacement by isotonic saline of the daily secretion loss constitutes a satisfactory though not a very accurate method of treatment.

The "weighing scale" for patients requiring water and electrolyte balance (post-operatively): In 1942, Wangenstein^{17, 18} introduced the weighing scale for patients with the idea of determining gravimetrically the state of hydration in post-operative period. This has been tried extensively by Wangenstein and his colleagues and found very reliable. They claim that this weighing scale is without a peer as an aid in the early detection of overhydration or underhydration, and the error in calculating water and electrolyte needs according to them is about 0.3%.

Ordinarily weighing the patient once a day suffices. With this information available for comparison with readings taken since his admission, any pronounced deviation becomes apparent. The aim is to keep the patient's weight deviation within 2%. At morning rounds the house officer, after

noting the patient's weight, urinary output for the last 24 hours and the specific gravity orders the kind and amount of fluids for the day. For e.g. if there is increase in weight, less of saline and more of glucose solution (hypertonic, if diuresis is indicated) is ordered.

In extreme cases, weighing the patient twice a day may be necessary.

RECENT OBSERVATIONS

More recent observations have cast some doubts on our basic concepts, and when finally established may alter the therapeutic control of water and electrolyte balance.

(A) *Sodium Chloride*: It is difficult to state that there is any normal daily requirements of the human body of sodium and chloride which are the chief extra-cellular electrolytes. While it is true that the usual daily salt intake amounts to from 2 to 10 gms. this is largely based on the taste rather than metabolic demand. The Tlascalan Indians forgot the taste and use of salt after they had been cut off from salt for centuries (Moyer). Infants sustain their most rapid period of growth on 1 gm. of salt per day.

Salt deprivation is followed after a short lag by prompt cessation of sodium chloride excretion by the kidney. Conservation of body salt, therefore, is rigidly observed by the normal kidney, there being no loss comparable to the obligatory loss of water. "Thus there is no data on hand to prove that generally a few grammes of salt should be given daily to patients taking nothing by mouth, having no abnormal electrolyte losses but requiring nutritional substances parenterally" (Maddock).

(B) *Potassium*: Largely owing to the patient skill of Darrow⁶ and his associates at New York, the wider significance of potassium ions in surgery is beginning to be recognised. It has been established that there is potassium deficiency in burns, in trauma, haemorrhage, post-operative vomiting, pyloric stenosis and intestinal obstruction with protracted

vomiting. A serious lack is probable if the patient has been treated with gastric suction or infusions of sodium chloride only.

Clinically the potassium deficit can be suspected in patients manifesting marked muscular weakness, flaccid and feeble muscles, restlessness and E.C.G. changes, the last being characterised by a prolonged Q.T. interval and lowering or inversion of the T-Wave. Low blood pressure with a bounding pulse and a loud systolic precordial murmur may be present. It can be proved by demonstration of lowered levels of serum potassium below 14 mgm. per 100 c.c.

Randall, Lockwood and others¹⁵ have shown that with or without severe water and sodium deficits a substantial deficiency in potassium may be evidenced. Although the mechanisms involved are not completely understood it is believed that in the dehydrated surgical patient potassium leaves the cell as intra-cellular water is removed and that it is lost by being excreted by the kidneys. Unlike in the case of sodium, there is no renal mechanism which conserves body potassium and so even with severe potassium depletion there is continued loss in the urine. This intra-cellular depletion of potassium is made good by replenishment with readily available extra-cellular sodium. If, under such circumstances rehydration is accomplished by use of saline solution alone there is further entrance of sodium into the cells and the potassium deficit becomes intensified. These authors further believe that the state commonly referred to as hypochloreaemic alkalosis is in fact a potassium deficiency and claim that such patients have responded dramatically to administration of oral or parenteral potassium.

In treatment potassium chloride or citrate can be given by mouth, if this is practicable, in doses of 2 gm. $\frac{1}{2}$ hourly, or 100 to 1000 c.c. of a 1.14% solution of the chloride can be injected I.V., or 500 c.c. of the solution with an equal amount of Na Cl. can be

given by hypodermoclysis. The only absolute contradiction is poorly functioning kidneys. But many feel that the greatest danger is heart block and hence advice that potassium solutions should not be used indiscriminately till more information and reliable guides are available.

(C) *Intracellular fluid and cell membrane*: The composition of fluid within the cells is more complex and variable than that of the surrounding extra-cellular space. Some of the components may be synthesized within the cell.

In the past the intra-cellular fluid was thought to be free from sodium and chlorides and the cellular membrane was considered to be impermeable to potassium. This concept has been disproved by the studies of Yannet and Darrow and their associates. These investigators have shown that a small amount of sodium and chloride is present in normal skeletal and cardiac muscle. Sodium may be withdrawn from the cell in certain types of acidosis. Potassium leaves the cell when the protoplasm disintegrates and potassium enters the cell during growth.

