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THE

Indian Journal of Radiology

The Official Journal of the Indian Radiological Association

EDITOR

A. N. K. MENON



EDITORIAL SECRETARY

L. R. PARTHASARATHY

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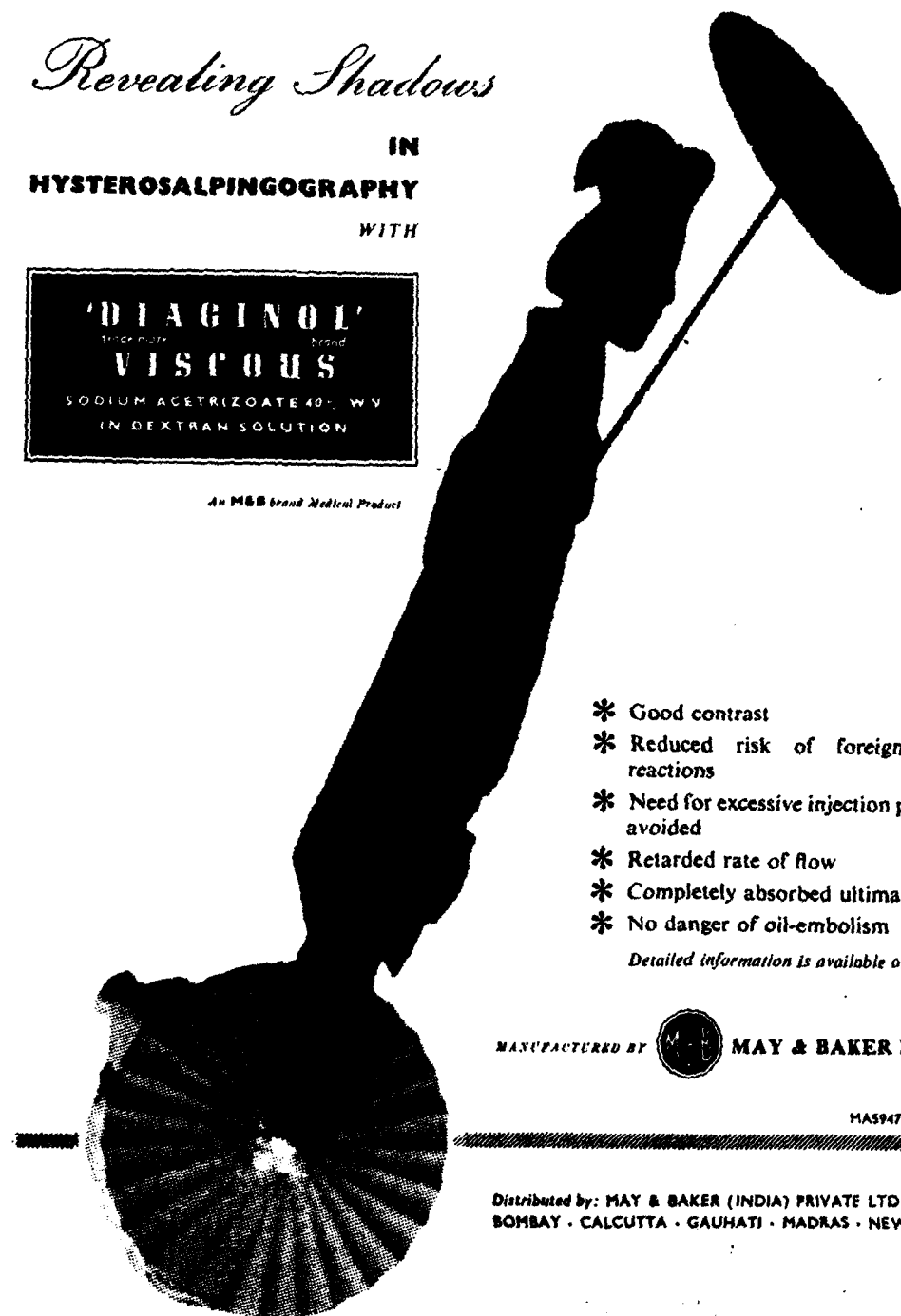
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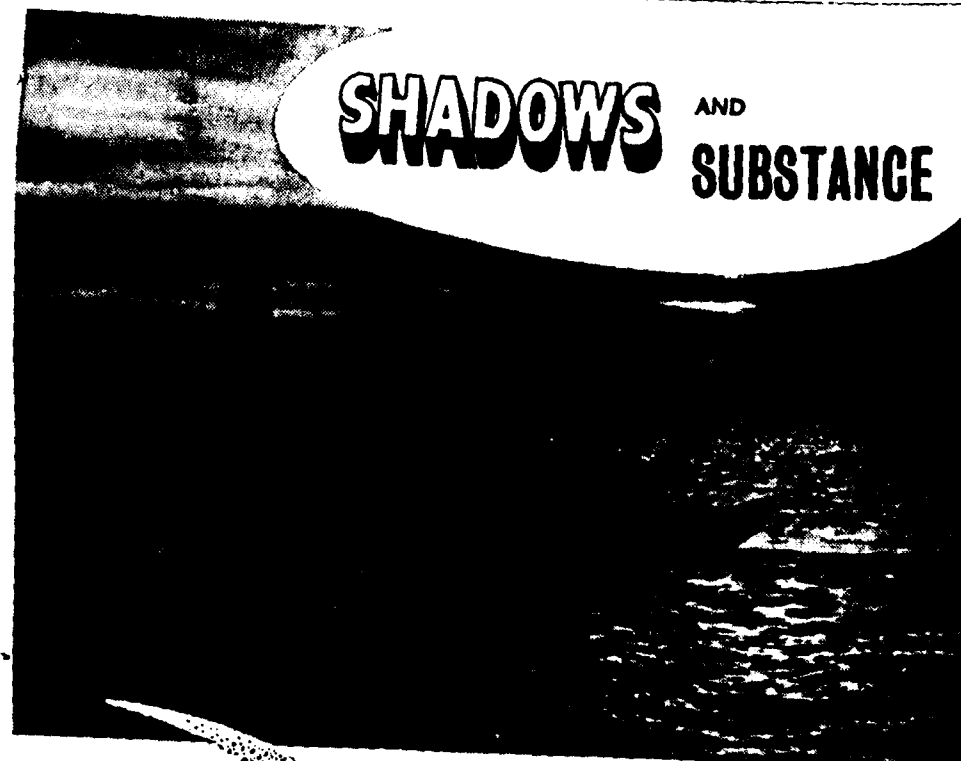
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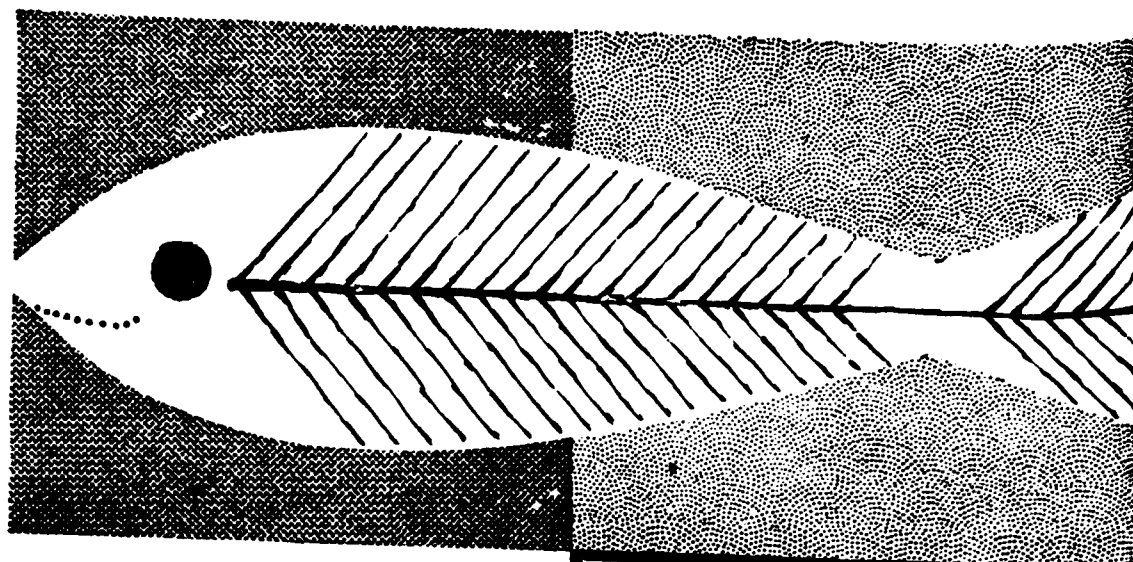
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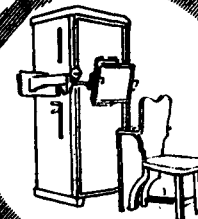
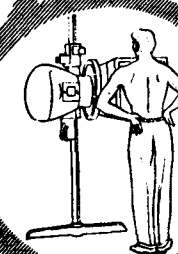
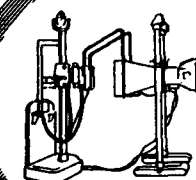
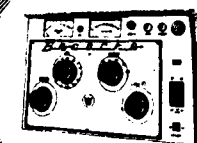
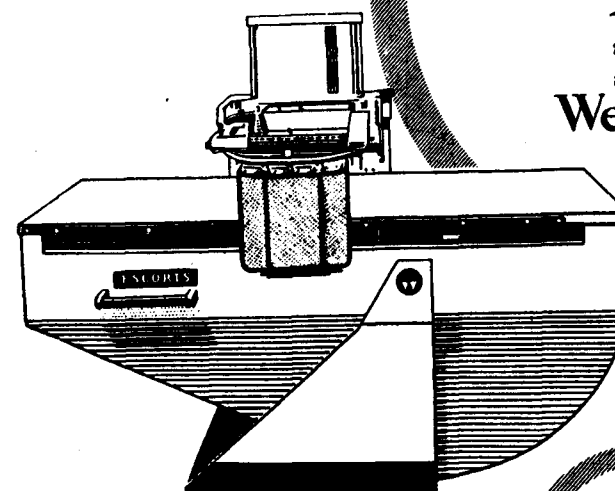
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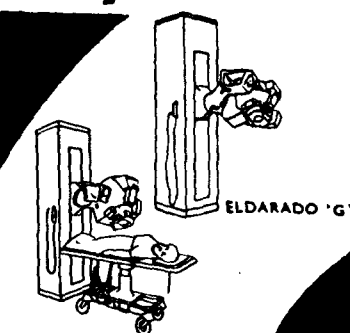
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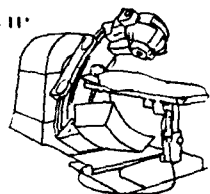
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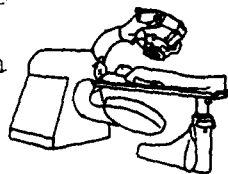
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Editorial

16th INDIAN CONGRESS OF RADIOLOGY

The 16th Indian Congress of Radiology which was held on 7th, 8th and 9th January 1962 at the S. M. S. Medical College in the City of Jaipur, the capital of Rajasthan, was another mile stone in the onward progress of Indian Radiology. The pink artistic city of Jaipur, the jewel of chivalrous Rajasthan, lived up to her full reputation of generous hospitality and grandeur. After the registration of the delegates and the Central Council meeting of the forenoon, the Congress was inaugurated at 2-30 p.m. in the Central hall of the Medical College by Dr. Mohan Sinha Mehta, Vice-Chancellor of the University of Rajasthan. Dr. L. R. Sarin extended a hearty welcome to the assembled delegates and guests. Dr. L. H. Athle, the outgoing President introduced the President elect Dr. K. B. Mathur in a short but elegant speech and installed him in the presidential office. Dr. K. B. Mathur, our popular president, well known for his old world courtesy, beaming friendship and kindness, delivered the presidential address with dignity and charm. He dealt with all the burning topics of the present day radiology including organisation, teaching, modern progress in radio-diagnosis and Radio-therapy, manufacture of radiological equipment and unity among the radiologists. Since his address is printed elsewhere in the journal I do not want to elaborate on this any further. Next, the President presented the Sir Jagadish Chandra Bose Medal, the highest award of the Indian Radiological Association to Professor Rajwesi, Director of the Max Planck Institute of Bio-Physics and Radiotherapy, West Germany. Professor Rajwesi, the President elect of the World Congress of Radiology in

Munich, one of the greatest savants in Radiology in the present world and the well known author of more than 1,000 scientific papers and treatises needs no introduction to an assembly of radiologists. At 4 p.m. the Scientific and Technical exhibition was opened in the lawns of the Medical College by Dr. S. P. Wancho, the Director of Medical and Health Services of Rajasthan. The exhibition, even though moderate in dimensions, brought forth fully to the public gaze the newly manufactured x-ray tables, control and accessories in our country. After tea and a recess, Sir Jagadish Memorial lecture was delivered by the distinguished Professor Rajwesi, who is a scientist and philosopher in one. It was one of the best scientific treatises in radiobiology that was ever delivered. This great address will appear in the next issue of our journal. The annual general body meeting which followed had all the heat and light, seen in such occasions. Whether to have a combined radio-diagnosis and radio-therapy diploma or to have bifurcated separate Diploma courses in radio-diagnosis and therapy, evoked a heated and prolonged discussion. The majority favoured a combined diploma but there was a strong minority opinion for the bifurcation.

