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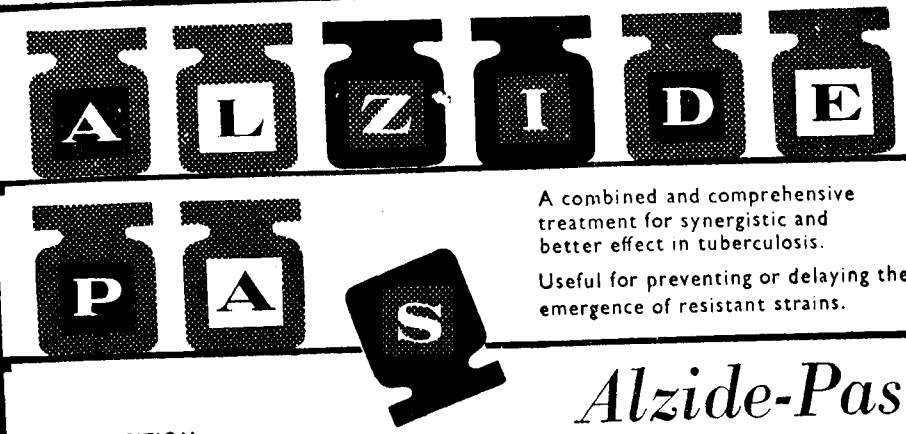
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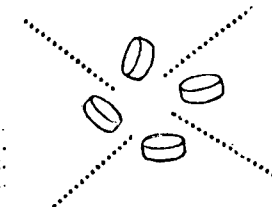
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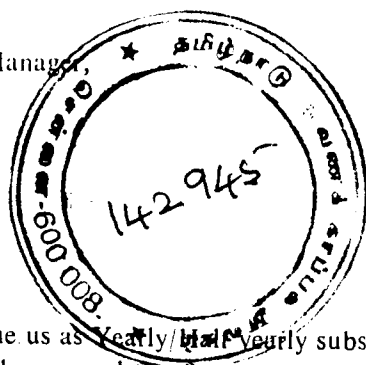
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MEDISCOPE

Journal of Medicine & Surgery

VOL. 1

APRIL 1958

No. 2

Radiological Diagnosis of Peripheral Vascular Diseases

By

K. M. PILLAI B.A., M.B.B.S., D.M.R.D. (Lond)

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Buerger in 1924 published his Book on the "Circulatory Disturbances of the Extremities". Many of the facts mentioned in this Book hold true even today but a number of statements have become out of date from our present day knowledge of these diseases.

ANATOMY OF THE PERIPHERAL CIRCULATION

Basically the Circulatory System is a closed one of Endothelial tubing containing a mass of circulating blood. With the exception of the Capillaries, this tubing is invested with layers of Elastic and Connective tissues and smooth muscle. In any particular vessel, the thickness and relative proportion of the

investing layers are related directly to the intraluminal pressure and volume of Blood flow. As the large arteries branch progressively into vessels of smaller calibre, the proportion of Elastic tissue becomes less and less while that of the smooth muscle increases so that the walls of Arterioles are composed almost entirely of Smooth muscle. This feature is responsible for the varied Dilator and Constrictor changes.

NERVE SUPPLY OF PERIPHERAL VESSELS.

The Peripheral circulatory apparatus is innervated by the Sympathetic. The function of the System is predominantly and perhaps exclusively Vasoconstrictor.

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Certain workers have however shown Vasodilator Neurons as well.

Although there is no voluntary regulation of the state of the Blood vessels, there is no doubt that Central co-ordination of vasomotor activity exists. Such a view is supported by the vascular changes produced by emotion. The exact location of the higher centres responsible for the control of these activities is poorly understood. The Motor and Premotor areas have been implicated in the vasomotor reactions as experimentally shown in animals but the mode of coordination is still not very clear. Electrical stimulation of the Hypothalamus in anaesthetised animals has uniformly produced Vasoconstriction of the Cutaneous vessels.

Apart from the fundamental Clinical examination of the patient suffering from a Peripheral vascular disorder, there are a number of special methods of examination. Among these may be mentioned Histamine Flare Test: Oscillometry: Skin Thermometry: InfraRed Photography: and Radiological investigations. This last part only will be dealt with in this paper.

CLASSIFICATION

Boyd's classification will be adapted in this paper. He classifies Vascular Obstructive conditions into:—

(1) Traumatic Thrombosis.

Commonly seen in the Popliteal after posterior dislocation of the Knee.

(2) Juvenile Obliterative Arteritis.

In young men rarely over 35 years. Occlusive process starts in the small

arteries of the feet and ascend up leading to extensive Gangrene. Association with Fungus infection of the Interdigital clefts. Periods of quiescence. Always bilateral.

(3) Primary Popliteal Thrombosis.

Confined to the Popliteal artery. Usually extends from the level of the knee to the Adductor opening. No inflammatory changes in the walls. Similarity between this and the traumatic.

(4) Senile Obliterative Arteritis. (Arteriosclerosis Obliterans)

(5) Diffuse Obliterative Arteritis.

Narrow irregular lumen - More advanced cases show irregular beaded appearances of the main arteries and larger branches. Vessels often show calcification.

(6) Secondary Popliteal Thrombosis.

Occurs in 50% of Senile Obliterative Arteritis patients. Arteriosclerotic changes seen in the patent limb arteries. Thrombosis begins at the Femoral Condyles probably due to repeated minor traumata.

PLAIN XRAY FINDINGS.

The most important radiological evidence is the calcification seen in the walls of the main Arteries of the extremities. The Brachial, Radial and Ulnar: the Femoral and the Posterior Tibial are common vessels showing calcification in them. Often the Dorsalis Pedis Artery shows calcium in the walls when no other vessels show calcification in them. This calcification must be assessed with the clinical findings of the

particular case as deposition of calcium in the walls of arteris may be seen without clinical evidence of arterial obstruction. Calcification is best demonstrated by soft tissue exposures on non-screen films. Calcification in an Aneurismal sac can be easily demonstrated and would explain some of the symptoms in the particular case. A peripheral artery aneurism can be diagnosed clinically without any difficulty and radiological investigation may be necessary only in cases where there is doubt clinically.

ARTERIOGRAPHIC INVESTIGATION

It is interesting to note that a few weeks after Roentgen discovered Xrays, Hashek and Lindenthal produced Arteriograms by injecting radioopaque medium into an amputated arm. Pioneer work on Arteriography of the human limbs however was done by Sicard and Forrestier in France in 1923 and by Hirsch in Germany. The long intervening period of scanty original work was due to the absence of a suitable Contrast medium rather than due to any technical difficulty.

Edwards postulated that a suitable contrast medium should be:—

(1) Satisfactorily opaque even when diluted with Blood.

(2) Freely miscible with blood without producing Embolism or false filling defects in the Xray films.

(3) Sufficiently limpid to flow rapidly through a relatively small needle.

(4) Unaltered appreciably by adequate sterilisation.

(5) Devoid of painful reactions

(6) Devoid of injurious effects on blood and vessel wall.

(7) Free from inflammatory effects after extravasation.

(8) Devoid of toxic effects.

(9) Should be excreted within a reasonable time.

By far the best medium satisfying all these requirements is Thorotrast but unfortunately it has been established beyond reasonable doubt that it is a radioactive substance and its use has been given up in almost all centres. More recently however tri-iodine compounds have been made available in stable forms and these compounds are seen to have no side effects and to fulfil all the data stipulated by Edwards long ago. We have used Diaginol 50% almost exclusively for peripheral Arteriographic work and have found no immediate or delayed effects in a large series of cases.

Among the diagnostic applications of peripheral Arteriography may be mentioned:—

(1) Visualisation of the course and direction of the Artery.

(2) Width of the lumen

(3) Shape of the inner wall

(4) Level and degree of Arterial obstruction.

(5) Amount of collateral circulation.

(6) Sites of Arterio-venous fistulae.

(7) Aneurisms.

(8) Arterial supply of tumours.

TECHNIQUE.

It is surprising to read in a recent publication on Peripheral Vascular Diseases (1956 Ed) "the open method or operative method although requiring more effort is safer than the closed or Percutaneous method since it permits control if bleeding occurs from the artery after removal of the needle". The number of percutaneous arteriographic investigations all over the world must run into tens of thousands by now and even the most conservative workers in the field have switched over to the closed method. As one gains experience in the technique, it becomes easier to perform a percutaneous Arteriogram. The same arguments that hold for the preference of the Percutaneous technique of Cerebral angiography to the open method hold good in the performance of Arteriography in a greater measure as the Femoral is an easier vessel to enter into than the Carotid. Even in the more difficult Brachial artery, the vast amount of literature that has accumulated particularly from Sweden should make one prefer the percutaneous technique and only expose the artery if the closed method fails.

Percutaneous puncture of an artery in the words of Turnbull is not a formidable affair nor is it easy. Deep infiltration with Novocaine is essential and it is wise to infiltrate the arterial wall as well. As intra arterial Novocaine is now accepted as a form of treatment for the relief of pain as well as of spasm there need be no fear on this account. As a matter of fact it is essential to prevent arterial Spasm. The arterial

wall must be pierced vertically through and through and the needle must then be withdrawn after tilting it over the abdomen. It is advisable to use an 18 Gauge needle with a very short bevel. Once the needle is safely inside the arterial lumen, saline can be slowly run in while the radiography is arranged.

There are several serialographic techniques available and most of them are not expensive and could even be locally manufactured. One such apparatus adapts the Tube head and Film carrier moving towards the foot of the table while the film carrier automatically rotates to bring the next film into position. A simple method is to use a lead apron to cover the leg and use the main tube head to expose the thigh region and immediately after the exposure to turn the lead apron up to the thigh and with a portable tube previously set in position over the leg to expose the lower portion. Very satisfactory films have been obtained this way. It is essential to immobilise the patient's leg as otherwise the patient tends to move the limb at the time of radiography. The needle is left in position while the films are processed and seen. Further views if necessary can then be taken. When the investigation is completed, the needle is withdrawn and firm pressure applied over the artery at the site of puncture for five minutes. This pressure usually seals the puncture completely.