In certain circumstances either potassium or sodium may be transferred between the intra and extra-cellular compartments with no apparent shift of the other. It is recognised that oral or parenteral administration of potassium will not necessarily produce an increase in the intra-cellular concentration. If glucose is given at the same time, however, the concentration of potassium within the cell will increase and some intra-cellular sodium will be transferred to the extra-cellular compartment. On the other hand, intra-cellular potassium may migrate from the cell with no change occurring in the intra-cellular sodium under conditions of dehydration.

The old idea of the cell membrane being impermeable to ions is giving place to a much more dynamic conception based on the expenditure of energy by the cell. The equilibrium between the ions in the cell and

in their environment is a matter of cell metabolism and is modified by the physiological activity, by the pH of the cell's surroundings and by hormones such as the adrenal steroids particularly the mineral corticoids.

These and several other observations form a brilliant chapter in the biochemical aspects of surgery and may in the near future completely reorientate our present concepts. Until such time, the prescription of the quality and quantity of water and electrolyte solutions and the route of administration "must reflect common sense, careful clinical observations and a profound awareness of our ignorance today" (Moyer).

REFERENCES

- Butler, A. M. & Talbot, N. S. "Parenteral Fluid Therapy—Estimation and provision of daily maintenance requirements". *New Eng. J. Med.* 231. 585-590. 1944.
- Black, Meclance & Young. Quoted by Marriott.
- Child, C. H. & Holswade, G. R. Replacement and maintenance of water, electrolytes and proteins in the surgical patient. *Surg. Clin. N. Amer.* W. B. Saunders & Co. Philadelphia & London. April 1950. 315-349.
- Coller, F. A. & Associates. *Ann. Surg.* 119. 533. 1944.
- Darrow, D. C. The treatment of dehydration, acidosis and alkalosis. *J.A.M.A.* 114. 655 to 660. 1940.
- Darrow, D. C. and Pratt, E. L. Fluid therapy. *J.A.M.A.* 143. 365-373 & 432-439. 1949.
- Edwards, H. C. *Recent Advances in Surgery.* 3rd Edition, J. & A. Churchill. London. 1948. P. 25.
- Gamble. Quoted by Child.
- Gastineau, C. F. "A classification of the disorders of electrolyte metabolism". *Proc. Staff Meeting. Mayo Clinic.* 25. 630-634. 1950.
- Lichtenstein, M. E. *J.A.M.A.* 137. 461-462. 1948.
- Lockwood & Randall. Quoted by Child.
- Maddock, H. G. *Arch. Surg.* 57. 553. 1948.
- Marriott, H. L. "The maintenance of Fluid Balance". *Annals of Royal College of Surgeons of England.* 7. 339-356. 1950.
- Moyer, C. I. Fluid & Electrolyte balance. *Surg. Gynec. & Obst.* 84. 486-600. 1947.
- Randall, H. T., Habif, D. V., Lockwood, J. S. et al. *Surgery* 26. 341 to 363. 1949.
- Underhill et al. Quoted by Moyer.
- Wangensteen, H. O. The Surgeon & his trust. *Surg. Gynec. & Obst.* 84. 567 to 578. 1947.
- Do. *New Eng. J. M.* 236: 121-129. 1947.
- Wilkinson, A. W. Barbara et al. Excretion of chloride and sodium after surgical operations. *Lancet* 1. 640-644. 1949 Apr. 16.

CASES & COMMENTS

RECURRENT POSTERIOR DISLOCATION OF THE SHOULDER

(With a Case Report)

by K. S. GREWAL and IQBAL SINGH, Amritsar.

Posterior dislocation of the shoulder is itself uncommon but the recurring variety of the same is very rare. Out of 641 cases discussed in the Journal of Bone and Joint Surgery in Feb. 1948, not a single case of posterior recurrent dislocation has been mentioned. The earliest reference in English literature is that of a single case by Bankhart in 1938. In 1943 Watson Jones reported two cases followed by two more by Rowe and Yee in 1944; a case by Hindenach in 1947 and another by Zadik in 1948.

CASE REPORT

Raj Kumar, aged 20 years visited the Orthopaedic section of the V. J. Hospital on 31-8-1950 with the complaint that his left shoulder frequently went out for the last six months. Six months ago when he woke up one morning he found that his arm was lying by the side of his body, and was fixed and could not be moved. It was reduced by a doctor. Since then the shoulder dislocates off and on, commonly during sleep. His sister has learnt the art of reducing the dislocation, and does it every morning for him.

In the personal history of the case we found that he was having epileptic fits for the last two years, at intervals of 15-20 days, but the history of any trauma to the shoulder, or of an epileptic fit preceding the dislocation was denied, though 10 days before operation he got a fit in the ward resulting in dislocation of the shoulder.

On examination the deltoid was wasted. Flexion 45 degrees and internal rotation with slight thrust backwards caused the dislocation and the arm got fixed by the side. Point of the acromion became more prominent and the head of the humerus could be felt under the spine of the scapula posteriorly.