An attractive souvenir depicting the history, geography and modern progress in the background of ancient glory of Rajasthan was released on the inauguration day.

On Monday the 8th January at 9-15 a.m. the Scientific Session was inaugurated by Col. R. M. Kadiwal, Principal, S. M. S. Medical College. He paid a warm tribute to the role played by radiology in modern scientific medicine both in the diagnosis and treatment of diseases. On the 8th and 9th of January, four scientific sessions were held in which 15 radio-diagnostic papers and 4 radio-therapy papers were read and discussed. Most of the papers were of a good scientific standard and evoked illuminating discussion, and compared favourably with similar scientific sessions

in the rest of the world. Diagnostic papers on contrast medium radiography as Aortography and Arteriography showed some original approach in investigation and were well appreciated.

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Entertainments, dinners and lunches were of a lavish nature and no effort was spared to make the stay of the delegates as comfortable as possible. The annual banquet had all the glamour and glitter seen on such august occasions and the floral decorations in the banqueting hall were particularly pretty and original. H. E. the Governor, the Health Minister, Vice-Chancellor and the leading Radiology firms and manufacturers graciously entertained the delegates and guests and were lavish in their hospitality. Dr. Sarin, Dr. Bhargava and their colleagues all deserve our grateful thanks for the splendid way in which they organised the 16th Indian Congress of Radiology in sylvian surroundings in their historic city where there is a harmonious blending of the ancient and modern.

A. N. K. Menon.

Presidential Address

BY

Dr. K. B. MATHUR, Lucknow.

President, Indian Radiological Association, 1962

SIXTEENTH INDIAN CONGRESS OF RADIOLOGY, JAIPUR.

Dr. Mohan Singh Mehta, Professor Raj-wesky, Dr. S. R. Wanchoo, distinguished members of the the Medical profession, fellow members of the Indian Radiological Association, ladies & gentlemen,

My first duty is to thank you Dr. M. S. Mehta, for graciously consenting to inaugurate the 16th Indian Congress of Radiology and to welcome you on behalf of all the delegates as well as mine. Your presence in our midst, I am sure, will lend tone and distinction to the deliberations of this conference. My next duty is to express gratefulness for the honour the members have bestowed upon me by electing me unopposed to the highest office of the Indian Radiological Association. I must confess to a sense of humility when I think of my distinguished predecessors in office, great stalwarts in the field of Radiology. I am, however, a humble soldier fighting for the cause of Radiology, and if you have given me your confidence I can only assure you, friends, that I shall continue to exert myself to the utmost to promote our professional interests as well as of the science to which we are all devoted.

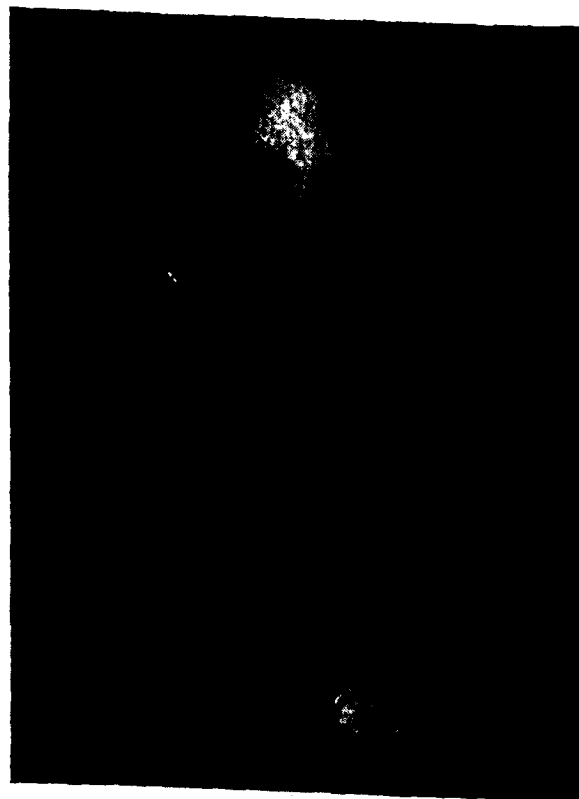
This is the first time that the Indian Radiological Association is holding its annual Congress in one of the most beautiful cities of India, rightly called the Pink City and one of the few in the world which has a planned lay-out. May I thank the office-bearers and members of the reception

Committee for the wonderful hospitality they have accorded to us in these beautiful surroundings.

Coming now to professional matters, I may, in passing, refer to the new techniques in Radiology that are being developed every day, making it the greatest diagnostic aid to clinicians. There was a time when Shakespeare's well-known gibe, "What shadows we are and what shadows we pursue!", applied to us literally as well as figuratively. But those days have passed. From shadows we have come to substance. Our technique has now developed to a stage where modern Medicine and Surgery would cease to exist without the help of diagnostic Radiology. It can be described as the pivotal speciality to which every other speciality turns for aid when it is in difficulty.

It also leads us to the conclusion that in the interest of efficient practice of Medicine, radiologists should always be invited to attend important operations and post-mortem examinations so that they may be able to see the actual lesion and compare it with the X-Ray appearances. This, I venture to say, will further the advances of both radiology and medicine.

From the days of old gas tubes and induction coils we have advanced to the technique of Image Intensifiers, Photo-Fluorography, Tomography, Automatic Rapid Serial Changers and cine-Radiography. The



Dr. K. B. MATHUR

M.B.B.S., Z.M.R.E. (Vienna)

President.

development in Neuro-Radiology, Angio-Cardiography, Aorto and Splenography have come to a stage of technical perfection. This goes to show that our friends, the X-Ray Engineers, have not lagged behind but have gone ahead of us.

In the field of Radio-therapy, soon after the birth of X-Rays, scientists in the U.S.A., Germany and France began to experiment on cancer and used X-Rays in cancer and some skin diseases. In 1920, 200 K. V. deep therapy was introduced in Germany and since then immense improvements in the field of dosimetry, design of apparatus and technical methods have taken place, such as super voltage therapy, particle therapy and Isotope therapy.

The use of radio-active isotopes as tracers in clinical work is opening up fresh fields of diagnostic aids. The newer methods of perfusion of small parts by radio-active agents and chemicals promises results not achieved so far by any type of external radiation.

We have today perspex and plastic moulds for superficial growths and some types of lesions in the mouth. To-day a Radium implant or Radon seed can be accurately used and exact dosage delivered by a post-operative radiographic checkup. In fact there has been an all-round advance in Radium-therapy too. Cobalt beams have come into use and today we have six cobalt beams installed in this country under the Colombo Plan.

A brief review of the Indian Radiological Association

In keeping with the advance in technique has grown our Association which was formed on the 17th February, 1931, by some of our senior members in Bengal. The first Indian Congress of Radiology was held in 1932 in Calcutta under the Presidentship of

Dr. M. D. Joshi of Bombay. Then it went into hibernation. It was only in 1946 that work in real earnest was begun when the Congress assembled in Madras and the Journal was started the next year. Since then our Association and the Journal have grown from strength to strength. Our Journal is appreciated and read with interest in many parts of the world. Our membership has considerably increased. In 1955 we celebrated the Diamond Jubilee of the discovery of X-Rays and published a monumental work in the form of a special Souvenir to which articles were contributed by many eminent radiologists and Scientists from all over the globe.

A special annual feature of the Congress has been the Jagdish Chandra Bose Memorial lecture. We have been honoured by the presence of Radiologists and Scientists of international repute to deliver this lecture, including Dr. Berven, Dr. Ross Golden, Dr. Cochrane Shanks, Dr. Bhaba, Dr. Khanolkar and our very revered Late Dr. K. P. Mody.

We are thankful to you, Professor Rajwesky, for coming all the way from the U.S.S.R. to deliver the Jagdish Chandra Bose Memorial lecture. We can certainly hope for an improvement in our knowledge of professional matters to hear his lecture, coming as it will be from a man so experienced and renowned as he is. May I express the hope that his visit will lead to a more frequent exchange of professional celebrities in all branches of science between his country and ours to our mutual benefit.

The Association has been sending delegations at every International Congress of Radiology. I strongly feel that the time has come when we might hold at least an Afro-Asian Congress of Radiology, if not the International Congress in our country and help raise the general standard of the

speciality in this part of the world. Our problems are somewhat different from those of the economically advanced countries and hence countries of the Afro-Asian Continent are bound to benefit from such a Congress. We have not only to cover the leeway but also to keep abreast of the progress that is being made every day elsewhere.

Radiological service to the Nation

Coming now to the problems of our own country, the most important task facing the Radiologists of India is the provision of an efficient and widespread All-India Radiological Service both with regard to radio-diagnosis and therapy. Two important factors in the development of such a service are:—

1. Man-power—Both Medical and Technical.
2. Apparatus and equipment.

I entirely agree with some of my predecessors that the radio-diagnostic service should have a decentralised pattern and the facilities should be extended to the remotest village.

As to the radio-therapy service, this being much more technical and expensive, should be centralised in bigger hospitals. This centralised pattern is also being followed in most of the advanced countries of the world.

These two factors—Man-power and Equipment—should be tackled in a realistic manner having regard to the requirements of our country.

Man-Power

Radio-diagnosis and radio-therapy have made such phenomenal progress during recent years that it is no longer possible for one and the same person to practise both branches of Radiology with equal efficiency. When Hindu Law has begun permitting

divorce, I see no reason why the same privilege cannot now be extended to these two branches which were so far bound together, if I may say so, in a sort of sacrament. It is not proper to keep them tied together for purposes of post-graduate education any longer. From a practical point of view most of our trained Radiologists are engaged mainly in the diagnostic branch, whether in hospitals or in private practice. To start private radio-therapy practice one has to invest almost a fortune, only to find that the clinic is not even half complete. The new radiologists, possessing deep therapy equipment, cannot be called full-fledged therapists in this rapidly advancing speciality. In a modern properly equipped radio-therapy institute, the radiologists have no time for diagnostic work. A large number of radiologists all over the world have expressed the view that the teaching of diagnostic and therapeutic radiology must be separated. This will also help in the development of both technique and research.

For the requirements of the country we need a large number of radio-diagnosticians and hence a one-year post-graduate diploma course in diagnostic radiology is essential and would serve the needs of the country.

Those who wish to take up radio-therapy could join a similar course in therapy and could be absorbed as assistant therapists or lecturers in different hospitals and teaching institutions. The higher qualification of M.D. should also be awarded in radio-diagnosis and radio-therapy separately and such of the post-graduates after undergoing practical training in some of the world's best diagnostic and therapy centres could be entrusted with the jobs of Heads of Departments in various fully equipped institutions. These highly qualified and experienced specialists would be capable of training similar highly qualified personnel. I have

no doubt in my mind that even at present we have in our country some equally capable radio-diagnosticians and radio-therapists, but their number is inadequate.