COMPLICATIONS

There are few complications encountered. Haematoma is the most common one

and this should not occur if firm pressure is applied. If there is an arterial tear due to puncture of the artery at the side and not at the centre, the bleeding would be greater. The way to prevent this is to puncture the artery in the centre. If the needle is held lightly over the artery, the pulsations would be felt and seen on the needle. The needle would move vertically up and down if the needle is held over the centre while it would wobble from side to side if it is to one side. The position then could be corrected until it is over the centre.

Iodine reactions are complications that occur in all contrast work and it is essential to test the sensitivity of the patient to Iodine. This is done preferably on the previous day in the wards and we use the same concentration of the dye to test sensitivity. One or two CC are given intravenously and possible reactions watched for. This test is by far the most reliable one.

RADIOLOGICAL APPEARANCES.

Thrombosis of the vessel is evident as an abrupt ending to the flow of the contrast or as a long continuous narrowing of the vessel lumen. A similar appearance would result if the picture had been not timed properly and erroneously interpreted. It is therefore important to serially radiograph the region to exclude such a possibility.

An Embolus gives a characteristic abrupt ending to the contrast and persistently seen in serial films. A concave filling defect could be some-

times seen and is pathognomonic of the condition.

Arteriosclerotic changes inside the vessel are seen as filling defects inside the vascular lumen and these are sometimes sufficiently extensive to warrant a diagnosis.

Beaded appearances are seen in Diffuse Obliterative Arteritis and are again characteristic of the condition. It has been our experience that once calcification is seen in a vessel wall sufficiently extensively, it would not be possible to fill that portion of the artery even with a large number of serial pictures. The obstruction to the vessel has therefore in such cases been at a more proximal level. In cases where a limb has been amputated for extensive gangrene and where plain radiography showed calcification in the vessel wall, we have unsuccessfully tried to inject Dye into the artery immediately after the amputation. This type of result would confirm the progressive extension of the lesion proximally.

As Samuels puts it, "Diseases of the Blood vessels are a lifetime study for any individual because of the amazing ramifications that require intensive, skillful and experienced consideration by the Angiologist" a term that he has suggested to the Physician cum Surgeon cum Radiologist interested in the study of this curious but interesting anomaly that incapacitates a patient often driving him or her to desperation.

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Arsenical Amaurosis With Two Case Reports Treated With B.A.L. Etc.*

By

DR. J. M. PAHWA, M.B.B.S. (Pb), D.O. (Pb), Z.O. (Vienna) M.S., (Luck)

Blindness due to Arsenicals is not quite uncommon in our country. Of all the preparations of Arsenic inorganic or organic, Inorganic salts are supposed to be innocuous for the eyes. Cases in Literature causing Amblyopic symptoms by inorganic salts are rare. Reynolds (1900) reported that in mass poisoning due to drinking of arsenic contaminated beer in Manchester which affected about 1000 people, not a single case of Amblyopia was seen, nor a single case with affection of the retina or the optic nerve was reported. De Hass (1919) however reported occurrence of neuro-retinitis with development of bilateral central scotoma from poisoning by inorganic arsenic salts.

In contrast, organic arsenicals show a high degree of toxicity for the visual elements. It has been found that pentavalent compounds are injurious to the eyes as compared with the trivalent compound. The first compounds which showed marked toxicity were atoxyl and Soamin which were very popular for trypanosomiasis and Syphilis. They rapidly produced a large number of cases of permanent blindness though they are comparatively much safer if they are given carefully and contraction of the peripheral field is also watched.

The symptoms usually appear weeks or months after the injections of Arsenicalis or they may make their appearance in a sudden and dramatic way. In those cases which appear weeks or months after usually the visual symptoms precede signs of general arsenical poisoning, such as headache, vomiting, colic labyrinthine disturbances, ataxy and incontinence etc. Cases which start with dramatic suddenness show bilateral complete amaurosis from which no recovery usually results. The clinical picture usually takes the form of a rapidly developing extreme concentric contraction of peripheral field with a central depression which is soon followed by pallor of the optic discs developing into optic atrophy with no tendency to recovery. It is interesting that sometimes pupillary reactions may be well retained.

As to the site of the lesion—experimental research on animals have shown gross non-inflammatory degenerative changes in the ganglionic cell layer of the retina and the optic nerve. The earliest changes are however found in the proximal portion of the optic nerve. In the human subjects also similar histological changes have also been found in the retina and the optic nerve by Nonne and Sattler. The pathological picture is

*Read before the Indian Medical Association Sitapur branch on 31st January, 1958.

essentially that of a non-inflammatory degeneration.

A different manifestation is sometimes seen, particularly in association with the Salvarsan group of compounds characterised by dermatitis, haematuria, Kerato-conjunctivitis, necrotic type, iritis, retinal haemorrhage and occasionally papillitis.

The purpose of this paper is to describe two cases of complete blindness, one after Soamine (3 injections) and the other after Acetylarsan (5 injections). The curious thing about the second case was that the patient noticed and felt definite diminution of vision with the third injection, but in spite of all this, two more injections were pushed by so called our Vaid doctor attributing this thing to "garimi" of the injection. It is indeed a pity that Government is encouraging our Vaid doctors and producing so called "Quacks." In saying this I must impress upon you all that I have no ill feeling towards this system but they should not in any case be allowed to come into our domain and use our medicines without knowing its doses, pharmacological actions and toxic reactions etc. It is an admitted fact that more misuse of all these modern antibiotics are being used by them, thus making the whole nation resistant to penicillin etc. In ophthalmology they are also responsible for part of this immense blindness. They dispose of all the patients by giving panacea of Zinc drops or modern antibiotic ointments. All cases of failing of vision are attributed by them due to

commencing cataract while the real trouble was simple primary glaucoma for which early treatment is very essential.

Though the treatment of arsenical amaurosis as said before is not of much avail it gives me pleasure that both of them responded very well and have been cured by B. A. L. (British-Anti-Lewisite) along with Vasodilators retrobulbarly.

B. A. L. being ineffective by mouth is administered by intramuscular injections when it is distributed throughout the body. It is concentrated in the Kidneys and excreted in the urine. The effect of a single dose largely disappears within 4 hours after injection and, therefore, this should be the interval between doses in acute poisoning. It is presumed that in acute poisoning B. A. L. transfers the toxic element from the tissue cells to the tissue fluids particularly the plasma and thence to the Urine.

So far the papers which have appeared in which B. A. L. has been found to be effective in various manifestations of arsenical poisoning occurring mostly during antisyphilitic treatment with arsenicals and local and systemic poisoning by arsenical war gas Lewisite such as exfoliative dermatitis, arsenical encephalopathy agranulocytosis following arsenical therapy. Being prompted by their favourable results I used in two cases of arsenical blindness because of Neuritis etc. But this should not be administered in the presence of Liver damage.

Jagdamba Prasad 59 years Hindu male came to us on 30th December 1956

the complaint of loss of vision after Moamin injections which he took on 27th, & 8th December. Patient had 6 injections 5 years back also. It had any ill effect. Patient noticed loss of vision on 10th December and consulted a local Eye Specialist who did not do anything as vision was 6/9 & 6/12 and prescribed some tonic etc. He came to our hospital on 23rd December.

I noticed frank optic neuritis in the left eye and early changes in the form of congestion of veins etc. in the left eye. Vision was Rt=HM only Lt.=3/60

He was prescribed B. A. L. injections and Entodon injections but he did not take them and came to our hospital on 30th December and was found to have following vision.

Rt=PI only

Lt=F. C. at 1 ft. distance.

Following treatment was immediately started :—

1. B.A.L. 2 C.C. of 5% (Boots) 6 hourly—4 injections and then twice daily for 3 days and then once for 4 days.

2. Retrobulbar injection of Priscol in both the eyes for 7 days.

3. I. V. Glucose 50 C.C. with 500 Mgm of Redoxon once daily for 7 days.

4. Entodon one injection twice a week.

5. Vitamin B Complex with Vitamin B 12 on alternate days.

Vision started improving when on :—

21.1.57	1/60,	6/24
24.1.57	6/60,	6/18
9.2.57	6/12p	6/9

He is maintaining this vision since that time as he comes to me in Kanpur for check up every month. His fundus shows pale discs. His field (Fig 1) is contracted, but he is quite happy.