Movements with the head dislocated:—

ACTIVE:

Abduction	30°
Flexion and extension	10°
Rotation	Nil.

PASSIVE:

Abduction	90°
Flexion and extension	70°
Rotation	Nil.

Reduction of the shoulder could be effected by externally rotating the slightly abducted arm and by simultaneous direct pressure over the humeral head from behind forwards.

Operation:—Operation was performed with patient lying on the unaffected side. An incision 5 inches long was made over the back of the shoulder extending along the lateral $\frac{1}{2}$ of the spine and the posterior border of the deltoid. The deltoid muscle was detached from the spine and reflected forwards. The teres minor and the infraspinatus muscle were found well developed and healthy. These were cut near their insertions. The capsule was found to be lax and a fold could be picked up (Fig. 1). The capsule was incised $\frac{1}{2}$ " distal to its posterior attachment, and the joint opened up. The humeral head was found to be intact and covered by healthy articular cartilage. The humerus was retracted forwards with flat retractors and the joint examined. The posterior glenoid margin was rounded and smooth and was

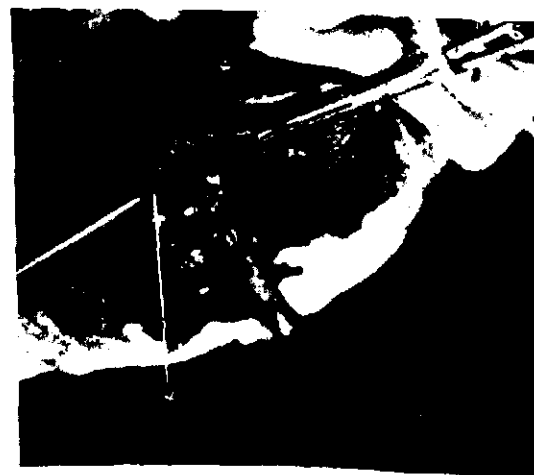


Fig. 1.

Photograph shows the fold of the capsule picked up by the Kocher's forceps marked X.



Fig. 2.

Photograph shows the ridge of bone on the neck of scapula marked A. B denotes the glenoid margin. C denotes the head of the humerus.

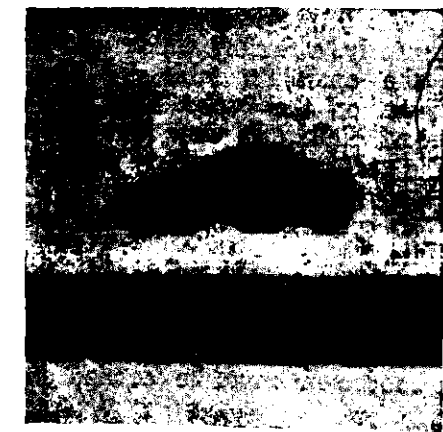


Fig. 3.

Photograph shows the piece of fibrocartilage removed from the ridge of bone in Fig. 2.

devoid of labrum, which was found to be attached to a ridge on the neck of the scapula $\frac{1}{2}$ " behind the rim of the glenoid (Fig. 2). The labrum was detached from its abnormal attachment (Fig. 3) and the bone adjacent to the bony margin of the glenoid was raw with a chisel. Two holes were made from just outside the glenoid rim to inside the joint $\frac{1}{2}$ " apart, by means of a bent awl. Mattress silk worm gut sutures were applied through these and the capsule. Infraspinatus and teres minor were re-attached to the humerus, and deltoid to the spine of the scapula; wound closed and dressed, the arm bandaged to the side.

Anti-epileptic treatment was started 10 days before the operation, and the patient was kept constantly sedated with luminal gr. 1 thrice a day for 5 weeks. Stitches were removed on the tenth day and movements started 4 weeks later. Discharged on 18-10-1950.

Movements on discharge:

ACTIVE:

Abduction	90 degrees
Flexion and extension	Full
External rotation	Full
Internal rotation	20 degrees

Patient was re-examined on 15-12-1950.

The patient had no complaint. The movements were all full except internal rotation, which was limited in extreme.

He had no epileptic attacks during this period.

DISCUSSION

In our case trauma did not play any part. We could get no history of trauma, and further, on the operation table we could not find any pathology suggestive of traumatic origin of the dislocation. It is difficult to conceive of a trauma severe enough to cause a detachment of the labrum, and cause it to be firmly fixed to a ridge $\frac{1}{2}$ " behind the glenoid rim, on to the neck of the scapula. Hence in our opinion the defect was congenital in origin. It is however possible that repeated epileptic attacks resulted in the incoordinated contraction of the muscles, causing the head to dislocate into the recess behind the rim.