The present one-year combined diploma course in diagnosis and therapy is not so useful and, if I may say so, is neither fish nor fowl nor even good red herring. It would be much better if the student is given a thorough grounding in only one speciality of his choice which he is actually going to practise. The basic principles of therapy and radiation hazards could very well be included in the curriculum for diploma in diagnostic radiology. Similarly, the technicians for the two different specialities be trained separately and exhaustively. Some Institutions have already started the training but this is only a drop in the ocean for such a vast country. I hope the facilities would soon be extended.

Now I come to the question of Apparatus and Equipment

The present policy of the Government in charging heavy customs duty and sales tax on X-Ray apparatus and films is a positive disincentive to the development of radiology. The rate of customs duty on X-Ray films is 40% of the invoice value. It looks ridiculous that these items are bracketted with luxury goods for purposes of taxation. It is a policy which baffles understanding. X-Ray films are a necessity, unlike luxury goods. There is only one State in the Union, Mysore, which deserves to be congratulated for keeping the Sales Tax to the minimum *i.e.*, 4% single point. I would strongly urge the Government to see reason and abolish or reduce the rate of customs duty and Sales Tax on X-Ray materials.

It need not be stressed that the success of the Third Plan should be the paramount consideration with every patriotic Indian. We as radiologists can do our bit by

reducing the consumption of X-ray films and utilising every bit of the X-ray film that we have. We should import only such X-ray plants and accessories as have a potential value and not those which have only an academic value. Instead of having too many diagnostic X-ray plants at one place, we should disperse them so as to afford facilities at many more centres.

Friends, in these days of shortages of material and apparatus a ray of hope has emerged in the fact that some firms, including Escorts, I.G.E. and Siemens, have started, or are about to start, the production of most of the components of X-Ray plants of low output. The Government has wisely allowed more than one manufacturer to start production to prevent monopolistic tendencies. I hope these firms will soon find it possible not only to produce all the components in our country but also to produce higher and higher power plants, both diagnostic and therapeutic. I have reason to believe that our Government has given permission to some foreign firm to put up a plant for the manufacture of photographic films including X-ray films also. It is time this was done if it has not already been done.

Radiology Bill

Now I come to a matter immediately affecting our profession. It is high time for the Government of India to enact a law to control the practice of radiology. For many years we have been hearing about this bill, but there is something which is holding up its passage. A measure of this sort is absolutely essential and long overdue.

Here I do not mean that possession of an X-ray machine by a non-specialist may be banned. After all, a modern clinician should have the fluoroscope unit ready at hand to assist him in assessing the progress of a

patient. What I mean is that a person without proper training and knowledge should be prevented from practising the speciality. Even a general practitioner possessing post-graduate qualifications or necessary training in Radiology is competent to practise this branch of science.

If possession of an X-ray plant could make one a radiologist then all the moneyed people could turn over-night into radiologists. I find that many general practitioners who have managed to save some money immediately go in for an X-ray plant, even if it is only a portable 15 M. A. unit. What we do not like is that they immediately begin to proclaim themselves radiologists and start producing skiagrams of no diagnostic value and, worse still, start giving their interpretations on the same, which may not only often be incorrect but result in deceiving themselves and the public. I would even go to the extent of calling them anti-social, because they waste our hard-earned foreign exchange on films and apparatus. The same machine and could be better utilised in the hands of an expert.

It is one thing to possess a good X-ray plant and quite another to make an effective use of it. Experience and training count here for as much as in any other field of human activity. Friends, you will be glad to learn that the Editor of the Journal of I. M. A. in its issue of December 16, 1961, has written a very strongly worded editorial supporting the necessity of controlling the practice of radiology and limiting it only to those trained in the speciality.

I would, therefore, most earnestly request my friends, the general practitioners, to use their machines either only for fluoroscopic check-up or for an occasional radiographic examination of their own cases.

It should be the policy of the State Health Ministry to entrust specialist work

to those who are best suited for the job, whether they are wholtime Government employees or private practitioners. It is true a senior private practitioner cannot spare three or four long hours a day for honorary work in district hospitals. The preparing of skiagrams is not so much the task of a radiologist as it is to interpret them. I know of several big hospitals in the country which employ whole time junior radiologists to carry on routine work in the department and keep the difficult skiagrams for interpretation by a senior honorary radiologist. In such cases the hospital gets the benefit of the services of an experienced radiologist without in any way affecting the routine working of the department.

The present system requiring the honorary specialists to devote the best part of their day to honorary hospital work is bound to fail. Either the senior practitioners will not be forthcoming or they will find it impossible to give the required time to the department. It is high time we faced the realities.

Future of private Radiology practice

It is becoming increasingly difficult, due to the prohibitive cost of modern up-to-date X-ray apparatus, both diagnostic and therapeutic, for young radiologists to take to radiology practice. With the radiological departments of State and other hospitals being progressively better equipped and better staffed, the future of private radiology practice is gloomy except in some of the metropolitan towns. Another hinderance is the almost unrestricted facility of X-ray examinations in government hospitals for patients who could pay for examination by a private radiologist.

While on this subject, may I mention that in some States charges for all types of radiological examinations and for all classes of patients in Government - controlled

hospitals, are placed at Rs. 7/- or so, a figure, which in the present state of higher prices of materials, is ridiculously low. It amounts to a sort of cut-throat competition with private radiologists. I do not mean that the rates may be raised and the poor deprived of this modern aid to diagnosis, but, certainly, there should be discrimination between one who cannot afford to pay and one who can. My humble suggestion to the Ministers of Health is that there should be no charges for the really poor and needy. After all, it is the duty of the State to provide free medical aid for all, and particularly for the poor. The charges for the others who can afford to pay should be raised to a reasonable figure. I suggest that the Government hospitals should charge Rs. 16/- for each skiagram from patients who can afford to pay for their examination and the monetary saving from these examinations be utilised for more liberal examinations of the poor. If this is not done the poor will continue to suffer and the well-to-do, with their influence, will be able to get their examinations done at the ridiculously low rate in Government hospitals.

I may also refer here to the anomaly that exists in respect of the revenue derived by the Government and other Hospitals from the treatment of a certain category of patients. While the Surgeon, and in some cases the physician also, gets 50 percent of the fee realised from patients in private wards, the Radiologist gets nothing out of X-ray examination of the same class of patients. This anomaly must go. The Radiologist, I submit, has a greater claim on such fees as he has no scope for private practice after hospital hours unlike the physician and the surgeon. The honorary radiologist also should receive a similar share because he offers his free services to the hospital only for the poor.

Again, the entire personnel of the Radiology department of hospitals should be given adequate risk allowance as they are, in the performance of their duties, constantly exposed to radiation hazards in spite of the best available protection.

The salaries of the head of the Radiology Department in fully equipped hospitals and teaching institutions should be on par with that of other heads of departments in the same institution.

Radiation hazards and Hysteria caused by the scare

Recent advances in radiation technique have practically eliminated, or at any rate diminished to a great extent, radiation hazards. The writings of pure physicists and biologists have, however, created almost a scare and it has become incumbent on the radiologists to take note of these statements not only for the benefit of the patients but for their own profession. The hysteria caused by these writings has cooled down considerably and I hope the unnecessary scare will soon die an inevitable death. I must, however, sound a note of warning to the public and to the untrained radiologists that radiation hazard is very much a reality when conducting the radiological examination of the abdomen of women in early pregnancy. Examinations by low power units, and the consequent longer and repeat exposures, are definitely harmful to the foetus. Radiation in the early stages of pregnancy is likely to produce some abnormalities of foetus and even foetal death. In later stages of pregnancy similar exposures are not so harmful.

Expert opinion, however, continues to be divided on the medical effect of the ionising radiations. There is one group of workers which believes that the smallest doses of radiation such as those employed in diagnostic radiology tend to rise the incidence of

leukaemia and malignant diseases. There is another group which holds that the doses employed in diagnostic radiology are not high enough to produce leukaemia or cancer and a threshold for radiation exists below which no harm is done.

The truth, as often, lies somewhere in the middle. I can do no better than quote the following from an editorial in a recent issue of the Journal of the Indian Medical Association :— "A critical examination of the available evidence shows that hazards of the medical uses of radiation have been unduly exaggerated. These hazards are no greater than the hazards, for instance, of cigarette smoking, of driving an automobile, of living in a dust laden atmosphere, of exposure to sun, and even of wearing clothes. Care should, however, be taken to reduce roentgen ray exposure. Radiotherapy for benign conditions should be avoided as far as possible. Most routine pelvimetries should now be eliminated. Use of filters, multiple leaf collimators and gonadal shields in children and young adults must be enforced." In the end the editorial emphasises that **"free recourse to fluoroscopy and roentgenography by those lacking special training in this field should be discouraged. Indications for diagnostic radiological examination involving exposure of the gonadal region to the primary beam should be judiciously and carefully weighed."** This only lends further support to the necessity of the enactment of a suitably drafted Radiology Bill.

In conclusion, I wish to commend to my radiologist friends, whether in private

practice or serving in hospitals, to put the following four-point test to their professional activities, which is more or less on the lines of the 4-way test of Rotarians :—

1. Is the contemplated examination really necessary?
2. Am I using the minimum number of films and the minimum size necessary for the examination?
3. Am I giving my best attention to the patient?
4. Am I taking all the necessary precautions for the safety of the patient, myself and other personnel?

The last is much more applicable to the radio-therapist.

I will be failing in my duty if I do not express my gratitude to the Trades Association which has taken pains to put up the Technical exhibition here, in spite of great difficulties. Without them we cannot serve the people, and without us they cannot exist. Therefore we have to work hand in hand for the benefit of humanity. Dr. S. R. Wanchoo, Director, Medical and Health Services, Rajasthan, has very kindly consented to inaugurate the Scientific & Technical Exhibition for which we are very thankful to him.

Before I close, I once again offer my most sincere thanks to the organisers of this Congress here. They have worked very hard to make it one of the most successful of all the sessions. I had the honour and privilege to organise two such Congresses, the ninth

at Lucknow, of which I was the organising secretary, and the 12th at Kanpur where I was chairman of the Reception Committee. I know what amount of time, labour, enthusiasm and tolerance are required to shoulder this burden. Dr. V. D. Bhargava and his team of workers deserve our grateful thanks. On behalf of the Indian Radiological Association and on my own behalf, I must thank our hosts, Dr. L. N. Sarin, Dr. R. A. Casliwal, Dr. V. D. Bhargava, and to their team of devoted workers for giving us the opportunity of meeting at Jaipur. Thanks are also due to the distinguished guests who

have taken the trouble of coming at this function, as also to my fellow delegates who have come from different parts of India and given their valuable time for the advancement of their subject.

We look forward to very interesting and fruitful scientific sessions, an outstanding Jagdish Chandra Bose Memorial lecture, a very peaceful annual general body meeting and last but not least extremely enjoyable social functions. I hope we shall all avail of this opportunity to make new friends, to renew old friendships, to freely discuss our difficulties with each other and share our experiences. I thank you all once again.

Unusual Sites of Skeletal Tuberculosis*

BY

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Generally, the skeletal tubercular lesion has a predilection to occur in those parts of the bone which are highly vascular. The selective locations of such lesions are in the epiphysis and juxtaepiphyseal parts of the long bones. In an analysis of 230 cases of adult skeletal tuberculosis, Lafond (1958) reported the various uncommon sites as follows:—

Tibia	...	3 cases
Os pubis	...	2 cases
Trochanteric bursa	...	2 cases
Clavicle, Scapula and Ischium	...	1 case each

The findings in Johansson's series (1926) of more than 400 cases of skeletal tuberculosis in children below 14 years of age, and the series reported from Zurich of 400 cases of adult skeletal tuberculosis are in agreement with Lafond's report. In the first series, the majority of the individuals were male and belonged to the younger age group, and the disease was often seen in weight bearing joints, especially of the axial skeleton. It is well known that in tuberculosis any bone or joint may be affected. The disease is usually mono-ostotic or

monoarticular in the initial stages. This communication presents a few instances of uncommon sites of skeletal tuberculosis which, in general, can be mistaken for other lesions.