Second case of Pyare Lal 65 years Hindu male was admitted in this Hospital on 5th January 1957 with loss

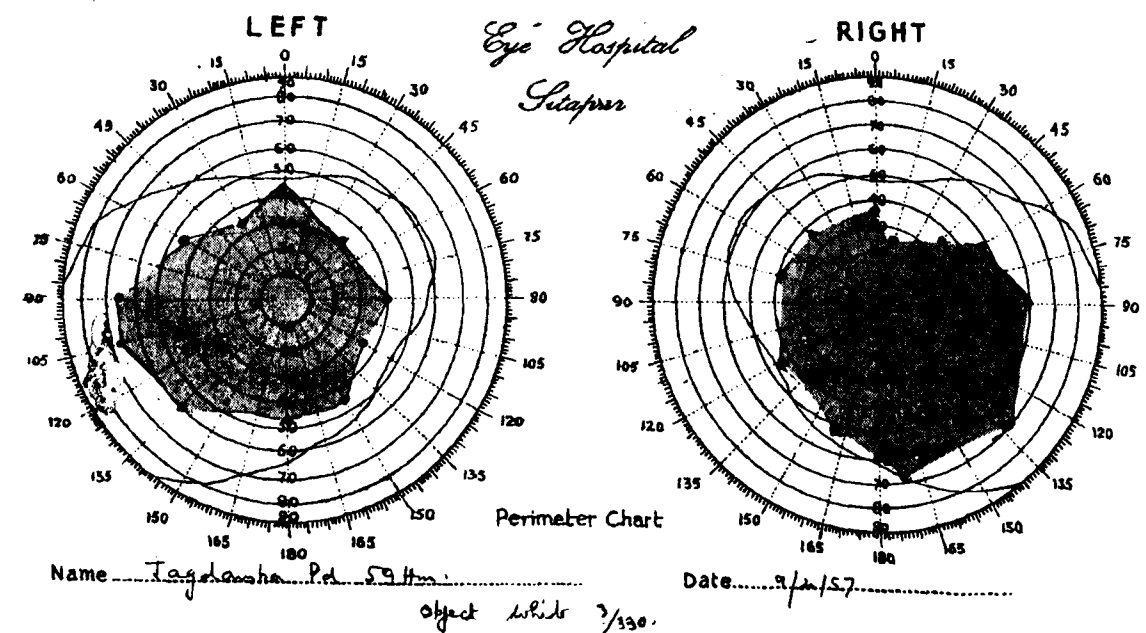


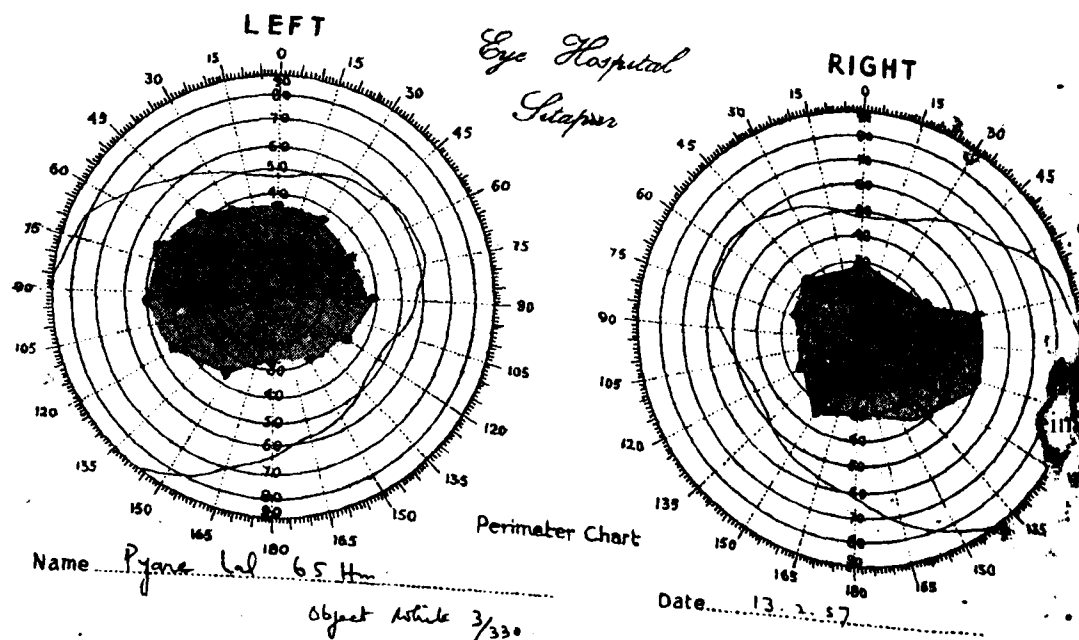
Fig. 1

of vision after 5 injections of acetylarsan given bi-weekly for asthma. Patient started getting diminution and cloudiness of vision after 3 injection but it was not taken notice of by the Ayurved doctor under whose treatment he was. It was attributed to the strength or heat of the injection. Further two more injections were pushed till when he came to us there was just faint projection of light.

On examination there was found to be slight congestion of veins and pupils were sluggish to light both direct and consensual. He was found to be highly myopic also (-15D). Intensive treatment was started with B. A. L., Vitamin B 12, and Entodon, glucose with vitamin C and retrobulbar priscol etc. Patient felt gradual improvement till on 17th January vision was - 14D = 1/60 B. E.

He left this hospital on 13/2 with:—

Rt. 2/60 Lt. 3/60
with-14D = 5/60 with-15D = 6/60



His field was much contracted (Fig. 2). Though in this case there was no regain of eyesight but it was enough and patient is quite happy. It should have been more injections of acetylarsan were given and treatment started then.

There are certain facts which should be taken into consideration before Arsenical treatment is begun, old people show comparatively lesser tolerance to arsenicals than younger age groups. Marked arteriosclerosis or advanced diseased conditions of the kidneys and liver are definite contraindications; diseased condition of the optic nerve should be carefully administered. If the patient during Arsenic therapy complains of any cloudiness or mistiness of vision etc. it should not be taken lightly and advice of the eye specialist sought immediately.

Fig. 2

(Continued on page 51)

MEDISCOPE

Cancer of the Larynx

By

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Ear, Nose and Throat Surgeon, Govt. General Hospital, Madras

(Continued from March '58 Issue)

DIFFERENTIAL DIAGNOSIS.

His disease affecting the vocal cord presents common symptoms such as hoarseness, difficulty in swallowing, difficulty in breathing etc. The conditions affecting the larynx which to a great extent resemble malignant growths are:—benign growths, tuberculosis and syphilis and chronic inflammatory conditions of pachydermia and leukoplakia may give rise to suspicion. When there is a well established disease present, on the first examination, a tentative diagnosis may be made by consideration of the history, routine examination and examination by indirect laryngoscopy. Confirmation of the diagnosis will always be made by histopathological examination after removal of a piece of tissue by direct laryngoscopy. Tuberculosis very commonly affects the posterior commissure. It also affects the vocal cord and also presents in appearance as a thickened and slightly thickened vocal cord. The larynx shows hyperaemia and

anaemia and there is generalised oedema affecting very often epiglottis ary-epiglottic folds and producing turban epiglottitis.

Syphilis:— The possibility of its presence may be eliminated by a serological test, though a positive serologic reaction does not prove that the patient does not have cancer in addition to syphilis.

Benign tumours can generally be differentiated by their gross appearance in the laryngeal mirror, polyps organising haematomas and vocal nodules, favour smooth surface and are often pedunculated. Carcinoma always presents a roughened surface usually irregular. Papilloma generally has a roughened surface but pink in colour, leukoplakia, keratosis, pachydermia and other so-called precancerous conditions call for a thorough examination, continued observations and finally to settle the diagnosis the biopsy is a necessity.

The following table gives a clarification of the conditions:

CARCINOMA.	TUBERCULOSIS.	SYPHILIS.
History.	General health may appear temporarily good. Pulmonary Tuberculosis usually present. T. B. Larynx is usually secondary.	History of exposure. Antecedent infection or lesion elsewhere.
Family history of Cancer.		

APRIL '58

	CARCINOMA.	TUBERCULOSIS.	SYPHILIS.
Age.	The peak age is 40 to 50 only about 10 per cent under 40 years of age.	20 to 40	30 to 50 years
Sex.	Male predominance.	Both	Male.
Onset.	No pain or temp. Hoarseness is earliest in intrinsic growths slow onset.	Quite insidious with general symptoms of fever, cough and sputum.	Rapid. No temperature otherwise good condition.
Hoarseness	Present from the beginning in case of intrinsic growths, late in appearance in extrinsic type. Decided progressive and persistent.	Early. Varying from amblyphonia to a total aphonia late in the course.	Somewhat, especially if fixation is present come on early.
Localisation.	Vocal cords—usually at the middle one third in intrinsic and above the false vocal cord in extrinsic growths.	Cartilages are not respected, regions are inter arytenoid, posterior wall and posterior surface of epiglottis.	Usually attacks anterior part of larynx, anterior surface of the epiglottis more often times vocal cords later false vocal cord.
Dysphagia.	None or very little unless it is a post-cricoid growth in which case dysphagia is the main symptom.	Decided, especially if alteration of epiglottis and arytenoids is present.	None or very slight especially if epiglottis is involved.
Infiltration and tumour.	Irritative, redness, not sharply demonstrated—wide base, unilateral, deeply situated, may begin as a thickening becoming papillary and later fungating or cauliflower-like.	Pale, edematous, slightly injected on the borders, first at the inter arytenoid area, later on vocal cords, surrounds one pale or irritative hyperaemia, diffuse and deep infiltration. Tumours may be single or multiple.	Red, prominent swelling, punched out, solitary tumour, diffused thickening and catarrhal swelling.
Ulceration.	Solitary large, deep, irregular tip of tumour usually affected, gangrenous base.	Multiple, small tumours coalesce forming often red granulation on border. Small irregular, superficial swollen edges, shallow base covered by mucopus, appears gray and necrotic with undermined edges.	Large, solitary, deep, infiltrated undermined edges, dirty floor of ulcer, punched out edges, with little tendency for granulation

	CARCINOMA.	TUBERCULOSIS.	SYPHILIS.
Movements of vocal cords.	Early stages, mobility not interfered, later on fixation is usual.	Quite good, but infiltration may cause mobility hindrance.	Quite good.
Regional Lymph node.	Large in later stages, especially in extrinsic cases.	Slight.	Shortly, but small considering the great inflammation, not tender.
Histopathology.	Biopsy shows squamous transitional and rarely lymphoepithelioma cells.	Positive picture of biopsy showing giant cell systems.	Wassermann positive In Chronic cases, the scars are prominent.

TREATMENT

General Principles: In the treatment of the cancer of the larynx it is aimed to give the greatest possible chance of cure of the disease. The disease left alone is certainly fatal. One would, therefore, feel that there are a few factors to be taken into account in advising treatment.

(1) Relief of suffering; (2) Prolongation of life; (3) Cure of disease although the cure of the disease may be the main aim of the treatment. The effective treatment of the cancer of the larynx is conveniently divided into radiological, radium and x-rays and surgical. The surgical treatment (a) removal by Laryngo-fissure route; (b) removal by laryngectomy; (c) removal by lateral pharyngotomy route; (d) the removal of the glands.