Asplund in his paper describes the case of a boy of 18 years, who had recurrent posterior dislocation of the shoulder, who used to dislocate his shoulder whenever he would abduct the arm to 50° and then simultaneously flex and internally rotate it. Asplund attributed the condition to a weakness of the external rotators of the shoulder, which did not provide adequate support in their stretched condition to the

shoulder posteriorly, while the arm was simultaneously flexed and internally rotated. An arthrogram showed a large recess posteriorly, a finding which was confirmed on the operation table by the missing labrum, on the back. This also goes to support Mollerud's view that this case was truly recurrent in variety because of the missing labrum. In this a bone buttress block operation was done with good results.

The movement that causes the dislocation is flexion and internal rotation in slight abduction, though the range through which the movement must be carried out before producing the dislocation is different in different cases. In our case the safe range of flexion was 45 degrees while in Asplund's case the arm had to be abducted to 50 degrees and then simultaneously flexed and internally rotated. In the case reported by Hindenach the safe range was 30. The shoulder may remain dislocated or may come back to normal as reported by Mollerud in a girl of 18 who had bilateral recurrent posterior dislocation of the shoulder. The left shoulder would get dislocated whenever she elevated the internally rotated arm, and then the head of the humerus was felt under the spine of the scapula, but the head would be reduced when the arm was brought back to the side. It would appear that the movement that causes the dislocation puts the maximum stress on the posterior aspect of the joint; hence the defect is mostly posterior and trauma, if at all, must be direct to the shoulder to push the head directly backward as in Zadik's case.

The diagnosis of the condition may be easily missed for the disability may be very slight and this fact is well brought out by Hindenach in his case of a soldier who sustained an injury while doing physical training in April 1944. He was treated by physiotherapy and massage but without avail and was subjected to an operation for possible rupture of the supraspinatus tendon; but the condition remained unrelieved. Another operation was performed

using the anterior approach and the lateral end of the clavicle was excised. Repeated luxations took place after this. A Nicola's operation was performed then but this also did not have the desired effect, till in November '45 the posterior repair was done supplemented by a bone buttress block with good results.

Radiography is not of much help in the diagnosis of the condition especially the routine antero-posterior picture; for the contour of the shoulder may be perfectly normal, but arthrogram in the lateral view may be of help by showing the posterior position of the head of the humerus. However a careful examination at the time of the dislocation will reveal the head of the humerus lying under the spine of the scapula with the arm fixed in adduction or in flexion.

Various operations have been suggested from time to time but in our opinion the posterior Bankhart operation and the repair of the defect is the treatment of choice, because it adequately deals with the pathology as seen at the time of the operation. This is also borne out by the experience of Rowe and Yee who in one of their cases did the Nicola operation but the result was disappointing and later they had to do a posterior Bankhart's procedure supplemented with bone block with good results.

Kaplan's procedure of the modified 'Clairmont operation', (the use of the anterior part of the deltoid as a sling through the quadrilateral space back to the posterior aspect of the joint) could act as a support only inferiorly and not posteriorly where it is most needed.

A more stable support posteriorly is advocated by Fiebre and Milaret who advocate the use of posterior bone block taking the graft from the rib and fixing it under the infraspinatus. The whole limb is immobilised in a plaster of paris spica with the arm abducted and externally rotated; but in our opinion this operation is not desirable as it necessitates the fixation of the shoulder for a long time and

may lead to limitations of movements of the joint. This operation, however, is of definite value in those cases of congenital posterior dislocation of the shoulder in which there is an abnormally small glenoid with a normal head.

In our case posterior recurrent dislocation of the shoulder was due to a congenital abnormality and the Bankhart's method of repair was undertaken.

REFERENCES

1. Asplund, Gustav (1942). *Acta. Chir Scandinauice*. 87: 103-112.

2. Bankhart, A. S. (1938). *Brit. J. Surg.* 26: 23-29.
3. Harmon Paul H. (1945). *Surg. Gynec. Obst.* 81: 266-268.
4. Hindenach, J. C. R. (1947). *J. Bone & Joint Surg.* 29: 582.
5. Mollerud, Adolf (1946). *Acta. Chir, Scandinavice*. 94: 181-186.
6. Rowe, Carter R. and Yee, Lester B. K. (July 1944). *J. Bone & Jt. Surg.* 26: 580-584.
7. Watson Jones (1943). *Fractures & Joint Injuries*. E & S Livingston Publishers, Edinburgh.
8. Zadik, F. A. (1948). *J. Bone & Joint Surg.*

CONGENITAL LYMPHANGIOMA CAVERNOSUM

(Report of a Case)

by NUR, M. MALIK, Michigan.

The lymphangiomas are relatively rare tumors of newly formed lymph vessels. They are usually congenital, or appear soon after birth. When present, some forms may prove to present very difficult problems in diagnosis, treatment and prognosis. The purpose of this paper is to report a case of congenital cavernous lymphangioma in an infant, and to discuss briefly the principal types of lesions.



Fig. 1.