Case 1.—G. S., 8 years, female, was first seen by us with a discharging sinus in the region of the right parietal bone, which followed the incision of an abscess about eight months before admission. She had been under treatment with streptomycin and penicillin and the exact total dosage which she received was not known. On examination, there was a sinus in the right parietal bone discharging yellow pus. The sinus was fixed to the deeper structures. The clinical diagnosis of right parietal bone osteomyelitis was made.

Figure 1 (a and b). Skull skiagrams of Case 1 showing a punched out area of about 3 cm. in diameter in the right parietal bone with central densities and surrounding sclerosis. These densities do not represent calcific areas, and are artefacts due to a heavy-metal containing ointment applied externally. There is no associated lesion of the mastoids. The chest skiagram

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Fig. 1



Fig. 2

of the child did not reveal any lung lesion. Roentgenological diagnosis:—

Nonspecific osteomyelitis of the right parietal bone.

Surgical excision of the lesion and histopathological examination revealed its tubercular nature and acid fast bacilli were demonstrated in the section. Three months after antitubercular treatment, the sinus healed completely and the skiagram of the skull showed a gap in the right parietal bone with mild sclerosis surrounding it.

Comment.—As such, the tubercular lesion in the vault of the skull is more common in the frontal bone (Golding, 1952) with minimal sclerosis surrounding it. In this case, the lesion was observed in the parietal bone and there was marked reactionary sclerosis. It is possible that the sclerosis in this case was due to super-added infection by pyogenic organisms. It is unlikely that the anti-tubercular treatment that the patient had received initially caused such bony alterations.

Case II.—I. S., 20 years, female, reported with a swelling and discharging sinus in the left upper back, of one and half years' duration. Clinical examination of this patient revealed a discharging sinus and a swelling 3 inches in diameter, on the spine of the left scapula. Clinical diagnosis of a cold abscess was made in the absence of the classical signs of active inflammation.

Figure 2.—Skiagram of the left scapular region of this patient, shows central erosion of the spine without sclerosis or rarefaction of the surrounding bone. The chest skiagram did not show any active lesion.

Histopathological study of the excised tissue showed the presence of granulomas compatible with tuberculosis, though no acid fast bacilli could be demonstrated.

Case III.—R. M., 32 years, male, had a history of tubercular disease of the lumbar spine with sinuses, which had responded to massive antitubercular treatment. While under treatment he had noticed a slowly progressive swelling over the outer end of the left clavicle. On examination, a cystic swelling was found at the outer end of the left clavicle. Thin clear fluid, similar in appearance to the normal synovial fluid, was aspirated when the diagnostic puncture was performed. A provisional clinical diagnosis of hydatid disease of the bone was made.

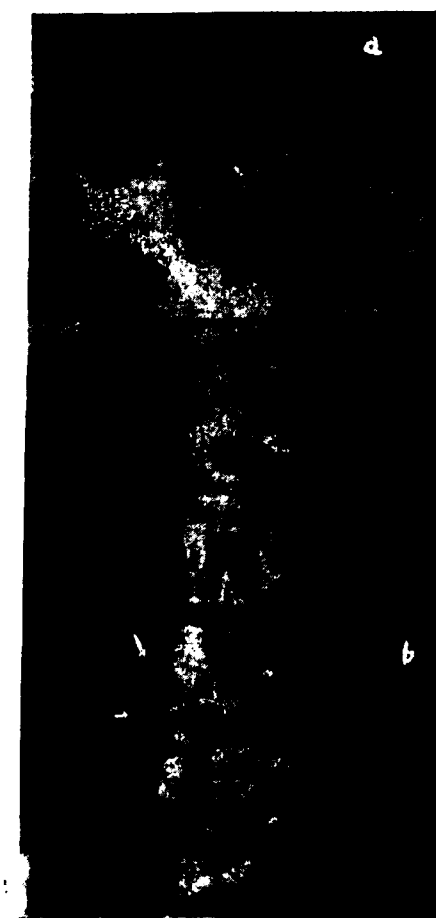


Fig. 3

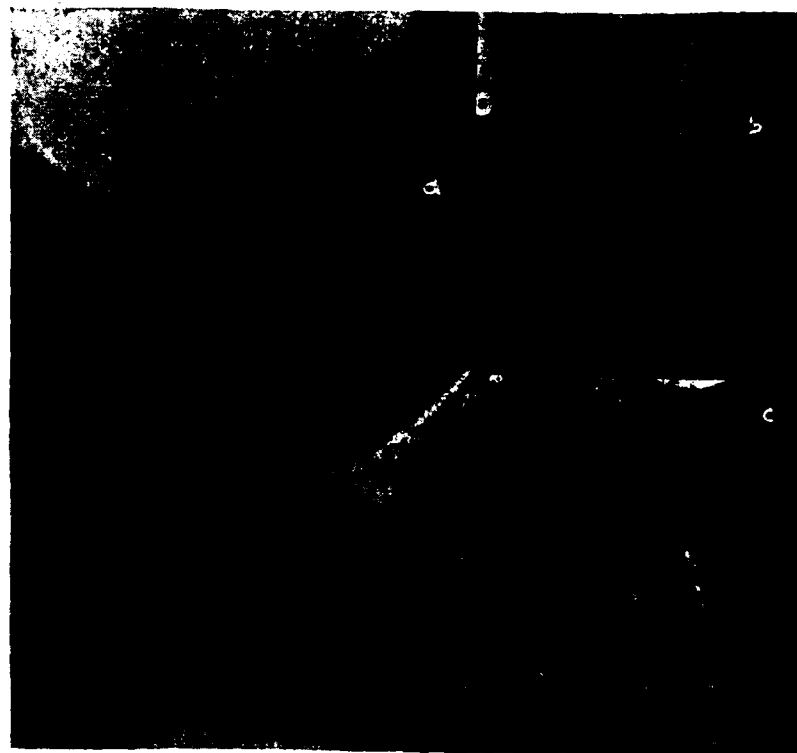


Fig. 4

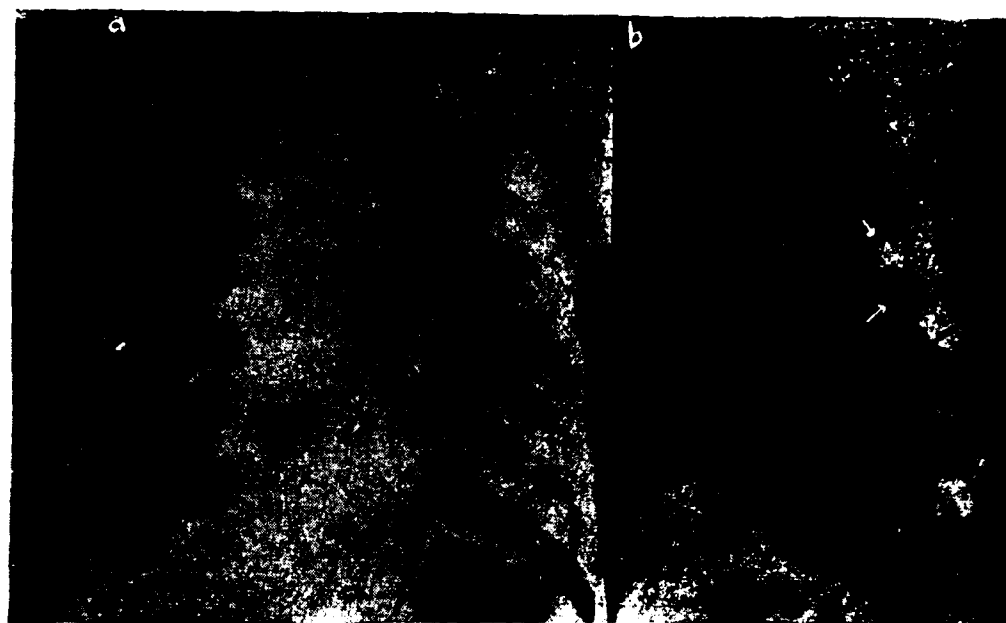


Fig. 5

Figure 3.—(a) Skiagram of the left shoulder girdle shows the presence of multilocular cyst in the outer end of the left clavicle, with some expansion of the bone. There is, however, no involvement of the acromio-clavicular or shoulder joint.

(b) Skiagram of the lumbar spine reveals complete erosion of the right transverse process with sclerosis of the right border of the fourth lumbar vertebra. The chest skiagram did not reveal any abnormality.

While the changes in the lumbar spine were suggestive of a tubercular lesion, the cystic changes in the outer end of the clavicle could not be satisfactorily explained.

Excision of the outer end of the clavicle including the cyst was done. The cyst was found to have wide ramifications into the brachial plexus close to the cervical dome of the pleura, on the posterior aspect upto the medial end of the left third rib. Histopathological examination of the excised bone showed an atypical tubercular lesion with poorly formed granulomas and the presence of acid fast bacilli. The patient was given antitubercular treatment, and he did not have any further local symptoms.

Comment.—Roentgenologically, the tubercular lesion shows an area of erosion in the bone and rarefaction. Where the clavicle is involved, the common focus of disease is in the medial end and associated with involvement of the sternoclavicular joint. In this case, both the site and the appearance are unusual. The outer end of the clavicle is involved, sparing the acromio-clavicular joint and the lesion itself is multilocular and cystic. As a result, the preoperative diagnosis of tuberculosis of the outer end of the clavicle was not possible in this case.

Case IV.—L. S., 38 years, female, was admitted with the history of pain and

swelling in the left side of the neck and increasing weakness of all the extremities of eight months' duration. On examination, the patient was having paralysis of all the extremities and a cold abscess in the posterior triangle of the neck on the right side. A clinical diagnosis of tuberculosis of the cervical spine was made.

Figure 4.—(a) A. P. skiagram of the cervical spine shows erosion of the right pedicle and transverse process of the fifth and sixth cervical vertebrae, with no involvement of the intervertebral space. *(b)* Oblique skiagrams of the cervical spine shows a few more details and the erosion of the laminae.

Figure 5.—(a) Chest skiagram shows a round shadow at the level of the aortic knuckle. There is no lesion in the lungs.

(b) Left lateral skiagram of the chest shows the lesion in relation to the head of the sixth rib associated with a cold abscess.

Cervical laminectomy of the affected vertebrae was performed and the diagnosis was confirmed by the pathologist. No acid fast bacilli could be demonstrated in the sections. Antitubercular therapy was instituted, and followup of more than one year showed that the quadriplegia had completely disappeared.

Comment.—This case has been presented to record an instance of tubercular involvement of laminae and pedicles. It will also be noted that in this case there was a lesion of the head of the sixth rib.

Case V.—S., 9 years, male, was first seen by us with the chief complaint of pain and swelling in the right hip joint of one year's duration. On examination, the classical signs of tuberculosis of the hip joint were present.



Fig. 9

Roentgenological diagnosis rested between multiple pseudocystic tuberculosis and syphilitic osteomyelitis. In the absence of evidence incriminating a leucic process, the first possibility was considered more likely.

Confirmation of the diagnosis was obtained by excising the lesion of the tibia for histopathological study. Response to antitubercular treatment was satisfactory.

Case IX.—R. K., 27 years, female, came under our observation with multiple discharging sinuses of 14 years duration. She also complained of low grade fever off and on. She had antitubercular treatment on the basis of a biopsy report from one of the lesions before the present admission. Apparently she did not respond to antitubercular treatment, since more lesions appeared in due course. On examination, she had multiple discharging sinuses in the region of the right elbow, left ankle and knee, associated with restriction of movements of these joints. Healed lesions were observed on the extremities. There was tenderness over the third lumbar vertebra. Also, discrete, slightly enlarged lymph nodes in the posterior triangle of the neck and in the axillae were observed.