At first, let us consider radio-therapy which is considered as a form of palliative treatment or to be used in such cases as were quite inoperable. Max Cutler states the main point of issue under what circumstances radiotherapy should be used for operable cancer of the larynx; more specifically should

radio-therapy (pre-) be preferred to surgical treatment, for early carcinoma of the true vocal cord amenable to laryngo-fissure? Should radio-therapy be preferred to surgical treatment for operable intrinsic carcinoma of larynx when disease is advanced as to require total laryngectomy; and he concludes modern radiation therapy is an increasingly effective method of treatment of laryngeal cancer. Concentration radio-therapy has resulted in the curing of certain forms of cancer of the larynx hitherto regarded as incurable by irradiation. When the cords are freely removable or only partly fixed by carcinoma, curability is high but when they are completely fixed, cure is less common and laryngectomy is indicated; and he further concludes laryngectomy should be limited to intrinsic lesions with complete fixation of the cords occurring in good surgical subjects of good life expectancy. It is reasonable to expect that further improvements in technique of irradiation and earlier diagnosis will further diminish the necessity on total laryngectomy. We cannot forget Henri Coutard as the leading investi-

gator who has differentiated cancer of the larynx into two main varieties, clinical and histological; and how one group can be treated successfully and easily by x-rays while the other is not curable by radiation, is of much value. He also showed that one type tends to recur after an average 6 to 8 years interval of freedom. The following methods are used in radio-therapy treatment of the carcinoma of the larynx.

(a) *Radium needle implantation* Finzi-Harmer technique:—

(i) This is known as Finzi Harmer fenestration method. Radium combined with surgery. This can be used only in selected cases.

(ii) *Intra Laryngeal method*:— In some cases where external therapy has not sufficiently destroyed the lesion, direct interstitial radium therapy is used placing radon seeds in the lesion through direct laryngoscopy.

(b) Open irradiation with partial removal of the thyroid cartilage;

(c) *X-ray therapy*:—And many technique are enlarged. The x-rays are administered through both sides of the neck for a period ranging from 20 to 40 days in divided doses until a total dose of 3000 to 5000 r is given to each area.

(d) *Tele-Radium*:— External irradiation by means of which quantities of radium at a distance of 5 to 8 cms. from the skin has also given good results. A dose of 6000 r is given in 4 to 6 weeks. The main advantage of this method is

decreased liability to necrosis of the cartilages of the larynx.

SURGICAL TREATMENT.

It a general way, it may be said that the treatment of cancer of the larynx is by surgery. In the surgical treatment, the choice lies between total laryngectomy and some form the partial laryngectomy. The most commonly used form of partial laryngectomy is known as thyrotomy or laryngo-fissure in which the access is had to the growth by splitting of the thyroid cartilage and remove the growth along with a sufficient margin of normal tissue. Another form of partial laryngectomy is hemilaryngectomy, an operation which has given good results in the hands of Hautant. Endoscopic resection is suitable only to a very early and limited cordal growths. In certain cases of extrinsic lesions with involvement of adjacent structures such as pharynx and base of the tongue, the attempted surgical operation will require more than total laryngectomy. In such a case laryngo-pharyngectomy may be used. In selecting the case for a surgical extirpation, the presence of cervical metastasis, the motility and mobility of the cord, the histological character of the lesion and the general physical condition are considered. Lesions occupying the middle third of one vocal cord are suitable for laryngo-fissure. Lesions reaching the anterior commissure and even involving the opposite cord are also amenable to extirpation by laryngo-fissure route, but in such cases the anterior commissure technique should

be used. Lesions in which the growth is gradual but has reached the posterior end of the cord and produced impairment of mobility, such growths are recommended for total laryngectomy. When the tumour invades the cartilage also calls for laryngectomy provided there are no metastases.

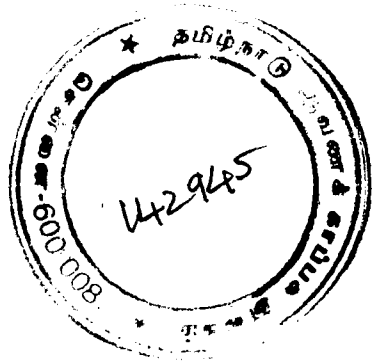
Rehabilitation of the Patient: Larynx is one part of speech mechanism. It provides a column of air coming up from the lungs and pair of vocal cords which vibrate but that it is the moulds of speech from the tongue, lips, cheeks, palate etc., which form the words. It

is quite possible and it is necessary for a patient to train oesophageal voice. This can be accomplished if the patient learns to collect air in his hypopharynx, oesophagus and stomach to replace the air column from the lung and to produce tone by means of vicarious cords formed in the hypopharynx and pharynx. Negus and Morrison have pointed out that the narrowed cricopharyngeal space is the site of sound production after laryngectomy. With regard to artificial larynx, if the patient fails to develop bucco-oesophageal voice, the artificial larynx may be tried.

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Psoriasis is an Enigma

(CLINICAL STUDY OF 20 CASES)

By

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Despite the rapid strides in the field of Dermatology, the aetiology, Pathogenesis and Biochemical nature of **PSORIASIS** remains an unsolved problem. The disease is met with commonly in private practice but has not been studied entirely.

Psoriasis is a disease where Scaleform the predominant feature. These scales are large, silvery and coherent. The psoriatic horny layers is more elastic and sticky than that of the normal skin, and this is due to an anomalous epidermal keratinisation. It is not actually an abnormal keratin, but is an abnormal horny layer. Keratin is one of the ingredients, the others being polypeptides and Aminoacids. The latter serve to hold water in the horny layer. This function can be shown by first extracting the horny layer with fat solvent and then with water when the brittleness and incapacity to hold water occur. Normally the hands over-exposed to detergents show this tendency.

The psoriatic scales show two chemical abnormal features viz :—

- (a) Low free Aminonitrogen contents and
- (b) A high sulfhydryl contents.

The low free aminonitrogen content in the psoriatic Scale has been explained by

Dr. J.M. Paschoud as due to a decreased ability of the psoriatic skin to split some protein-decomposition products, especially dipeptides. The decreased dipeptidase activity is due to inhibitory substance in the horny layer of the psoriatic epidermis. Dr. Peter Flech suggests a lack of Enzyme activity.

Psoriasis is a disease of :—

- (i) Abnormal or incomplete cellular decomposition and
- (ii) Abnormal utilization of Aminoacids for Keratin Synthesis.

1. The histological signs of abnormal cellular decomposition is shown by para-keratosis. (viz) the absence of Kerato-hyaline granules and the retention of Nuclear remnants in the horny layer. The incomplete decomposition of Psospholipids is shown by a higher content of choline in the Psoriatic Scales. There is a decrease in water-soluble polypeptides and Free aminonitrogen causing an impaired hydrolysis and cellularproteins.

2. An abnormal utilization for building Keratin is seen. Normally the human epidermal Keratinization takes place in two places. First a prekeratin (Fibrous Keratin) is formed in the Malpighian layer. Secondly this Fibrous protein combines with Sulphur contain-

52
L: 4.7 on 21, NS8MS NS8.1.2

ing proteins polypeptides of Aminoacids to yield the finished Keratin Molecules. Apparently these steps do not occur properly in the Psoriatic Epidermis.

The Raisan-D-'Etre for the Bio-chemical disturbances is a deficient activity of the Proteolytic Enzymes which are either inhibited or not activated. This cannot answer the complete problem.

Thus we are in a higgledy-piggledy regarding the Pathogenesis of the disease.

A new test for the diagnosis of the disease is the finding of the chemical abnormalities in the Psoriatic Scales (viz);

Low free aminonitrogen and the high Sulfhydryl contents.

FEATURES COMMON IN PSORIATICS:

They are :- (a) Psoriatics are in their best of health.

(b) They are generally constipated and

(c) They have usually emotional instability.

CLINICAL FEATURES IN PSORIATICS.

The chief clinical features are as follows :

(a) A silvery and grey scaly papule or plaque is the distinctive lesion. The margin of the lesion is very sharp, with the transition from the normal skin being abrupt.

(b) The amount of scaling is variable. The removal of scales by scraping reveals a membrane with petechial haemorrhages.

This membrane is called Buckley's membrane and this is Auspitz' sign.

(c) The form of the eruption varies widely :—

1. Generalised punctate or guttate psoriasis.

2. Coinsized discs or Nummularpsoriasis.

3. Annular Psoriasis with clear centre and peripheral spreading edge.

4. Gyrate or Figurate Psoriasis.

5 Psoriasis enplaque.

6. Sometimes scaling is so severe to produce ostraceous or rupiod Psoriasis, the heaped scales resembling the shell of an oyster or limpet.

(d) Pustulation in Psoriasis is uncommon unless provoked by external irritation.

(e) The infection of the nails in psoriasis produces pinpointed pitting.

(f) Psoriatic Lesions may occur in regions for Physical or chemical trauma. This is called Koebner's phenomenon.

(g) Psoriasis Arthropathica :- is a well recognised entity. The hands and feet are usually involved. Various types of arthritic and peri-arthritic changes may occur.

(h) The commonest sites of Psoriatic Lesions are scalp, back of elbows, front of knee and small of the back.

Histopathology in Psoriasis : Histologically psoriasis is characterised by

1. Para-keratosis i.e. imperfect keratinisation resulting in retention of the nuclei in the horny layer of the epidermis. The granular layer is absent.

2. Thinning of the Suprapapillary portion of the Stratum Malphigii.

3. (Edema and the clubbing of the papillae.

4. Elongation of the rati-ridges.

5. Micro-abscess of Munroe.

These are :-Accumulations of neutrophils found in the para-Keratic horny layer and beneath the Stratum corneum.