Photograph shows the patient with the scar. The lesion extended from the middle of the scar to the level of the acromioclavicular articulation.

CASE REPORT

S.D., a 23 month old female infant, was first seen in August 1950. The mother complained that her baby had developed a small lump behind the left shoulder. She believed it had appeared after a fall from bed some six weeks previously. When first noticed the mass was about the size of an English walnut. It had not grown noticeably since. The infant had not shown signs of discomfort and there has been no loss of function in the left arm or shoulder.

The patient was the second of three children. She had an elder brother, age three, and a younger brother, age eleven months. Both were in good general health. She was a full term normal delivery and cried spontaneously. At birth she weighed seven pounds and two ounces; was twenty-one inches in length; and had no demonstrable congenital defects. Her early growth was normal in all respects until the appearance of the above noted tumor mass. Her father and mother denied the presence of any familial disease on either side.

The physical examination and routine laboratory tests, including the X-rays, revealed no abnormalities. The patient was of light blond complexion, weighed twenty-seven pounds and was thirty-four inches tall. She appeared to be in excellent general health except for the presence of a diffused fusiform tumor behind her left shoulder located between the spine of the scapula and the posterior axillary fold. It measured 7 x 3 cms. and had its longer axis parallel to the scapular spine. It was semi-solid, subcutaneous and moveable. There was a suggestion of fluctuation in the long axis, but no inflammatory reaction, tenderness or pulsation was present.

The patient's head and neck were negative. Both fontanelles were closed completely. The lips and the palate were normal. The regional lymph nodes not enlarged. The heart and lungs were negative. There were no osseous or developmental anomalies in any other part of the body.

A tentative clinical diagnosis of post-traumatic semi-solid lipoma was made and the parents were advised to have it removed.

The infant received venethene and drop ether general anaesthesia. The incision was carried from the left shoulder to the middle of the posterior axillary fold. The mass presented itself beneath the adipose tissue as a cystic tumor, with a pearl-gray, fine, and very friable capsule. The cavity was deep and cavernous and was filled with about 30 c.c. of clear yellowish fluid. The cyst lay deep in the muscles and sent finger-like projections between teres major, teres minor, the deltoid, and far into the quadrilateral space of the muscular planes of the shoulder girdle. The draining friable capsular tissue was intimately connected to the muscle fibres in several directions.

Because of technical difficulties complete excision was postponed, and the wound was closed. One week later the mother reported a drainage of clear fluid from the middle of the scar. A small puncture ejected approximately 75 c.c. of lymph.

The patient was re-admitted to the hospital and with great difficulty the cyst was completely removed, using sharp dissection. A rubber drain was placed in the wound and brought out from the axilla in its most dependent position. All the bleeding points were controlled meticulously and the skin edges approximated with interrupted fine silk sutures. The drain was removed in 48 hours. The wound healed by first intention. The patient has full use of her shoulder and arm.

The pathologist reported that the specimen submitted for examination consisted of adipose tissue containing cystic spaces. These were lined with a single layer of swollen cells which could not be classified. The spaces were empty and many contained small papillary infoldings. Scattered throughout were many inflammatory cells. He added that because of the presence of the swollen cells and papillary buds the possibility of an infected congenital cavernous lymphangioma could not be ruled out.

DISCUSSION

In the literature the terminology of the lymphangiomas is confusing. Although much has been added by subsequent authors, the original classification by Wegner is still by far the simplest and the best. He divided them into three main types:

1. Simple lymphangiomas
2. Cavernous lymphangiomas
3. Cystic hygromas.

1. Simple lymphangioma, also called lymphatic naevus, is a relatively rare tumor. It is usually congenital and appears in the skin or mucous membrane soon after birth. The lesion is small, circumscribed and pink in colour. It is a benign growth and when indicated may be excised or treated with carbon-dioxide snow or electro-coagulation.

Lymphangiectasis or varicose lymphatics, as its name implies, is a type of acquired simple lymphangioma caused by dilatation of lymphatics. It commonly occurs in the groin, scrotum and the upper thigh. The dilated lymph channels do not break easily, but if injured may cause lymphorrhea.

2. Cavernous lymphangiomas: these are the commonest type of congenital tumors of lymph vessels, though they, too, are rela-

tively rare. They arise from abnormal mesodermal rests which have a tendency to develop into isolated imperfect lymph vessels. They involve the skin, subcutaneous tissue and the intermuscular septa. Most of them are seen about neck, head, genitalia and the mesentery. There are several clinical varieties of cavernous lymphangiomas. Those of the lips, cheeks and tongue may attain a large size.

Microscopically, the lesions are made up of numerous dilated lymphatic sinuses containing lymph or a mixture of blood and lymph. The septa are thin but there may be budding and proliferation of endothelium and of fibrous tissue between the spaces and a lymphocytic infiltration around them, as in the case presented. Mitotic figures are not seen.