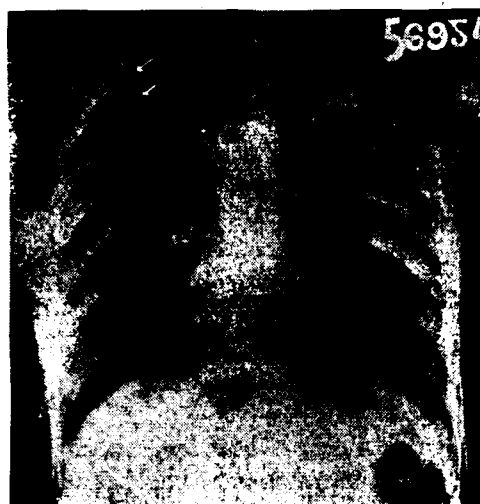


Fig. 10

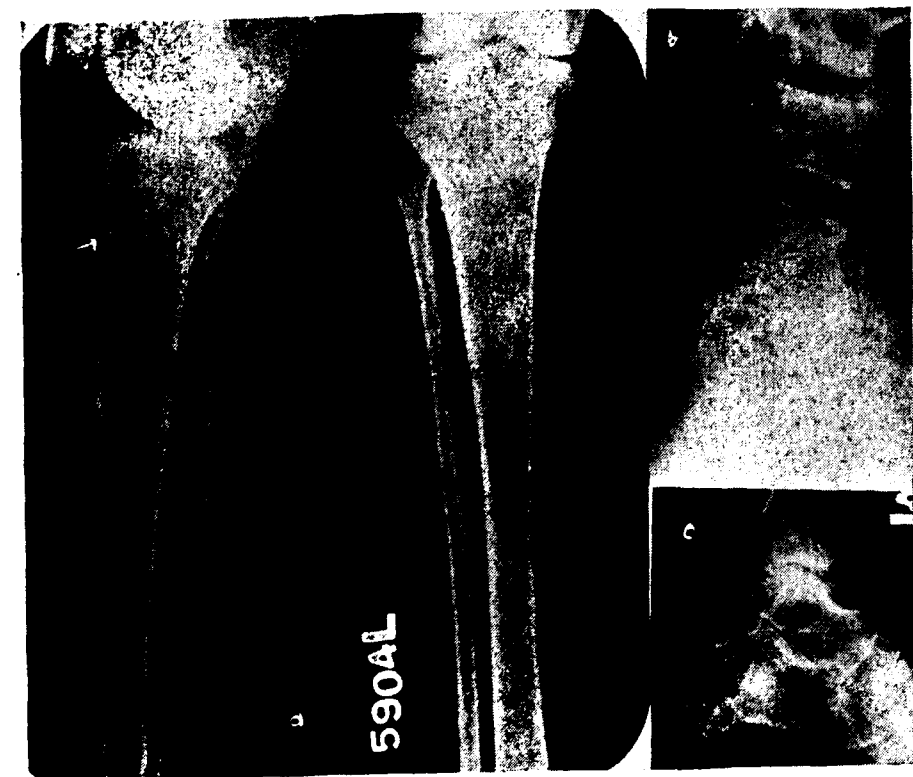


Fig. 11

Figure 11.—(a) Skiagram of the left knee and leg showing the soft tissue deformity on the outer aspect of the leg. There are cystic changes in the tibial tubercle with sclerosis.

(b) Lateral skiagram of the lumbar spine showing healed lesion-fusion of the third and fourth lumbar vertebrae.

(c) Skiagram of the left ankle showing a reduced joint space with sclerosis of the articular surfaces and cystic changes in os calcis.



Fig. 12

Figure 12.—(a) and (b) Skiagram of the elbow joints showing a reduced joint space and sclerosis of the bones of the right elbow joint.

(c) Left foot skiagram showing expansion of the first phalanx of the great toe with cystic changes and sclerosis.

Figure 13.—(a) and (b) Skiagram of the right half of the pelvis showing erosion of the ischium. The chest skiagram of this

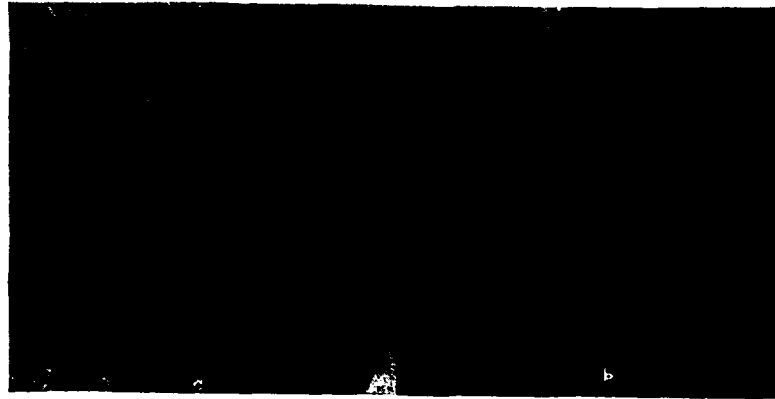


Fig. 13

patient did not reveal any abnormality. Roentgenological diagnosis in this case presented no problem since the lesions were fairly advanced.

Histopathological confirmation was obtained after excising one of the lesions of the extremity.

Comment.—Pseudocystic tuberculosis of multifocal origin is a well documented entity since Parrot (1880) described the lesion in an autopsy of a three years old child. It would appear from the published reports (McLemore Birdsong and Camillus, L'Engle JR, 1948; Cecil Komins, 1952; Clinton-Thomas and Young, 1955) that any bone may be involved. Cecil Komins (1952)

after reviewing 31 cases from English literature concludes that roentgenologically, multiple translucent cystic, rounded or oval lesion, commonly affecting the medulla, occasionally extending into the cortex of the long bones of the extremities, is diagnostic of this variant of skeletal tubercular disease.

Summary

Nine cases of unusual skeletal tuberculosis are presented to bring out their site and type.

Acknowledgement

We are indebted to Dr. V. Ramalingaswami, Professor of Pathology, for permitting us to incorporate the pathology reports in this communication.

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Prenatal X-ray diagnosis of a case of Iniencephalus

Report of a case in charge of

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The name Iniencephalus is derived from the fact that the neck or the Inion is the part principally involved in this condition.

Iniencephalus is a rare monstrosity which is incompatible with extra-uterine life; but it is desirable that an exact diagnosis of the condition be reached before onset of labour, in view of the marked dystocia that is likely to result from the fixed extension of the foetal head met with in this condition.

To attain this ideal must be almost impossible without radiology; and to be able to differentiate accurately from the other conditions that give rise to this type of deflexion of the foetal head, is more so the field of a radiologist.

Therefore it is considered that the subject of prenatal x-ray diagnosis of Iniencephalus under consideration is of paramount importance to the radiologist as well as to the obstetrician.

Incidence of foetal anomalies in this hospital from 1958-1961 formed 2.7% of total number of normal births. Iniencephalus formed 1.2% of the total foetal anomalies; commonest being anencephalus and hydrocephalus both forming 21.6% and 10.8% respectively of the foetal anomalies met with during this period of three years.

Case History.—This patient aged 25 yrs. and gr. III had two previous normal

deliveries, with healthy babies. She was admitted to this hospital on August 8, 1959, with a history of draining and absent foetal movements since one day.

The period of amenorrhoea stated by the patient was 30 wks. Height of uterus corresponded to 34 wks. gestation.

A clinical diagnosis of hydramnios was made; uterus being tense, presentation and position of the foetus could not be made out clinically and the patient was referred for x-ray diagnosis.

First x-ray report (August 8, 1959) (Fig. 1).

"Typical appearances of hydramnion seen. The foetus is seen with its head and cervico-dorsal spine hyperextended, suggestive of the possibility of the presence of an Iniencephalic monster.

Impression.—Difficulty in the normal course of labour is to be anticipated.

A further x-ray in a week or ten days might be helpful by showing whether the extension of the head is still maintained at the same angle; thus proving its fixed nature or otherwise."

Accordingly, x-ray examination was repeated on August 19, 1959.

Second x-ray report (August 19, 1959) (Fig. 2).



Fig. 1

Note typical appearance of hydramnion and hyperextension of the foetal head and cervico-dorsal spine.

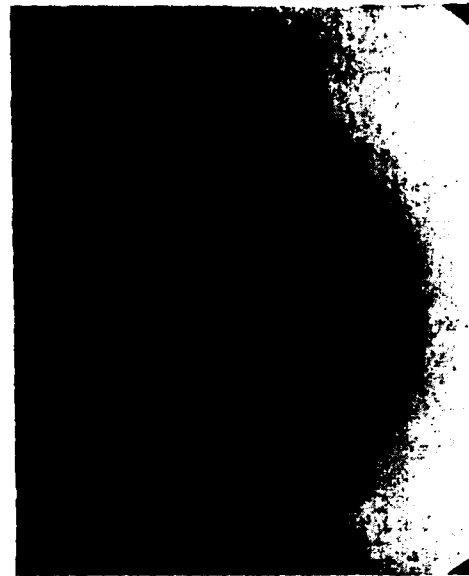


Fig. 2

A soft tissue shadow is seen arising from the defect in the occipital bone.

"The attitude of hyperextension of the head and the cervico-dorsal spine is maintained with no perceptible change in the degree of extension.

Besides a discontinuity is noticed in the shadow of the squamous part of the occipital bone.

On careful scrutiny, a soft tissue shadow can be traced to its origin from this defect in the occipital bone, which therefore is most likely to be an encephalocoele.

X-ray appearances therefore suggest that the foetus is in all probability an Iniencephalic monster; confirming the previous diagnosis."

Subsequently, medical induction was undertaken and the patient delivered spontaneously of a monster baby weighing 5 lbs. The foetus at birth had its head hyperextended; the face directed skywards; the skin of the face passing directly on to the chest there being no indication of a neck.

X-ray of the specimen shows abnormal shape of cervical vertebrae and spina bifida (Fig. 6.)

Iniencephalus can be recognised in a good lateral projection of the foetus, although the associated hydramnios tends to decrease the quality of the film.

It would not be out of place here to mention the accepted radiological features of Iniencephalus in order of incidence and diagnostic importance.

The cardinal features of Iniencephalus are:

1. The hyperextension of the head and cervico-dorsal spine.
2. Defective development of the squamous part of the occipital bone at the foramen magnum which thereby gets enlarged.

3. Cervico-dorsal spina bifida in varying degrees.

4. Fusion of the occiput to the cervico-dorsal element of the spine occasionally met with.

5. X-ray film taken after a reasonable interval (8-10 days) shows no change in the attitude of the foetus, especially the degree of extension of the head remains unchanged, showing its fixed nature.

In the differential diagnosis the following are to be considered in the order of incidence.

1. *Face or a brow presentation.*—Differential diagnosis here is based on the presence of a normal occipital bone and non-fixity of the head proved by a subsequent picture.

2. *A simple spasm of the neck.*—Perceptible variability in the degree of extension of a normal foetal head in x-rays taken at reasonable intervals is suggestive of the existing condition being a simple spasm (Fig. 5).

3. *Foetal thyroid tumour and a cystic hygroma.*—The anterior part of the neck of the foetus may reveal on close scrutiny the presence of a soft tissue shadow. In spite of the absence of this positive finding the presence of such a tumour may still be suspected when a persistent extension of the head is observed, which is not accounted for by a cervico-occipital malformation, as in Iniencephalus.

4. Occasionally a foetal intra-uterine death may simulate this condition. But other associated findings of intra-uterine death will help to arrive at a correct diagnosis.

5. *Klipper-Feil syndrome.*—This is a milder type of Iniencephalus. In it the foetal face



Fig. 3

Shows hyperextension of foetal head and cervico-dorsal spine in case of foetal death (spaulding's sign + ve).



Fig. 5

Shows a full term foetus with hyperextension of foetal head and cervico-dorsal spine. Occipital bone is normal.



Fig. 4

Shows extension of the foetal head but normal occipital bone (a case of gestation in an arcuate uterus).



Fig. 6

X-ray of the specimen. Note the abnormal shape of the cervical vertebrae.

is directed anteriorly, but the head being fixed cannot be rotated. Spina bifida is present with fused or reduced number of cervical vertebrae resulting in sinking of the head into the chest as it were, between the shoulders, obliterating the presence of a neck.