1. In the scalp the diagnosis is readily made for psoriasis gives "an impression of a miniature mountain under the fingers."

2. Psoriasis can readily be distinguished from scaly eczema, seborrheic dermatitis and pityriasis rosea by the silver scaling and salmon red erythema and the clear cut lesions. Patchy squamous eczema has no silvery scales.

3. Lichen planus has papular lesions with severe itching and a violaceous tint.

4. In syphilitic psoriasis form lesions may occur but these lesions are polymorphic and the prime feature is the infiltration of the Syphilitic papule. The Kahn and W.R. are positive.

Aetology : This has been a corundrum. No single cause can be attributed for psoriasis. Such a common skin disease has not been subjected to "fundamental study". The disease occurs commonly in the second and third decade of life but no age is exempt. Heredity is seemingly an etiological factor in producing an inherited predisposition.

Sex : There is a slightly higher percentage of cases in the males.

Metabolic factors play some part. An increase of blood cholesterol is found in most of the cases.

The skin is the mirror of the mind and psoriasis is more common in those with emotional instability. Thus stress and strain play an important role.

There is little evidence that endocrine dysfunction plays any role.

The occurrence of arthritis with psoriasis and the response of Psoriasis arthropathica to corticosteroids has been explained as due to collagenesi or possibly an infective basis.

The treatment in Psoriasis : This may be considered under two headings:

(A.) General (B.) Local.

General : 1. Tranquilisers as chlorpromazine, reserpine, Nutinal, Meproamate (Pertranquill, Miltown, Equanil) are useful.

2. Favourable results have been noticed with corticosteroids in cases of psoriasis arthropathica.

3. A low fat diet is recommended in psoriasis.

4 Chronic intractable cases have been found to improve with a course

(a) Metallic injections as arsenic, mercury or manganese;

(b) Shock therapy as TAB

Local therapy : Dr. Geokermann recommends the administration of crude coal Tar with Ultra-Violet exposures.

Salicylic acid may be added to crude coal Tar to help the Keratolytic effect.

Dithranol 0.5% in Liquid Paraffin is effective.

CLINICAL STUDY OF 20 CASES OF PSORIASIS.

Age group	Number.
0 to 10	2
10 to 20	4
20 to 30	9
30 to 40	3
above 40	2

Sex Incidence: 11 cases were males and 9 cases were females.

<i>Community:</i> Hindus	11
Christians	4
Anglo-Indians	2
Muslims	3

Diet habits: 9 were vegetarians and the rest non-vegetarians.

Family history: In only one family mother and daughter having psoriasis. Mother aged 26 with psoriasis of 7 years duration and daughter aged 10 of psoriasis is 3 years duration.

Occupation and social status of the patient:

Government Officers	1
Students	5
Agriculturists	3
House-wives	6
Merchants	4
Bishop	1

Emotional set up of the patients: All of them exhibited emotional instability.

Associated diseases: Two cases had associated Diabetes. One patient had coronary insufficiency and finally died during the attack.

TYPE OF LESION

Type	No. of Cases
1. Psoriasis punctata (small scale covered points)	3
2. Psoriasis guttata (Like drops of water)	1
3. Psoriasis Circinata (Exhibiting activity at the periphery, the centre being free)	1
4. Psoriasis nummularis (Like small coins)	2
5. Psoriasis Figurata or Gyrata (Fantastic figures)	5
6. Psoriasis diffusa (Cutaneous surface is affected in large areas)	6
7. Psoriasis rupoides (Large conical crusts marked by concentric rings)	1
8. Psoriasis Arthropathica (Associated joint involvement especially the interphalangeal joints)	1
9. Psoriasis of nails (Thickness eroded points irregularly laminated, rigid brittle and yellowish white)	0
10. Psoriasis of the palms and soles producing worm-eaten appearance.	0
11. Psoriasis affecting mucous membrane	0

Laboratory Investigations:

1. Blood count: No leucocytosis has been observed and the differential count has been normal.
2. Blood Kahn: Negative in all the cases.
3. Urine: Nil abnormal.

4. Diagnosis: Clinically in all the cases and confirmed by histopathology in 9 cases.

Features noticed histopathologically are:

- (a) Parakeratosis.
- (b) Thinning of the Suprapapillary portion of the stratum Malphigii.
- (c) Elongation of the rete ridges.
- (d) Oedema and clubbing of the papillae.
- (e) Munroe's Micro-abscess.

Treatment given:—1. All the patients received one tranquillizer or another as pertranquil, Miltown, Equanil, Valdispert continuously for more than two months.

2. They all received a low fat diet.

3. The patient with psoriasis arthropathica received a course of cortisone therapy parenterally with usual salt free diet. The dosage given was 1 cc I.M. (25 mgms) thrice daily first 10 injections. 1 cc twice daily next 10 injections and 1 cc once daily next 10 injections. The patients show remarkable improvement in arthritic and skin condition and it is now 9½ months there has been no recurrence.

Local treatment: For patches above neck the following solution has been used:

R/Picis Carbonis dr 1

Acctone oz 1

Dispensed in amber coloured bottle.

For patches below neck:

R/Liquor carbonis detergens dr 1

Hyd. Ammoniata gr 20

Salicylic acid gr 20

Paraffin ointment (B.P.) ad

Mix oz 1

Physiotherapy: All the patients received Ultra-Violet exposures sub-erythredoses, daily in the morning before applying ointment with the customary protection for eyes.

Duration of observation: The cases given above have been observed from a period varying from 4 months to 13 months. The single case of Psoriasis arthropathica has been under observation since 9½ months:

4 months	Two cases
7½ months	Three cases
9½ months	One case
11 months	Five cases
13 months	Nine cases.

Recurrence: Out of the 20 cases three cases have so far shown recurrence giving percentage of 15%.

(Arsenical Amaurosis With Two Case Reports Treated With B. A. L. Etc.)

(Continued from Page 40)

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Very truly Yours,

DR. B. RAMA RAU, B.Sc., M.B.B.S.

Editor

"Injured Elbow"

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INTRODUCTION

The history of management of fractures stretches far back into antiquity. Ancient Indians were well versed in the treatment of fractures and Susruta who lived in the Golden age of Indian History splinted fractures with bamboo withes, and Alexander the Great took them to Greece among the fruits of his conquest.

Hippocrates wrote his masterly works at the dawn of 4th century B. C. and his dicta on the causation and management of fractures and dislocations enjoyed the highest reputation for a long time. The principles laid down by him stress reduction of fractures by traction and countertraction, the importance of securing apposition of fragments and splinting them in position of rest.

The credit of emancipation of modern surgical thought especially with regard to fracture treatment from the influences of antiquity certainly goes to PERCIVAL POTT (1713-1788). Practising in London at St. Bartholomew's Hospital and suffering from prolonged invalidism due to fractured Tibia, he produced his immortal monographs on Fractures and Dislocations, Spinal Paraplegis, and

Head Injuries. The place HUNTER occupies in the surgical Pathology of Bone is equalled by Pott in the treatment of fractures. It was he, who taught and insisted on immediate reduction of fractures and perfect immobilisation by including joints above and below the fracture a principle inviolable today.

Larrey, personal surgeon of NAPOLEON and the Surgeon General of his GRAND ARMY, employed compresses, bandages and straw cushions stiffened with camphorated spirit acetate of Lead, and white of eggs and retained these splints during the period required for union of fracture.

In 1852 the Belgian Surgeons, MATHIJSEN and VAN DER LOO, taking clue and inspiration from the moulds of clay employed in India from ancient times in the treatment of fractures, introduced Plaster of Paris splints which have simplified fracture treatment.

ROENTGEN'S discovery marks a further epoch. X-rays have greatly contributed to better understanding and treatment of fractures.

Rehabilitation and Chemotherapy, undreamt of a few decades ago have

made vast contributions to the solution of this ancient problem.

With increased mechanisation injuries and accidents have become more numerous and early recognition and prompt treatment of these cases on proper lines is essential to eliminate many avoidable disasters and save the patient from life-long disability. Fractures around the elbow constitute more than one-third of all fractures that are treated in our hospitals and deserve special consideration, not only because of their common incidence but also as no joint is more liable to be so mismanaged. This is mostly due to prevalence of treatment of fractures by quacks and bone-setters, who devoid of any knowledge of Physiology and function of bone and joints, use such primitive methods as massage and forcible manipulation in their treatment. The incidence of such complications as Myositis Ossificans and Volkmann's contracure has become less and less now, due to better understanding and application of broad principles of fracture treatment laid down by PERCIVAL POTT, H. O. THOMAS and ROBERT JONES.

Years	No. of cases.	Percentage.
1-10	73	56.0%
11-20	22	17.1%
21-30	19	14.8%
31-40	8	6.4%
41-50	6	4.8%
51-60	1	0.8%
	130	

Thus fractures around the elbow are most common during the first decade, and their incidence diminishes with age as shown by the above figures.

ANALYSIS OF CASES

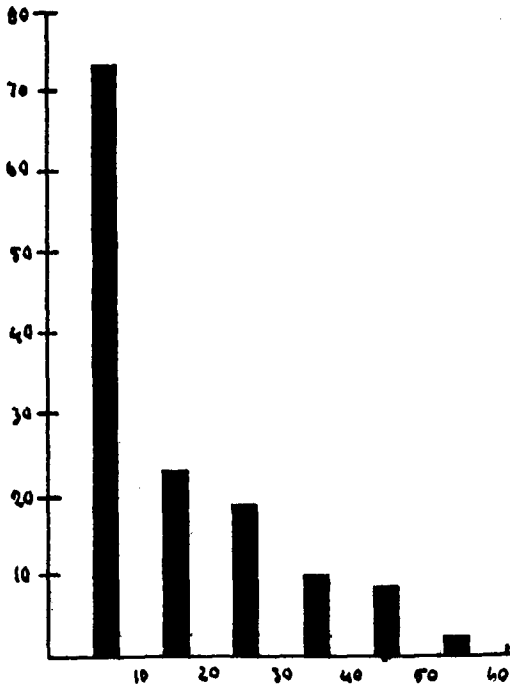
Material :—130 cases of all types of fractures around the Elbow treated in the King George Hospital, both as out-patient and in-patient form the basis of this study. Out of these 80 cases were treated during the last six months, 50 cases which were treated prior to that period are also included for purposes of analysis.