As lymph is an excellent culture medium for bacterial growth, all cavernous lymphangiomas are markedly susceptible to infection. Consequently, it is important to avoid trauma. Another characteristic of these cystic tumors is their secretion of astonishingly large quantities of lymph; unless excised completely they will drain for a long period.

The treatment consists of early and thorough removal of the cystic mass. Where this is not feasible, injection with sclerosing solution as in the case of hemangioma, or radiation therapy may be tried. Watson and McCarthy, in a report of over one thousand cases, believe that these cavernous lymphangiomas are resistant to radiation treatment. However, other authorities disagree.

3. Cystic hygroma is a cavernous lymphangioma which appears in the neck and axilla. It is either a unilocular or a multilocular cystic tumor which is seen only in the first ten years of life. Hygroma may grow to a very large size. This is because the lymphatics retain their embryonic power of growth. According to the studies of Goetsch, the hygromas grow and propagate by proliferation, and by the sprouting of endothelium and connective tissue from the walls of the cysts.

The presence of the fluid may force the cyst between vessels, muscle spaces or into the mediastinum. It may produce pressure symptoms on the neighbouring structures. If infected it may prove fatal. The treatment consists of surgical removal of the hygroma.

SUMMARY AND CONCLUSION

1. Lymphangiomas are usually congenital, are relatively rare tumors of the lymph vessels.

2. A case of congenital lymphangioma cavernosum is reported which demonstrates the extreme difficulty in diagnosing these tumors.

3. It is recommended that when dealing with a tumor mass in young patients, especially in the neck, shoulder and axilla, the possibility of congenital lymphangioma, as well as of lipoma, Hodgkin's disease, tuberculous glands, branchial cyst, or of aberrant thyroid, should be considered.

4. The treatment of lymphangiomas varies, of course, with the type. The simple lymphangiomas require only excision; the cavernous type is best excised if feasible. The incidence of post-operative infection is

great and recurrences are common. In cystic hygroma also, excision should be done before it becomes secondarily infected because infection may prove fatal.

BIBLIOGRAPHY

1. Allen, E. V., Barker, N. W., and Hines, E. A., Jr. *Peripheral Vascular Diseases*. Philadelphia and London: W. B. Saunders Company, 1947, pp. 556-60.
2. Anderson, W. A. D. *Pathology*. St. Louis: The C. V. Mosby Company, 1948, p. 1246.
3. Babcock, W. W. *A Textbook of Surgery*. Philadelphia and London: W. B. Saunders Company, p. 427.
4. Berman, J. K. *Principles and Practice of Surgery*. St. Louis: The C. V. Mosby Company, 1950, pp. 602-03.
5. Goetsch, E. "Hygroma colli cysticum". *Arch. Surg.* 36: 394. 1938.
6. Ritchie, W. P. *Essentials of General Surgery*. St. Louis: The C. V. Mosby Company, 1941, p. 203.
7. Warbasse, J. P. and Smyth, C. M. *Surgical Treatment*. Philadelphia and London: W. B. Saunders Company, 1937, p. 426.
8. Watson, W. L. and McCarthy, W.D. "Blood and Lymph Vessel Tumors; a report of 1056 cases." *Surg., Gynec., and Obst.*, 71: 569-588. 1940.
9. Wegner, G. "Ueber Lymphangiome". *Arch. f. Klin. Chir.*, 20: 641-707. 1877.

HYDATID CYST OF THE KIDNEY

by N. DAS, New Delhi.

Hydatid cysts of kidney in the human being are uncommon. The total number of cases of hydatid disease recorded in the Lious Barnett Hydatid Registry of the Royal Australian College of Surgeons, is 2,002, and of these only 44 are examples of renal cysts. The records of Royal Prince Alfred Hospital, Sydney, compiled since the year 1900, contain 16 examples of renal hydatid disease.

According to Brailsford, in each one hundred cases in man, approximately seventy appear in the liver, ten in the lungs, $2\frac{1}{2}$ in the kidneys, $2\frac{1}{2}$ in the spleen, and five in the other abdominal organs, five in muscles, four in the brain, and one in the bone. Frequency of these figures is not difficult to explain. The infection occurs by swallowing the ova of the echinococcus. These swallowed ova are attacked by gastric juice which dissolves their shells and sets free embryos having six hooklets. These embryos obtain access to the radicals of portal vein and are carried to the liver. In the liver most of the embryos settle and develop into hydatid cyst, but a small proportion get through into general circulation via the inferior vena cava and right heart from which they are carried to any tissue of the body, where they ultimately come to rest and develop into hydatid cysts.

The rarity of renal hydatid disease and the fact that it has not been possible to come across any report of renal hydatid in Indian literature has prompted the writer to record this case. The typical case history, and an extraordinary fine specimen of the disease obtained at operation, has further added to the enthusiasm of the author to record this case.