Intermediate stages are met with between Klipper-Feil syndrome on one side and a typical Iniencephalus at the other extreme, depending on the degree of bony changes involving the neck.

The transient stages can be grouped as one or the other only on a pathological basis and not radiologically; the brain and the spinal cord lying partially outside the bony framework, in a sac, in Iniencephalus and being confined to the bony skeleton in Klippel Feil syndrome.

Discussion

Although it is maintained that the importance of prenatal x-ray diagnosis of Iniencephalus lies in the fact that this condition causes dystocia, in the case under consideration, it has further enhanced the importance of x-ray examination of every recognised ante-natal case of hydramnios, to permit recognition of this condition in earlier periods of gestation; as in the present case medical induction saved the patient from undergoing a major operation for a monster baby.

It is of paramount importance that a simple spasm of the neck of the foetus be recognised as such, prenatally, as in this condition the foetus is quite healthy and a wrong diagnosis as Iniencephalus may lead the obstetrician to decide in favour of a destructive operation of the foetus or medical induction if diagnosed in earlier

periods of gestation, to the detriment of the life of the foetus.

(Fig. 5) shows an x-ray of a patient referred to our hospital as Iniencephalic gestation; but decided to be normal and delivery by caesarean section undertaken to save the foetus; with the happy result of giving the mother a normal healthy baby.

The baby gradually recovered from the spasm in the neck in a perinatal period of 4 days.

It would be interesting to mention here an instance where maternal condition, *i.e.* gestation in an arcuate uterus, was the cause of hyperextension of the foetal head.

This condition of the mother was diagnosed clinically and confirmed at caesarean section. The foetus had acquired a spasm in the neck which corrected itself within a perinatal period of 3 days as in the above case.

Summary

A case of Iniencephalus diagnosed prenatally is discussed with the different types of foetal and maternal conditions causing intra-uterine extension of the foetal head met with during the period of 3 yrs. from 1959-1961.

It is concluded that hyperextension of the foetal head and cervico-dorsal spine in utero with defective development of the occipital bone and spina bifida, justifies a diagnosis of Iniencephalus.

Acknowledgement

I acknowledge the courtesy of Dr. (Mrs.) P. M. Naidu, for sanctioning the publication of this case which was under her charge. My thanks are due to the radiological staff of the Institution for their co-operation in collection of films.

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A New Standard for the Size of Pituitary Fossa

BY

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Of the many problems that have presented themselves to the Radiologist from time to time, one has been the size of pituitary fossa. We have only to review the efforts of men like Camp J. D. (1924) Enfield C. D. (1922) Pendergrass E. P. (1929) Gordon M. B. and Bell L. A. (1922) and Caffy J. (1956) to appreciate the complexity of the problem. In spite of it, the worst is that the available standards do not provide any useful help, as the dimensions of the normal pituitary fossa show extreme range and variations.

Further, there has been no agreement uptill now about the dimensions to be measured. Some authors measure length as the greatest antero-posterior distance of pituitary fossa. In such measurements, no consideration is given to consistent orientation of the skull so that the diameters bear no constant relationship to anatomical landmarks. Others have measured the interclinoid distance as an indication of length, failing to recognise that the anterior clinoids, of which the shadows are projected on to pituitary fossa, in no way enter into the formation of membranous and bony enclosure of the pituitary gland. Many a time depth has been measured from the interclinoid line to the bottom of the projected fossa rather than from a line corresponding to the position of diaphragma sella. Being confused more than enlightened by all this others like Hare 1949, Silverman, F. N. 1957 and Karlas 1948, approached the problem differently. They believed that measuring the area of a sagittal section is preferable to length and depth. Karlas 1949 also measured the volume of pituitary fossa by filling it with plastecine and found some

relationship between the area of sagittal section and volume. The object of this paper is to present a very simple means of evaluation of the size of sella turcica. The approach is somatic. The answer is not far from sella.

Material

For the present study, 70 normal lateral roentgenograms were picked at random from our hospital film library of previous years. Only those which were technically perfect were accepted. It was made sure that not only did they show perfect projection of sella turcica but also the head of mandible. Unfortunately, during the review of these cases it was realised that the outline of the head of the mandible was not very clearly visualised as the roentgenograms were taken at a standard focus film distance of thirty-six inches. To overcome the difficulty the focus film distance was reduced to fifteen inches. This resulted in an uninterrupted view of the mandibular head which was nearer the film. With the above variation in technique another thirty fresh lateral roentgenograms were added to the series. In these roughly a ten percent correction was done for the magnification of sella turcica. This made available for study one hundred roentgenograms representing all the main age groups and both sexes.

Method

The technique of determining the length and depth of sella which was thought acceptable was similar to the one used by Silverman, F. N. (1957). Measurements were made with a scale which had the accuracy of half a millimeter. Further



Fig. 1
Male Infant.

addition to the kit was a pair of callipers. Length of the fossa was represented by a line drawn from the tuberculum sella to the tip of dorsum sella. This line corresponded to the position of diaphragmatic sella. In young children and infants, the posterior clinoids did not interfere with the identification of the tip of dorsum sella. In older children and adults, the enlargement of

posterior clinoids frequently encroached on the projected shadow of the pituitary fossa but in nearly all the instances, the tip of dorsum sella could be clearly visualised through the clinoid processes. The line of reference was drawn to this point disregarding the super-imposition of posterior clinoid processes. A perpendicular drawn from this line to the deepest point of pituitary fossa was the depth.

Another set of measurements which was of considerable interest, was the length and depth of the head of the mandible in the lateral projection. A line was drawn just above the constriction of the neck. This represented the antero-posterior diameter of the head. A perpendicular drawn from this line to the most distal point on the convex superior border was taken as the depth.

Lastly a table was drawn to compare the length and depth measurements of the sella turcica and the head of the mandible.

Sex and Age Groups	No. of Cases	Difference in millimeters of Length							Difference in millimeters of Height						
		Nil	.5 mm.	1 mm.	1.5 mm.	2 mm.	3 mm.		Nil	.5 mm.	1 mm.	1.5 mm.	2 mm.	3 mm.	
MALES:															
Adults ...	52	34	3	6	2	6	1		32	6	7	4	2	1	
Old ...	5	3	1	1	—	—	—		—	3	2	—	—	—	
Children 5/15 years...	10	6	—	2	1	1	—		8	1	1	—	—	—	
Children below 5 years ...	9	8	1	—	—	—	—		9	—	—	—	—	—	
FEMALES :															
Adults ...	15	9	3	3	—	—	—		12	—	2	—	1	—	
Old ...	—	—	—	—	—	—	—		—	—	—	—	—	—	
Girls 5/15 years.	4	2	2	—	—	—	—		3	—	1	—	—	—	
Girls below 5 years ...	5	4	1	—	—	—	—		4	1	—	—	—	—	
Total ...	100	66	11	12	3	7	1		68	11	13	4	3	1	



Fig. 2
Male Adult



Fig. 3
Male Aged.



Fig. 4
Female Infant.



Fig. 5
Female Adult.



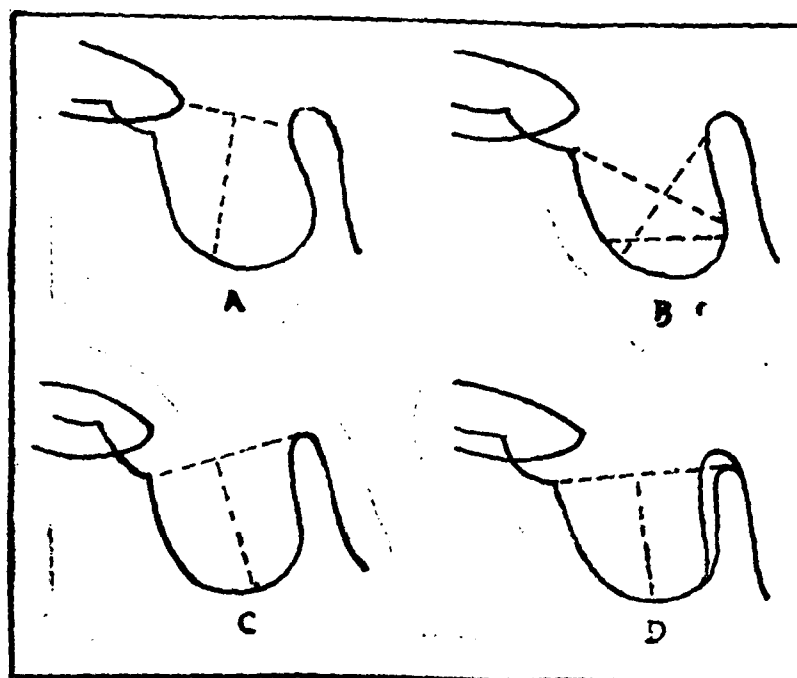
Fig. 6
Female Aged.

Statistical review of one hundred cases showing the difference of dimensions in millimeters of the length and height of sella turcica and mandibular head.

Results

Within two millimeter variations the length and height of sella turcica and the head of mandible show striking identity in 99% of cases. Out of these sixtysix per cent had exactly similar length and sixty-eight per cent exactly similar height. Three millimeters was the maximum variation and two in only one percent.

On the strength of the above observations, it seems that nature has provided a ready-made answer to the size of sella turcica, and the head of the mandible which is almost similar in size to sella turcica and is a handy and convenient



Methods of measuring pituitary fossa. (A) "Length" is interclinoid distance "depth" is perpendicular dropped from this line. (B) Several techniques used for measurement of "greatest (apparent) length": tuberculum to most remote point on posterior wall; tip of dorsum to most remote point on anterior wall; region of middle clinoids to most remote point on posterior wall. (C and D) are examples of technique used in the study. "Length" corresponds to position of diaphragma sellae, and "depth" is perpendicular dropped to deepest point.

structure for ready reference. Only 2 mm. variations in ninety-nine per cent cases make this method a much more useful guide than hitherto known. Furthermore, it has been noticed that variations of age, sex and stature do not affect the standard of accuracy.

Regarding the configuration of sella, it was observed that the flat type of sella showed the maximum amount of disparity. Only twenty per cent of sella in the present series were flat and even out of these the dimensions of thirty per cent were exactly identical to the mandibular head. A difference of 3 mm. was noticed only in 5% of these 20 cases.

Summary

Measurements of length and depth of the pituitary fossa and the mandibular head have been taken in one hundred lateral roentgenograms of the skull with standard technique. The last thirty of them have been exposed at a reduced focus film distance

of fifteen inches to delineate the mandibular head more clearly.

It has been observed that within two millimeter variations, the length and height of sella turcica and the mandibular head correspond to each other in ninety-nine per cent cases. Out of these sixtysix per cent had exactly similar length and sixty-eight per cent exactly similar height. This holds good in all ages, in both sexes and in different statures. Only slight disparity was noticed in flat sella which formed 20% of the present series. Even out of these 30% showed exactly similar measurements and 95% of them had measurement within 2 millimeter variations.

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Peutz-Jeghers Syndrome

BY

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In 1896, Sir Jonathan Hutchinson described for the first time in twelve-year old female twins "a number of black pigmented spots on the lips and inside of the mouth", but he was not aware of the association of these pigmented spots with intestinal polyposis. The Dutch Physician, Peutz, recognised the significance of the association of pigmentation with intestinal polyposis when he described in 1921, the case history of a family in which several members had pigmented spots of the mouth, hands and feet together with intestinal polyposis. For twenty-eight years, the syndrome was a sleeping beauty till Jeghers came along in 1949 and touched it into recognition and importance by his masterly account of ten patients suffering from the condition since when it has been known as the Peutz-Jeghers Syndrome.

The first impressions about the syndrome were that it is a rare entity but later observations have confirmed that it is "at least as common as familial polyposis of the colon". Dormandy adds "it is also reasonable to suppose, in view of the high differential mortality in childhood from unrecognised acute complications that advances in diagnosis and treatment and improved chances of parenthood will bring about a further rise in incidence". The syndrome is equally distributed between both sexes.