Full follow up records are available for 34 cases and the rest of the cases are reviewed on the basis of available case notes and X'rays.

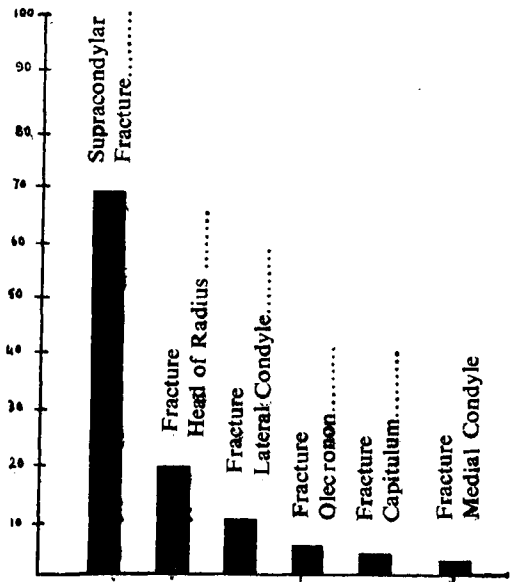
During the last one year, a total of 620 cases were treated in the Orthopaedic Department for various fractures. Out of these 212 had fractures around the elbow, i. e. slightly more than one third of fractures occurred around the elbow joint.

Sex Incidence :—Out of 130 cases analysed here, 107 were males and 23 were females. Thus the incidence of fractures around the elbow is nearly four times common in males than females.

Age :—The age incidence is as follows :



Age incidence of Fractures around the Elbow



Incidence of Different Types of Fractures around the Elbow

Incidence of different types of fractures around the elbow.

Total Number of Fractures: 130.		
Type	No.	%
Supracondylar	80	62.0%
Fracture Head of Radius.	19	14.4%
Monteggia Fracture.	11	8.3%
Fracture Lateral Condyle.	10	7.7%
Fracture Olecranon.	5	3.71%
Fracture Capitulum.	3	2.3%
Fracture Medial Condyle.	2	1.6%

SUPRACONDYLAR FRACTURES

Analysis of Supracondylar fractures in Children:

Age Incidence:	No.
1st year.	Nil.
2nd „	Nil.
3rd „	2
4th „	3
5th „	2
6th „	18
7th „	7
8th „	13
9th „	4
10th „	9
11th „	3
12th „	5

Amongst the cases analysed, the maximum number of cases have occurred (18) during the sixth year. The highest age at which the fracture occurred were 12 and the lowest 3. Three cases of the age period between 18 and 20 in which supracondylar fractures were found are omitted for purposes of this analysis as they are old fractures and were sustained at the earlier period of life.

Sex Incidence: Out of 71 cases of supracondylar fractures in children, 62 were males and 9 were females, thus showing preponderance of males in the ratio of 7: 1.

Mechanism of Injury: In most cases where a history of mechanism of the injury could be traced, it was fall on the outstretched hand. Only in three cases there was history of falling on the point of the elbow.

Type of Displacement: Out of 59 cases analysed for purposes of the type of displacement 13 cases did not show any displacement.

No Displacement.	20
Posterior and Medial Displacement.	21
Posterior and Lateral Displacement.	9
Posterior.	8

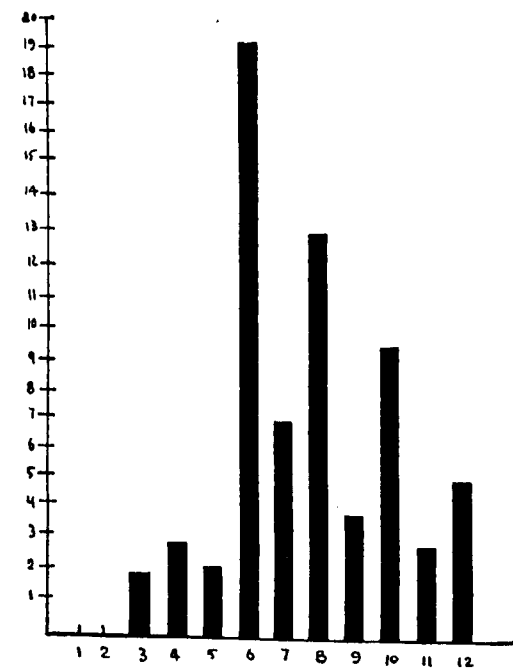
Thus the most common type of displacement of Posterior and Medial.

Incidence of Complications :

The following are the types of complications encountered in the cases analysed.

Cubitus Varus.	4
Myositis Ossificans.	2
Threatened Gangrene.	1
Soft tissue interposition and failure of reduction.	2
Volkman's Ischemic contracture.	1

Of the four cases of Cubitus Varus, two were treated by Supracondylar osteotomy and two refused operation. Of the four cases, three were treated elsewhere before they came to the hospital for correcting the deformity. The fact that this complication was the most common of the series, emphasises the



Age Incidence of Supracondylar Fracture in Children

responsibility of the surgeon who treats case first for accurate reduction of the fracture.

Both cases with Myositis Ossificans were treated outside with massage and manipulation. Bone setters and quacks are responsible for this mischief. Not a single case of Myositis Ossificans occurred amongst the cases treated in the hospital. Both the cases were advised to do active movements and avoid massage and forced manipulations. Their fate is not known.

There was one case of threatened Gangrene. There was extensive edema of the elbow. Radial Pulse could not be felt. The fingers were cold and the movements painful and restricted. The limb was placed in extension in Thomas Arm Splint and raised. Edema subsided in three days. Radial pulse did not

return but fingers could be moved and capillary circulation returned. One week from the date of admission the fracture was reduced, and P. O. P. slab was given with the limb in extension. Functional recovery at the end of three months was fair.

In two cases repeated attempts at reduction of fractures failed. Each time the fragment could not be brought into apposition and there was wide gap between them. Soft tissue interposition was suspected to be the cause. It was decided not to interfere any more and the fractures were immobilised in the best possible position that could be obtained. A corrective osteotomy will be done later on.

The solitary instance of Volkman's contraction in series shows the rarity of this complication nowadays. This is due to our better understanding of its etiology and pathology. We no more apply skin tight plasters, after reduction of the fracture, or immobilise the limb in acute flexion in the presence of gross edema and absence of radial pulse at the wrist. We always anticipate this complication, and thwart it by treating the limb in extension in the presence of even the slightest circulatory disturbance, and by immediate removal of Plaster in the presence of Pain, paralysis and pulselessness.

Complete fractures of the lower end of Humerus fall into four groups. (1) Supra condylar fractures. These are further divided into Extension and Flexion types according to the type of displacement. (2) Transcondylar or

Dicondylar fractures (3) Inercondylar T shaped fractures. (4) Epiphyseal separation of the Lower end of Humerus.

Supracondylar Fractures: This is one of the commonest injuries in children and adolescents. They constitute more than 60% of all elbow injuries. The fracture is of two types Extension Type and Flexion Type, depending on the direction of the displacement of the distal fragment. The extension type is the more common.

Extension Type: The injury results from a fall on the outstretched hand, the lower end of Humerus being pushed backwards by force transmitted up to and through the bones of the forearm. Occasionally these fractures are due to forcible hyperextension at the elbow, the lower end of the Humerus being pulled off by the lateral ligaments, while the olecranon being locked in its fossa, acts as a fulcrum, as in a fall on the extended hand with the forearm pronated.

Pathology: The Fracture line usually begins close to the articular surface on the front of the shaft and tends to be roughly transverse in the frontal plane but courses obliquely upward and backward in the sagittal plane. The obliquity tends to be more marked in adults, while in children, the fracture line is often practically transverse. As a rule fracture is complete, although occasional green stick fractures occur in this region.

The displacement is characteristic in that the short distal fragment is displaced upward and backward. This is

partly due to continuation of the fracturing force and partly to the pull of the triceps muscle which serves to maintain the displacement, while the end of the proximal fragment projects into the centre place beneath the Brachialis and Biceps tendon, and may injure the Brachial artery and vein or median Nerve in this region. In addition to the upward and backward displacement the distal fragment is often forced laterally or medially.

In addition to the fracture of the bones there is usually considerable damage to the soft parts; the periosteum is stripped up from the posterior surface of the proximal fragment and from the anterior surface of the distal fragment. The joint capsule is usually torn and there is variable amount of haemorrhage into the joint and into the surrounding tissues. The haemorrhage and resultant swelling may be so severe that venous return the forearm and even the radial pulse are interfered with.

Flexion Type: Less than 1% of all supracondylar fractures are of this type. They are produced by a fall on the flexed elbow. The line of fracture is oblique, being directed upward and forward, with resultant anterior displacement of the fragment.

Trans or Dicondylar Fractures: This has been described as a separate clinical entity by Kocher, Ashurst and Chutro. The fracture line lies just above the epiphyseal line courses transversely through the lower part of the bone, passes through one or both condyles, and is always partly intrarticular as it

passes through the coronoid and Olecranon fossae. The lower fragment includes all of the articular surface and usually the internal condyle.

The mechanism of production, displacement and soft part injuries are similar to those in the typical supracondylar fracture, except that in rare instances the dicondylar fractures are impacted. Many authors do not distinguish between the two types, but the dicondylar lesions deserve separate mention because the fracture is intraarticular and the callus may interfere with the movements of the joint.