CASE REPORT

Patient S. N. male aged 32 was admitted into the Surgical Ward II of the Irwin Hospital, New Delhi on 22-7-1949, with the complaint of intermittent attacks of severe pain in the right loin, radiating downwards and forwards to the groin, over a

period of six years, and occurring at intervals of about six months. Each attack of pain was associated with some haematuria, and the occasional passage of pieces of tissue resembling grape skin in the urine. In all other respects, his health had been satisfactory.

On examination, the patient was healthy looking, well built. His heart and lungs were clear on clinical examination, and no mass or enlargement of any viscus was noted on abdominal palpation. Examination of the urine on his admission to hospital revealed a slight trace of albumin. Plain skiagram of the abdomen revealed an area of calcification in the right lumbar region with a sharp and rounded lower margin coinciding with the lower pole of the right kidney. An irregular calcification extended upwards from this margin (Fig. 1).

Excretion pyelography showed good excretory function of the left kidney with a normal renal pelvis but a completely non-functioning right kidney.



Fig. 1.

Plain skiagram of the abdomen showing an area of calcification in the right lumbar region, with its sharp rounded lower margin coinciding with the lower pole of the right kidney. The irregular calcification extending upwards from this margin points that it is a partially calcified cyst and probably a hydatid cyst.

A differential white cell count revealed 10% eosinophilia. Casoni's skin test could not be done as the antigen was not available.

The case appeared to be typical of hydatid cyst of the right kidney, and nephrectomy was advised. This was carried out on August 3, 1949, under ether anaesthesia through the usual right loin incision.

The kidney was found to be considerably enlarged in the lower pole by a cystic swelling of the size of a large apple. The kidney was however normally situated. There were no adhesions and nephrectomy was easy.

The patient made an uneventful recovery.

The specimen consists of the right kidney with the whole of the lower pole replaced by a hydatid cyst (Fig. 2). The parent cyst contains numerous cysts (Fig. 2). The cyst wall of the parent cyst is partially calcified and is responsible for the typical shadow seen in plain skiagram.

DISCUSSION

From time to time rupture of the parent cyst had occurred into the renal pelvis, with



Fig. 2.

Photograph of the opened out specimen of the right kidney that was removed. Only the upper pole of the right kidney survives, the rest of the kidney being replaced by the hydatid cyst. The parent cyst is seen to contain many daughter cysts.

the escape of daughter cysts down the ureter causing attacks of renal colic and haematuria.

Reay⁵ maintains that rarely does a renal hydatid cyst come under observation without the presence of a palpable tumour in the lumbar region. He also affirms that a lower polar cyst usually presents as an abdominal tumour, and displaces the kidney upwards. The case reported here does not bear out either of these statements. It would be agreed with Craig and Lee-Brown² that in this disease "it is the hydatid which becomes displaced and not the kidney".

Calcification in the polar region of the kidney with its sharp semi-circular margin coinciding with the pole of the kidney, with an irregular spread of calcification towards the renal body, should make one suspect, a calcified cyst of the kidney, and probably a calcified hydatid. A completely calcified hydatid casting an average sized rounded or oval shadow is, however, very difficult to differentiate from renal lithiasis. Casoni's skin test, and differential white cell count is of great help in such cases.

No doubt, nephrectomy is the only treatment, when the diseased kidney is not functioning. What is the treatment, when the diseased kidney is functioning? Probably nephrectomy again is the answer since:—

(a) Attempts at removal of the cyst are not very successful.

(b) Convalescence is short and cure is sure.

Partial nephrectomy may however be considered.

SUMMARY AND CONCLUSION

1. One case of calcified hydatid cyst of the lower pole of right kidney is reported.
2. Uncomplicated hydatid disease of the kidney is compatible with good health.
3. Kidney can remain in its normal position though a large hydatid cyst may be present in the polar region.

REFERENCES

1. Begg, R. Campbell.: Brit. J. Surg. 24: 18, 1936.
 2. Craig, Gordon and Lee-Brown, R. K.: Surg., Gynec. & Obstet. 46: 668, May 1928.
 3. Dew, H. R.: Hydatid disease. Australian Medical Publishing Co. 1927.
 4. Howarth, V. S.: Brit. J. Surg. 38: 38, 1950.
 5. Reay, E. R.: Australian & New Zealand J. Surg. 11: 9, 1941.
4. A large hydatid cyst of the kidney may be present without a tumour being palpable in the lumbar region.
 5. Hydatid disease of the kidney, occasionally casts calcified shadows, that are to be differentiated from renal lithiasis and renal calcification of other aetiology. However, a calcification of the type seen in this case, is a strong evidence in favour of the hydatid disease of the kidney.

Contributors—March, 1951.

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REVIEWS OF BOOKS

Year Book of General Surgery (July, 1949 — June, 1950): Edited by **Evarts A. Graham, A.B., M.D.** with a Section of *Anaesthesia* Edited by **Stuart C. Cullen, M.D.** Pp. 670. Illus. 193. 1950. The Year Book Publishers, Inc., Chicago 11. Price \$5.00.