The pigmented as well as the non-pigmented races are affected and cases have been reported from all over the world with no particular geographical predilection.

The syndrome consists of three cardinal features; gastro-intestinal polyposis, mucocutaneous pigmentation and heredity.

Pigmentation may be cutaneous or mucosal. The pigmented spots, present at birth or during early childhood, are round, oval or irregular, discrete or confluent, contain brown, blue or black pigment and vary in size from 1 mm. to 5 mm. in diameter. The pigment is melanin. The spots are not raised but flush with the skin or mucosa, non-hairy, non-vascular and non-irritating. The cutaneous component of the pigmentation portion of the syndrome is the least essential part of the syndrome, most varied, and may be absent or disappear as the individual gets older. Their distribution is "peri-orificielle" around the mouth, eyes and the nostrils. The fingers and palms, the toes, forearms and the umbilical region may also be involved. It is the mucosal portion of the pigmentation that is the sine-qua-non of the pigmentary part of the syndrome since it does not fade after puberty but persists throughout life. The mucosal pigmentation is present over the buccal mucosa, lips, gums, palate, the

fauces and the nasal mucosa. In biopsies of the pigmented spots, Lloyd Ketterson was able to find a constant distribution pattern of the pigment particles in "vertical bands" but Dormandy was unable to confirm this. The pathogenesis of the pigmentary anomaly is obscure. No definite relationship is known to exist between the location, size, and distribution of the pigmentation and the location, size and symptoms of the intestinal polyps.

The polyps may affect any part of the gut from cardia to anus but are most constantly and characteristically present in the small intestine. In the small intestine, the jejunum is principally involved. The polyps are usually multiple or diffuse and rarely solitary. Polyposis may develop as early as the age of two and is characterised by spurts of growth followed by varying periods of quiescence with little relation between the rates of growth in different segments of the bowel. The newly erupted crops of polyps are separated from segments already affected by apparently normal gut.

Like polyposis of the colon, the syndrome is both familial and hereditary and is inherited through a Mendelian-dominant gene of high penetrance. No generation skips are evident. Both males and females carry the factor and are affected about equally. The question has been asked whether one or two genes are responsible for the twin characteristics of the Peutz-Jeghers Syndrome. Jeghers is of opinion that the correct explanation for this syndrome as for the majority of the other hereditary syndromes must be the presence of a single pleiotropic gene responsible for both characteristics, the polyps and the pigmented spots.

Other abnormalities occasionally associated with the syndrome are urinary,

bronchial and nasal polyps, skeletal and cutaneous abnormalities like clubbing, scoliosis, exostoses and familial soft-tissue tumours, congenital heart disease, Azygos lobe, diverticulosis and diverticulitis, undescended testis, thyroid, suprarenal and ovarian disease.

Symptoms are chiefly referable to the small intestine. Rectal and large-bowel signs and symptoms are minimal or absent. The symptomatology may be divided under four heads: (i) No symptoms at all (ii) Intussusception—brief but recurrent attacks of intense colic, with a palpable but ephemeral abdominal lump or lumps and sometimes classical intestinal obstruction. (iii) Haemorrhage from the polyps resulting in intractable iron-deficiency anaemia, malabsorption which may lead to macroscopic anaemia and malnutrition leading to defective or stunted growth in children. (iv) Malignancy—Peutz-Jeghers polyps in the colon or stomach tend to become malignant as commonly as any other adenomatous polyp at the same site. But the far more abundant, even apparently invasive polyps in the small intestine remain uniformly benign. There is something very curious about the resistance of the small intestine to malignancy that invites further study.

The following case is reported here for its clinical interest and rarity. A thirty-two year old man, weaver by profession, was referred to the Barnard Institute of Radiology for investigation with a complaint of bleeding per rectum and "piles" since three years. On questioning him about the nature of "piles" he said he used to feel a mass coming down during defaecation which used to get reduced spontaneously till three months before but now he has to reduce it manually. Patient complains of burning and pricking sensation during

defaecation. Previous history of the patient was not contributory. He never had any severe or acute gastro-intestinal complaints except mild dyspepsia for which he used to take aerated water with relief. Family history could not be elicited with any degree of accuracy. His uncle (father's brother) was supposed to have had a dark lower lip and his sister was claimed to have had "piles".

On examination, the patient was a fairly well-built but anaemic individual with clubbing of fingers and toes. The abdomen was scaphoid, moved freely with respiration and no tenderness or masses were felt. On rectal examination, no external masses were seen but soft, pedunculated masses were felt per rectum.

Proctoscopy revealed multiple polypi and internal haemorrhoids in the 3, 7, and 10 O'Clock positions. On sigmoidoscopy, multiple polyps of the sigmoid with bleeding ulcers were seen. Other systems were normal.

On local examination, irregular flat melanotic pigmentations were seen mainly over the mucosal aspects of both lips, more predominant in the lower lip, where it reached upto 1 cm. from the gingivo-labial sulcus. Pigmentation was also seen over the buccal mucosa, soft palate, and right side of the tongue. Patient had tinea versicolor of the face. Colour of hair—black with several grey hairs. Colour of iris—dark-brown.

Barium Enema Series: According to Ritvo, the criteria for the diagnosis of a benign tumour are a smooth, sharply defined filling defect within the lumen of the gut with no irregularity of the contour

of the region and normal distensibility of the intestine. A simple routine barium sulphate enema may obscure the polyps when the colon is filled and hence the polyps may be missed. Again the presence of faecal material or globules of gas may cause a filling defect which closely simulates a polyp. So the contrast studies were undertaken after careful preparation of the patient. Colloidal Barium (Alubar) was used as it not only stays in suspension for a longer time but also adheres to the crevices between the tumour masses and produces a honey-comb pattern which is pathognomonic of polyposis. Alternatively $\frac{1}{2}$ to 1% tannic acid added to barium sulphate emulsion can be used. As in a routine barium enema, polypi are likely to be missed, barium-air double contrast technique was employed which brings out the polypi better. A high kV technique can also be employed to bring out better contrast. In our institution, 120 kV and 30 mAs (other factors remaining the same) are used. The double contrast barium enema picture revealed extensive polyposis of the entire colon from the caecum to the rectum. Even the appendix appeared to be involved by the disease process.

The barium meal series did not reveal any radiological evidence of the presence of polyps in the stomach or small intestine. Plain radiographs of the skeleton did not reveal any abnormalities like exostosis or scoliosis. No evidence of nasal polypi was found in the sinus picture and no azygos lobe in the chest film.

Surgery would have confirmed the presence or otherwise of polyps in the stomach or small intestine but the patient was not willing for any operative procedure and had to be discharged against medical advice.

Discussion

Ravitch had remarked with obvious relief that "in these days of mass spectrography and paper colorimetry, it is nice to find a condition which one can diagnose from across the ward". The significant association of pigmented "tell-tale" spots with intestinal polyposis makes the spot diagnosis of the syndrome "an innocent pastime" and necessitates the consideration of the latter in all cases of unusual or aberrant melanin pigmentation, especially if the distribution is oral and/or facial. The converse is also equally true that in every case of intestinal polyp, it is worthwhile to look for mucocutaneous pigmentation and if necessary to go into the family and genealogical history of the patient.

The pigmented spots have to be differentiated from freckles. The facial spots differ from freckles in distribution, size, shape, and colour so much so that Siemens termed the Peutz pigmentation as "ephelides inversae". Freckles are practically never found over the buccal mucosa, appear early in life but not at birth and are usually sparser near the mouth and nostrils than on the cheek and the bridge of the nose and vary with the seasons of the year. Addison's disease is a "good misdiagnosis" which would lead one to the correct diagnosis on further investigation if only the syndrome is remembered. "What we know, we see". Patchy melanin pigmentation in mouth and palate is said to occur very occasionally in pernicious anaemia, schistosomiasis, ankylostomiasis, intestinal tuberculosis, coeliac disease, the sprue syndrome, gastrocolic fistula and Whipple's disease. Pigmentation may also be due to foreign substances, either exogenous or endogenous, such as amalgam, bismuth, lead, silver and mercury. Very rarely cases may present the characteristic pigmentation of the Peutz

syndrome without the intestinal polyposis. Jeghers et al had reported one such case and Dormandy four cases in one of which the absence of polyps was confirmed at post-mortem examination. Dormandy is of opinion that, in view of the infrequency of such reports, it seems reasonable to assume that such cases may represent sporadic mutations and incomplete penetrance of the gene responsible for the Peutz-Jeghers syndrome.

Ileal and jejunal polyps should be severely left alone as they seldom turn malignant. Polyps of the colon, rectum and stomach have a tendency to become malignant and prophylactic surgery is in order in these cases. Intussusception is treated on conservative lines like the "suck-and-drip" method. Gastric suction is preferred to intestinal suction. An enema is worth trying as it frequently cuts short an attack. Patients who know their disease can impart their knowledge to the Surgeon and save themselves from exploratory laparotomies. Periodic haemoglobin estimations and correction of anaemia may be necessary. Emergency surgery is as a rule not advocated. An important finding by surgeons was the spontaneous regression of polyps left behind in the rectum after colectomy. There are several interesting explanations offered for this phenomenon: (i) as being due to the action of desoxyribonuclease of the ileal contents coming in contact with the polyps; (ii) as being due to elimination of some toxic factors in the colon; (iii) and as being due to decreased vascularity of the part. Further reports may throw added light on the pathogenesis and possible control of these polyps. The children of affected individuals as well as those with pigmentation but no gastrointestinal symptoms should be routinely examined for evidence of polyposis every two years from the tenth year till about the

twentieth year by which time the majority would have developed polyps. Dukes advocates that these routine examinations should be continued at five-year intervals till the fortieth year by which age it is probable that those still without polyps have not inherited the gene.

Dormandy is of opinion that the disorder is a small hazard to life if the patient lives within the reach of good surgical treatment. "A person of unusual abilities who has the pigmentation can be expected to have offsprings of greater value to the community than the average parent with immaculate lips. At present the few patients who ask for genetic advice are those whose sense of social responsibility is a trait that outweighs a few polyps". The leader in *The British Medical Journal* does not want to be dogmatic on the issue but democratically leaves it to the good sense and sound judgment of the individual concerned. "As a piece of practical eugenics, those affected should be told as young adults of the risk to their children so that they may decide for themselves whether to have children or not. It is likely that members of an affected family who have no pigmentation will have children who are likely to remain free of the disease. Children of members with pigmentation have independently a 50% probability of being affected.

There are three types of polyposis which are clinically and genetically distinct from one another: (i) in which the colon and rectum alone are affected. (ii) in which the colon and rectum are affected along with associated abnormalities like multiple epidermoid cysts, fibromata and osteomata. (iii) the polyposis of Peutz-Jeghers syndrome. There is nothing however specially distinctive about the macroscopic or microscopic appearance of the Peutz-Jeghers polyps that would serve to separate them

from the ordinary polyps not associated with pigmentation. Attempts are being made especially by the New Zealand Medical Research Council to find genetic linkages between familial polyposis and blood groups and the latest report shows a statistically significant indication of autosomal linkages between M. N. S. groups and polyposis. This is a useful and important discovery which may help to predict the possibility or otherwise in a new-born child the chances of its developing polyposis in later life. No such study seems to have been made in Peutz-Jeghers syndrome and though we tried to get this patient's blood grouped, as the required antigens are not available, it could not be done.

Summary

The history, cardinal features and symptomatology of Peutz-Jeghers syndrome are reviewed.

A case-report of Peutz-Jeghers syndrome is presented and the differential diagnosis and management of the case discussed.

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Bilateral Basal Ganglia Calcification*

(Case report)

BY

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Introduction

Because of the rarity of this radiographic finding and complete absence of such a report in the Indian Medical Literature, it was thought worthwhile reporting a case observed in the Radiology Department of the Lady Hardinge Medical College and Hospital, New Delhi.