Epiphyseal separation of the Lower end of Humerus: Up to the age of five years the entire cartilagenous plate of the articular surface of the lower end of Humerus tends to be separated in one piece but after this time only the external condyle is broken off from the shaft leaving a thin trochlear portion attached to the shaft.

The mechanism of production, displacement and soft tissue injuries are similar to those in supracondylar fractures.

Clinical Features: Clinical features are characteristic. The patient is usually a child or adolescent, who gives history of injury by a fall on the outstretched hand. The elbow is swollen and held in a semiflexed position, supported by the other hand.

On examination there is marked tenderness over the lower end of the humerus, crepitus can be felt (though this need not be elicited to make a diagnosis) movements of elbow restricted and measurement shows shortening of the arm Dis-

location from swelling increases in proportion to the delay between the time of injury and that of reduction. In many of these the lower end of the anteriorly displaced upper fragment could be palpated beneath the skin. The breach in the continuity of the Humerus could be palpated posteriorly. Due to the displacement and extravasation of the blood in the ante-cubital space, there may be often tension over the overlying skin.

In every case of elbow fracture, particularly supracondylar fracture, examination of the patient is never complete without testing for the functional integrity of the nerves that cross the elbow joint namely the Ulnar, Median and Radial nerves. Not only is this important from the point of recognition of the important lesion, and its prompt treatment but also from the equally important medico-legal point, as to avoid the blame that the subsequent treatment was responsible for the nerve lesion.

In every case of supracondylar fracture as indeed in other fractures, around the elbow, it is axiomatic that the radial pulse must be felt, and any disturbance of the circulation noted. This is very important as non recognition of the circulatory disturbance to the limb may lead to that most catastrophic of all complications, i.e. Volkmann's ischaemic contracture.

However, the absence of radial pulse at the wrist is not always diagnostic of vascular disturbance, as the radial artery may sometimes take an aberrant course. In such cases, the capillary circulation

in the nail bed, gives as good an information of vascular supply of the limb as the radial pulse.

Supracondylar fracture should be differentiated from other injuries around the elbow, chiefly dislocation. In supracondylar fracture, the normal mutual relationship of the three bony points, namely the olecranon, the lateral and the medial condyles is maintained, while this is disturbed in dislocation. Besides there is shortening of the arm in supracondylar fracture, as measured from the Acromion to the lateral condyle, where both arms are equal in length in dislocation. Crepitus if felt is diagnostic of fracture.

X-ray Examination: Though the clinical diagnosis of supracondylar fracture is obvious on mere sight, every case must be subjected to x-ray examination as only this can reveal the actual type and degree of displacement. At least two views must be taken: antero-posterior and lateral.

No attempt at manipulative reduction is made until the x-ray pictures are available as the technique of manipulation depends on a correct appreciation of the type of displacement.

Treatment of supracondylar Fracture: Whatever be the method supracondylar fractures must be treated as emergencies.

There are three important objectives in the treatment. First and foremost is the prevention of Volkmann's paralysis; prevention of Varus and Valgus deformities; restoration of function. These objectives are achieved by early and

accurate reduction safe immobilisation and careful and prolonged after treatment.

The fracture must be reduced as early as possible; permitting the malposition to remain until the swelling has subsided is unreasonable. If the upper fragment is allowed to remain displaced in the antecubital fossa and thus press upon the neurovascular structures, damage to these structures may result and produce Volkman's contracture or nerve injury. Further the longer the reduction is delayed, the greater will be the difficulty in reduction because of the contraction of the muscles and organisation of the clot.

Reduction of the fracture by closed manipulation is the simplest and gives the best results.

Before the treatment of any elbow fracture careful examination should establish the normal function of the motor nerves controlling the hand, and the condition of the radial pulse. If the pulse is present, it should not be obliterated by manipulative reduction. If absent before manipulation it may be disregarded if capillary circulation is good.

Manipulative Reduction: Manipulation is best done under general anaesthesia. The child should be with an empty stomach and the bowels and bladder must be empty. 1/4-1/2 c.c. of Morphia is given intramuscularly or intravenously half an hour before the manipulation.

For children the anaesthesia is induced by Ethylchloride and maintained by open ether. For adults, the best type

of anaesthesia is Pentothal Sodium given intravenously.

As far as possible, a perfect reduction must be insisted upon. But it must be clearly understood that this ideal may not be achieved by one manipulation, as the limb is edematous and bony landmarks often not made out. More than one manipulation may be necessary to bring about this perfect result. Watson-Jones said, "When I speak of repeated manouveres under x-ray control in the course of one manipulative procedure under one anaesthesia. I do not mean that the patient should be brought back to the theatre day after day for repeated anaesthesia and repeated manipulations. That would be harmful and it might be dangerous—there is need for it."

The patient is laid on the table, and the assistant applies counter traction on the arm, while the surgeon grasps the forearm and applies traction in the line of the long axis of the limb. This is most important part of the whole manipulation. The elbow should never be flexed until traction is maintained for some time to overcome the muscle spasm. Forcible flexion without traction fails to reduce the displacement and may damage the vessels and nerves in front of the joint. While traction is thus maintained the thumb of the other hand is placed over the front of the proximal fragment with the fingers behind the distal fragment, which is then pressed forward into alignment with the proximal fragment. With the traction still maintained the elbow is flexed to thirty degrees above the right angle.

Then and only then, the sideward (lateral or medial) displacement corrected. The assistant takes the limb by the wrist and holds elbow flexed. The surgeon applies direct lateral pressure with hand over the side of the lower shaft of the humerus, and the other hand on the opposite side, over the displaced fragment. If lower fragment is displaced outwards, it is pushed inwards and if it is displaced inwards, it is pushed outwards.

What Constitutes a satisfactory reduction: A normal realignment means satisfactory position of the fragments. A partial reduction of the posterior displacement is satisfactory, provided angulation is corrected. Gross overriding, medial or lateral displacement, and angulation of the fragments are considered unsatisfactory.

2. Check Xrays are then taken at once and any residual corrected by remanipulation. The circulation of the limb is noted by feeling the radial pulse at the wrist and testing the capillary return after compression of the pulp of the fingers. If there is such marked swelling, that the radial pulse is not felt after manipulation, the degree of flexion should be reduced, till the radial pulse returns. The elbow is then placed on a posterior plaster slab, which extends sufficiently round the sides to control the lateral position and a wet bandage is applied. The limb is supported in a sling.

The importance of immobilising in Flexion: Flexion is the only position which stabilises the elbow when the fracture is reduced. It prevents rotation,

lateral yielding, or backward displacement of the lower fragment, and the action of the forearm as a depressing lever is prevented. The forearm in full extension of the elbow acts as a powerful lever, in abducting or adducting the limb at the site of the fracture. If the arm is kept at right angles, torsion of the lower fragments is easily produced. The triceps, when the elbow is flexed forms a reliable splint for the supracondylar fracture. It covers the posterior parts of the condyles and spreads below as broad aponeurosis.

After reduction of the supracondylar fracture, it is desirable to hospitalise the child for 24 hours to ensure frequent observations of the circulation of the limb. This is a thing highly impossible in our congested hospitals. At least, the parents must be instructed about the danger signal of vascular disturbance. Most sufficient as warnings of early ischaemia are pain, swelling, coldness, cyanosis or pallor. The most important and constant of these is pain. A child with well reduced fracture should not require sedatives other than Aspirin. Pain severe enough to require opiates should be warning that there is disturbed circulation.

If there is evidence of circulatory embarrassment and threatened ischaemia, all bandages are removed from the elbow and forearm, flexion of the elbow reduced, and ice bags applied. Satisfactory position of the fragments and elevation of the forearm are maintained by skin traction. Loss of position of the fragments is insignificant compared to the permanent disability caused by

unrelieved ischaemia. Prompt blocking of the sympathetic ganglia, I. V. Papavarine, nicotinic acid etc., may be tried to relieve the spasm of the arteries. If the symptoms are well advanced and do not subside with conservative treatment no time should be lost before exploring the cubital fossa and Volar aspect of the forearm.

After Treatment :— As swelling subsides, the flexion of the joint may be increased up to optimum position 30 above the right angle and new plaster slab applied.

The patient is advised active movements of the fingers and the shoulder at once. After 3-4 weeks, the cast and the sling are discarded and active movements of the elbow started at once. Full range of movements must be expected in about three months.

It must be impressed upon the parents, the harmful effects of forcible movements, massage and manipulation.

It is adequately proved that the more rapid return of function will occur if the child is unmolested. Forced manipulations do more harm than good. There should be no manipulation to increase motion either with or without anaesthesia. Repeated stretching and massage perpetuates the muscle spasm and delays the return of normal position. It may also lead into myositis ossificans.

Treatment of unreduced fractures with edema and with or without compression of neurovascular structures:

In neglected cases which are seen late, it is often necessary to suspend the extremity by of traction, applied to the

forearm, as the marked swelling may make the reduction difficult or even impossible. The surest way of relieving the compression of the brachial vessels is to reduce the fragments. However in a large number of cases the suspension method has to be followed, as it relieves the pressure on the neurovascular structures, even though it is not efficient in reducing the fracture. As soon as the swelling has decreased, the suspension can be discontinued, and the fracture reduced by manipulation.

Treatment of supracondylar fracture with forward displacement: This is a rare fracture and constitutes less than 1% of the supracondylar fracture. It is caused by falling on the flexed elbow.

The fracture is reduced by applying traction to the limb and extending fully. Any tilting of the distal fragment is corrected by applying lateral pressure. A posterior slab and bandage are applied, from the axilla to the knuckles.

The slab and bandage are removed at the end of three weeks and active movements of the joint started.

This type of fracture should never be immobilised in any position, except extension.