This book is too well-known to require any extensive review here. With this Volume, which covers almost the entire surgical literature from July 1949 to June 1950, the Year Book of Surgery completes fifty useful and widely read years of publication. Commemorating this event, the Editor has added a comprehensive chapter on "Surgical Progress in the Past Decade". The rapid growth of anaesthesiology and its development as a highly skilled speciality is acknowledged by a separate section devoted entirely to "Anaesthesia."

The publishers of the Year Book of Surgery deserve the warmest thanks of the profession for half a century of service. We wish them continued prosperity.

U. M. R.

World Surgery — 1950: by **Stephen A. Ziemann, M.D., F.A.C.S., F.I.C.S.** Pp. 177. Illus. 53. J. B. Lippincott Co., Philadelphia. Price \$6.00.

This publication which aims to give the English knowing surgeon a brief survey of the progress taking place in the various fields of general surgery, theoretical and practical, is a welcome addition to international surgical literature. Its handy size, attractive get up, crisp style and practical outlook all enhance its value to the tired practitioner. Particularly noteworthy are its summaries of surgical papers published in foreign countries. References are given to the original articles as well as to case histories illustrative of the matter under discussion. The service which such a publication renders to the busy practitioner cannot be over-estimated and surgeons will look forward to future editions with keen interest.

K. G. P.

The Medicus (Monthly Journal devoted to Medical Sciences — published at Karachi — Pakistan.)

The 5th Number of the 1st Volume of "The Medicus" has been received by us for review. The Journal is got up in good art paper and contains original articles and abstracts from current literature.

We wish this young contemporary every success.

C. P. V. M.

Indications For and Results of Splenectomy: by **F. A. Collier, M.D., A. Blain, M.D., and G. Andrews,**

M.D. Pp. 100. Illus. 16. 1950. Published by **Charles C. Thomas, Springfield, Ill.** (Blackwell Scientific Publications, Ltd., Oxford.) Price 16s. 6d. net.

A total of 132 cases on whom splenectomy was done as an elective procedure between July '34 and July '49 at the University Hospital, Michigan, have been studied and their present physical status evaluated in the preparation of this monograph. All the indications for splenectomy are dealt with in this book. Each of the several indications are discussed in two separate portions. A brief survey of the modern concepts of aetiology, clinical picture and treatment of the condition is followed by a review of the cases treated at the University Hospital. A detailed description of the surgical procedure found most satisfactory would have made this book very complete. The printing and the get-up are excellent.

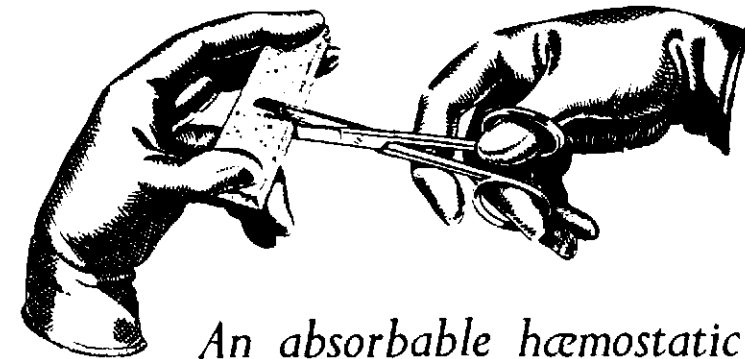
This monograph is an admirable record of the past experiences and the present knowledge of those diseases of the spleen that can be treated by splenectomy.

U. M. R.

The Clinical Use of Radioactive Isotopes: by **Bertram V. A. Low-Beer, M.D.** Pp. 436. Illus. 105. Published by **Charles C. Thomas, Springfield, Ill., 1950.** (Blackwell Scientific Publications, Ltd., 24 25 Broad Street, Oxford.) Price 70s. net.

Low-Beer has written this fairly comprehensive text-book describing the basic principles of artificial radioactivity and as a guide to diagnosis and therapy with radioisotopes. Brief, clear, well-illustrated, this book, the primer in clinical applications of radioactive isotopes, becomes an effective presentation. Part I deals with radiation physics and covers the whole subject in plain understandable language. Part II outlines the clinical applications of radioactive isotopes discussing in sequence clinical investigations, dosage determinations, and therapy. The section on dosage merits careful reading, and the mathematical formulae are cushioned with adequate verbal interpretations. There is a detailed analysis of dosage determinations with examples of calculations for dosage rate and accumulated dose. The therapeutic use of radiophosphorous and radioiodine are discussed with extensive references on this subject — also radiocobalt and all the radioisotopes which have been experimented upon till now, therapeutically. In addition to excellent illustrations, useful graphs and tables have been appended. References to literature are listed. The student, the clinician, the research worker and the radiologist will find this an excellent volume for reference and careful study.

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