Importance of accurate reduction in the treatment of supracondylar fractures :

Accurate reduction of the fracture is essential if future deformity and limitation of movement is to be prevented. By accurate reduction is meant not anatomical reduction, though the attainment of such an objective is highly gratifying both to the surgeon and to the patient. Overriding of the fractured

fragments is permissible as this is gradually corrected by growth process. But growth cannot correct angular deformities, especially if they are situated near the end of the bone. Hence, though overriding of the fragments and lateral displacement without angulation is permissible, angulation of the distal fragment should not be accepted and remanipulation must be done. Backward tilting or angulation limits flexion of the forearm. Forward tilting results in limitation of extension. Medial tilting results in cubitus varus and lateral tilting in cubitus valgus.

In the reduction of all supracondylar fractures perfect alignment must be secured even though perfect apposition need not be.

Influence of growth in the treatment of supracondylar fractures : Fractures in children are quite different from those of adults. The capacity of the bones to mould is greater in the young. A fracture increases the blood supply to the bone which accelerates the rate of growth. This tends to equalise shortness from overriding. Growth corrects angular deformities in the child to a slight extent. Bayonet apposition with normal alignment is satisfactory and will be corrected by the growth process. Sharp edges round off as growth continues. The displaced lower fragment becomes the base of the new shaft as the reparation process developed within the confines of the periosteum. The end of the outer or displaced upper fragment becomes absorbed and recedes as time proceeds.

Because of the capacity of the bone of the child to mould better, these fractures in children may be treated by simple conservative means more frequently than in adults.

Other methods of treatment for supracondylar fractures : Many arguments were offered for the open reduction of supracondylar fractures. Many surgeons, especially Homberg of Scandinavia advised open reduction, but it is now usually admitted that open reduction is difficult, and followed by decreased range of movement. If there is even a real indication in the absence of compounding, it is extremely rare. With gentleness and patience good results may be obtained without operation.

Internal fixation was advocated by some surgeons. There is nothing that internal fixation can do that cannot be done by simple reduction by manipulation and fixation by a plaster cast. Besides the presence of nails, etc. in the neighbourhood of the joint causes stiffness of the joint. Internal fixation has no place in the treatment of ordinary supracondylar fracture.

Bohler (1937) advised reduction under pronation but this is not sufficient in all cases.

Phillippedes (1937) advised reduction by means of mechanical traction and this was found to be of great value. Pearson (1938) constructed a handy frame for this.

Eric Madsen (1955) treated 50 cases by this method and he reported uniformly satisfactory results.

Compound supracondylar fractures: The major problem in the treatment of compound fractures is (1) Debridement of the wound (2) Reduction of the fracture. (3) Proper immobilisation of the part. (4) Combating infection.

If the condition of the wound is satisfactory, a compound fracture about the elbow should be treated like a simple fracture. This is possible only when there is small wound and no protrusion of bone. The wound is cleaned and dressed and the fracture reduced and immobilised. When the wound is large and the proximal fragment protruding the wound should be debrided under anaesthesia and the fracture reduced. If the wound is extensive and there is gross contamination, the limb should be suspended from the overhead beam. The primary consideration to preserve the limb and prevent sepsis. Although some attempts should be made to maintain the fragments in the correct position this consideration should be secondary. If no infection supervenes, the suspension may be discontinued in a week's time and P.O.P. applied.

Treatment of Malunited Supracondylar fracture: If a supracondylar fracture is seen 2-3 weeks after the injury, it is almost impossible to secure perfect reduction by manipulation. What should be aimed at in these cases is the attainment of normal alignment and the correction of any angulation. "It is the alignment that matters rather than the apposition". (Watson Jones) If this is achieved the rest of the deformity is corrected by moulding and the elbow

will often be clinically and radiologically indistinguishable from the normal elbow in a year or two.

Operative reduction should under no circumstances be tried. Open reduction with extensive dissection needed, often causes capsular combination, subperiosteal ossification and permanent stiffness.

If the fracture is already united by callus position of the fragments, it is better to allow the fracture to unite in its displaced position and after several months to correct the deformity by osteotomy. Late osteotomy is relatively easy and it does not involve extensive dissection round the joint and there is therefore no capsular contraction or periarticular ossification.

Causes and treatment of Delayed Function :

1. Persistent overriding of the fragments: In such cases there is delay in functional recovery until the callus deposited beneath the stripped periosteum and the protruding distal part of the fragment is absorbed. Because of this, attempts at closed reduction should be continued, to better the position up to as late as two weeks. Massage and forced manipulation are avoided. The limitation of movement is overcome gradually as the excess callus is absorbed together with recession of the distal end of the proximal fragment.

2. Medial and Lateral displacement: Should be corrected as far as possible. Uncorrected fractures are usually corrected by moulding. If varus or valgus deformity results it is treated by osteotomy after growth is complete.

3. Muscle Spasm: Although this complication occurs most frequently in fracture that are not completely reduced it may also occur after satisfactory reduction if massage is employed. Through these procedures, the injured muscles are further traumatised and though the range of mobility may be increased at first the manipulative procedure is always followed by greater limitation of motion. The patient should be advised to persist only in active exercises.

Complications of Supracondylar fractures: They can be divided into Primary and Secondary.

Primary complications: These are vascular lesions resulting in Volkman's Ischaemic Contracture or gangrene of the limb.

Nerve lesions.

1. Vascular Injuries: As result of the fracture the vessels of the forearm may be damaged in various ways. Contusion of an artery causing traumatic arterial spasm, contusion of an artery causing thrombosis at the level of injury or embolism at a more distant level, perforation or rupture of an artery causing internal or external haemorrhage, traumatic aneurysm or arterio-venous fistula. Any of these injuries may imperil the circulation of the limb. Sometimes a collateral circulation is established and recovery is complete. On the other occasions Volkman's Ischaemic Contracture results and sometimes the limb becomes gangrenous.

The vascular demands of the tissues of a limb are not uniform. Nerves are

the most susceptible to ischaemia of 15-30 minutes producing loss of conduction in the nerve fibres and also paralysis is even though they are not actually damaged. Muscles suffer next. If the ischaemia persists for more than six hours, muscle dies-skin can survive for as long as 24 hours. If free and vigorous collateral circulation develops within 6 hours recovery is complete. If the collateral circulation is inadequate and the ischaemia lasts more than 6 hours, Volkman's contracture develops. If the collateral circulation is totally inadequate, no tissue survives and gangrene develops.

The adequacy of collateral circulation depends on three factors.

1. The age and the Constitution: Of the patient. Collateral circulation is good in the young. Elasticity of the arterial wall is lost with advancing years, and also by the arteriosclerosis of Diabetes, Syphilis, and alcoholism. Shock and Haemorrhage by reducing blood volume also adversely affect the collateral circulation.

2. Local Pressure on collateral vessels. Swelling of the injured limb continuing after the application of an unpadded plaster may obstruct even a normal circulation and cause gangrene. When the main artery is damaged and survival depends on the collateral circulation, it is still more important that every source of external pressure is removed. Plaster of Paris cast must be removed and substituted only by a slab.

(To be Continued)

**BOOK
REVIEWS**



We have pleasure in informing the various publishers of Medical books and periodicals, that the future issues of 'MEDISCOPE' will feature critical reviews of recent publications, by competent authorities.

May we therefore request the publishers to send us their publications for review at their earliest convenience.

—Editor

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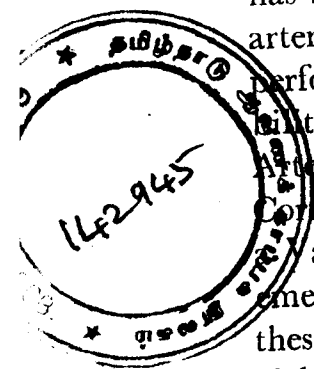
No. 2

EDITORIAL

Peripheral Vascular Disorders

Peripheral Vascular disorders have always stimulated and intrigued medical men during the last century ever since Buerger published his findings in a Book form. As mentioned elsewhere in this issue, many of the Aetiological and Therapeutical problems remain unsolved to this day although considerable advances have been made in the field of vascular Surgery both in the Peripheral and in the Internal arterial tree. Particular mention must be made in this connection to the work of Rob and his co-workers in the field of Arterial Grafts. There are several reports in the literature of extensive Thoracic and Abdominal Aortic grafts that have been successfully done in the treatment of what used to be called inoperable conditions in the past such as Aneurisms of the Thoracic and Abdominal Aortae. Intensive follow-up over a long period in these cases has necessarily been limited and some more time would have to elapse before a verdict could be finally pronounced on the general applicability of these procedures. However the spectacular improvement in the condition of the patient should make the possibility of these procedures more generally applicable in the near future. In the perfor-

mance of these technical advances, Radiology has played a very vital role and in this context it is important to remember the advances that have been made in Vascular radiology in the past two decades. It has now become a routine procedure to perform an Arteriography of any of the major or minor arterial tree in the human body with reasonable safety, and more important from the follow-up of the patient, to repeat these investigations at any reasonable interval with absolute safety. Thus it has been made possible to review the results of a Surgical graft at specified intervals to note the circulation through the graft and thus assess the value of the particular procedure in the particular patient. It is, therefore, essential that the approach to the particular artery be percutaneous rather than the Open technique as otherwise repetition would be almost impossible if one has to cut down on to the Artery every time an Arteriography is to be performed.



It is gratifying to note that considerable progress has been made in this country in the performance of arterial grafts. One of the major difficulties in the performance of these Grafting operations is the availability of Grafts in fresh form and thus preservation of Arteries is a very important step. As in the case of the Corneal Banks, we should make every attempt to maintain a Vascular Bank so that one could draw on it in times of emergency. Several methods are available to preserve these Arteries and they are neither expensive nor are they elaborate. It would be ideal if an attempt is made to centralise this particular variety of Surgery and to be run by someone with specialised training in the subject so that cases could be collected and sent to the Vascular Surgical Unit for treatment. Only thus would we advance in the theoretical and practical surgical knowledge of a condition which not only incapacitates a patient but may drive him or her to desperation.