Review of the Literature

Bilateral Basal Ganglia calcification is a rare entity first described histologically by Virchow and Bamberger in 1855. It remained a pathological finding till 1935 when Fritzsche and Kasanin and Crank reported the specific radiological appearance of this type of intracranial calcification. None of them mentioned parathyroid insufficiency in their cases.¹

In 1939 the occurrence of such a finding in cases of abnormal calcium and phosphorus metabolic disturbances as in hypoparathyroidism was described by Eaton, Camp and Love and in pseudo hypoparathyroid by Sprague et al in 1945. This seemed to be more than a mere coincidence. Therefore Camp et al again in 1947 justly re-emphasised this relationship between hypo-para-thyroidism and Basal Ganglion calcification by reporting 12 cases,

one caused by post-operative para-thyroid insufficiency and 11 others spontaneously occurring.

In 1951 Mendill reported Basal Ganglion calcification associated with hypo-para-thyroid in one case and pseudo-hypo-para-thyroid in another case.⁴

In 1959 Palubinskas and Davies reported a case of bilateral Basal Ganglia calcification with displacement which led to the diagnosis of a space occupying lesion. It was labelled as the idiopathic familial type as the patient's healthy daughter had bilateral Basal Ganglia calcification too. Patient's Calcium and Phosphorus levels were normal.⁵

In 1959 Bennet et al while analysing the 88 cases of Basal Ganglia calcification (77 reported in the literature upto 1957) and 11 of their own, stated in 66% finding of abnormal calcium and phosphorus disturbance, 48% of the total had idiopathic hypo-para-thyroidism. 2 were post thyroidectomy, of the remaining, 6 cases were of Idiopathic familial basal ganglia calcification, (these do not include the two cases reported by Davis in 1959). 10 miscellaneous, 5 Toxoplasmosis involving Basal Ganglion and in 8 no diagnosis could be given.¹

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Roentgenographic Findings

Basal Ganglia calcification is a distinct roentgenological finding seen characteristically, in the early stages, as small clusters of irregular punctate discrete, symmetrically distributed densities in the region of the various Basal ganglia especially the Putamen and Caudate Nucleus. When calcification

is more marked, the irregular shadows take on a very linear appearance. As the masses coalesce, the Roentgen shadows become larger, denser and more obvious.² These are situated 3-5 cms. above the sella turcica in the lateral projection and 2-4 cms. lateral to the mid-line in the A. P. projection of the skull.



Fig. 1

Bilateral calcifications.

Fig. 2

Note calcifications lie below anterior horns of lateral ventricles and 4 cms. above the sella.

The almost invariable bilateral occurrence of such calcification distinguishes them from calcified new growth, vascular malformation and post-inflammatory conditions.¹ Distinction from calcified choroid plexus which are a normal roentgen finding being present in about 5% of individuals of all ages (Dyke)³ is easily made in films in the lateral projection which show these calcifications usually limited to the region of the genu of the lateral ventricles whereas calcification of the larger basal ganglion will be anterior to this.³ Should doubt still exist air studies with or without Tomography would be decisive.

Case Report

Present History.—Patient P. female aged 18 years attended the Neurological Clinic with the complaints of attacks of loss of consciousness since the onset of puberty. The attacks lasted 4-5 minutes and occurred daily.

There was no history of any febrile illness suggestive of meningitis or encephalitis in the past.

Family History.—Patient is the 2nd child of a family of six children. No other child has such complaints. There is history of tuberculosis in the mother and one sister who are

both dead. The "attacks" comprised of typical grand mal seizures with characteristic tetanic carpo-pedal spasm. These seizures were preceded by bouts of temper, shivering and dark spots before the eyes. Duration of each attack averages 5 minutes. Higher functions and intelligent quotient are normal. Patient studied upto the 8th class but attacks started in the 9th class and she could not study further. No other relevant findings could be elicited in the Central Nervous system. There was no papilledema.

No abnormality could be detected in any other system.

Laboratory Data

Serum calcium 9.7 mg% (within normal limits) Serum Phosphorus 3.8 mg% (within normal limits) Alkaline phosphatase 4 units (Bodansky Units) Haemocrit-normal, Blood for S. T. S. Negative. Lumbar puncture; normal biochemically and cytologically.

Urine: normal microscopically. No albumin or sugar found. Studies of x-rays of father & brother revealed no evidence of intra cranial calcification.

X-rays of hands and feet of the patient show no abnormality.

X-ray skull.—Shows symmetrical bilateral calcification in the basal ganglia, confirmed by pneumoencephalography to be outside the ventricular system.

Comments

The incidence of different type of seizures (70%) and of Tetanic spasms and mental deterioration (61%) is high in patients with parathyroid insufficiency. Extra pyramidal signs in this group of patients are comparatively uncommon (16%) (Benett).

Thus the possibility of salvaging even a few of the mentally retarded and handicapped will justify the search for parathyroid insufficiency in the presence of Roentgenographic evidence of Bilateral symmetrical calcification of the cerebral basal ganglion.⁴

On detailed examination and investigation of this patient no ascertainable cause of this calcification could be found. None of the immediate family members examined had any radiologically abnormal calcification. In the absence of any demonstrable evidence of para-thyroid involvement either biochemically or radiologically, it is felt that this case will represent idiopathic non-familial incidence of Basal Ganglia calcification.

This patient sought medical advice because of her "attacks" described in the case report. How much this specific finding can be an exciting factor is difficult to decide. Marked improvement in these symptoms has been observed in patients with abnormal calcium and phosphorus metabolic disorders on substitution therapy without affecting the intra-cranial calcification.

This patient has now been followed for 5 years 1956-1961. Her epileptic fits are practically controlled on luminal. She had 2 fits in 1960 and none so far in 1961. She married in 1959 and has a healthy baby boy, who shows no evidence of intra-cranial calcification. Her basal ganglion calcification remains unchanged.

Summary

A case of Bilateral Basal Ganglia calcification reported with a review of the literature (90 cases). The possibility of parathyroid insufficiency in such cases stressed and a thorough search justified. This case

has been classified as non-familial Idiopathic type. A 2/3rd of the reported cases had such a metabolic abnormality. An understanding of the significance of Basal Ganglia calcification may lead to early diagnosis and treatment of an atypical case, thus preventing late irreversible changes. In 1/3rd of patients Basal Ganglia calcification is of undetermined significance.

Acknowledgements

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Radiation Cancer of the Skin

(A Case Report)

BY

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Cases of cancer developing after the use (or abuse) of ionising radiations in human beings and experimental animals have left no doubt about the carcinogenic properties of X-rays. A survey of the world literature on reports of such cases confirm the recurrence of radiation induced malignancies in the skin, bone, soft tissue, thyroid, blood, larynx and pharynx.

As Sir Stanford Cade describes it, there have been phases of radiation induced cancers (Cade 1957); the first was among the people who were professionally working with the new roentgen rays—technicians, scientists, doctors and nurses. Our generation's contribution to the martyrdom had started. After the period of these occupationally exposed radiation cancers, a second phase started. This is aptly called the era of Therapeutic Radiation Cancers. These cases are due to gross over exposure in the days when biological effects of radiation were yet unknown, dosage measurement crude and inaccurate and protection measures non-existent.

So far as we can find, there has not been any report of radiation induced cancer from the Indian sub-continent. This might give us a false feeling of security. A case of epithelioma developing in the skin of a patient who had radiation therapy for malignancy in throat 20 years ago, came under observation recently and it aroused our curiosity to report the case. Perhaps

many of such cases have been seen by other workers in India and it would be interesting to find them reported in literature.

Case Report

Mr. S. P., 56, a male staff-nurse in a rural dispensary, developed a swelling in the right side of his neck in 1941 when he was 36 years of age. The findings at that time were:—

Below the sterno-cleidomastoideus, deep in the neck just above the level of the right clavicle, there was a mass which felt as though made of several glands, firm but not stony hard and slightly movable, which gave the neck an appearance of being unusually full on the right side. No other gland was palpable.

Within the oral cavity a careful search showed only a tiny ulcer, perhaps 2 mm. in diameter, surrounded by reddish thickened wall lying on the right side, in the crease between the base of tongue and lateral pharyngeal wall just below the level of the tonsil.

Kahn and W. R.—Negative.

X-ray chest—N. A. D.

Biopsy of the ulcer—Lymphoepithelioma.

He was treated with X-rays, the details of which are as follows:

22-4-1941 to 19-5-1941 Deep X-ray (Maximar) therapy to the right angle of

jaw directed towards the tonsillar bed in fractionated daily doses. Total dose = 6120 r.

9-6-1941 to 1-7-1941, Deep X-ray therapy to the metastatic mass at the base of the neck on the right side. Total dose = 4200 r.

22-7-1941 to 31-7-1941, Radium by puncture to the large residual mass at the base of the neck, using 17 one mgm. needles for 3650 mgm-hrs.

Examination on 2-8-1941 did not reveal any ulcer in the mouth; mass in the neck was slightly smaller than before the radium needles puncture.

In January 1942, he came to the Christian Medical College Hospital, Vellore, for a check up for the first time. Findings at that time were: "Hard mass of fibrous tissue in the right neck, 6 cm. wide, fading

into the sterno-cleidomastoideous. Area of depigmentation of old therapy. Throat N. A. D.

In January 1943, he had a small ulcer in the irradiated area, 1 cm. in diameter with clear cut margin. Mass was smaller. There was intense scarring. Curetting and biopsy showed necrotic materials only. By the end of the year the ulcer healed up.

In December 1944, the scar broke down again and formed a small ulcer, 0.5 cm. in diameter.

Since then he did not turn up for follow up until August 1961, after about 17 years. This time he has come with a bigger ulcer than any time before and has been present for the last one year. Though it started only as a small ulcer, it is not showing any sign of healing rather it is getting bigger.



Sq. Cell Carcinoma on irradiated skin.

There is a depigmented area in the right side of the neck under which there is densely scarred tissue. Near the upper and medial part of this scarred tissue there is an ulcerated area about 3 × 2 cm. in size, raised above the surface and fixed to the tissues underneath. Clinically it looks like a cauliflower epitheliomatous growth arising in the irradiated skin. Scarring of the neck

restricts his head movements and has caused torticollis but he does not seem to be bothered by this handicap.

Examination of throat—N. A. D.

Biopsy of the edge of the ulcer confirmed the clinical diagnosis of Squamous Cell Carcinoma.



Sq. Cell Carcinoma.

Discussion

This case is interesting for several reasons besides it being possibly the first case to be reported from India. The first case of irradiation cancer ever reported in the world literature was in the year 1902 in the hand of an X-ray technician. Most cases of radiation induced cancer have occurred after occupational exposure to X-ray or after the treatment of some benign conditions like thyrotoxicosis, naevus, tuberculous lymph nodes, removal of superfluous hair on face and host of similar conditions; and comparatively only a few after the use of X-ray in the treatment of malignant

conditions, like the present case which was treated for lymphoepithelioma. The treated condition remains well todate.

Carcinoma has developed in the skin 20 years after irradiation in this case. Latent periods of 4 to 56 years have been reported in literature for radiation cancers to develop in the skin.

This patient received a heavy dose of irradiation and as a result got severe skin changes. The scar has been unstable all along. It broke down several times and took quite long to heal on each occasion. And finally after 20 years the edge of the ulcer

has changed epitheliomatous. This kind of histogenesis has been described in detail by Glucksmann and Boag (Glucksmann et al 1954) while doing experiments on animals to examine the carcinogenic property of ionising radiations. It is difficult to evaluate in this case what role the different ingredients of various ointments had to play in the development of cancer. It may be postulated that x-ray might have initiated the process of carcinogenesis and various constituents of the ointment might have accelerated it by acting as co-carcinogen. We do not know what kind of ointments were used, in any case it must have been of wide variety.

And finally this case illustrates the need of follow up of cases which had treatments with X-ray either for benign or malignant conditions in the long past and might have been written off. One of them might come in the condition as Mr. S. P. did with radiation cancer.

Summary

A case, possibly the first case in India, is reported here who had x-ray treatment for lympho-epithelioma of right tonsil and developed epithelioma of the irradiated skin 20 years later.

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Image Intensification, Television and Cine Radiography

BY

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In the fifty Medical Colleges of India a need is being felt for radiographic rooms with highly specialized equipment for teaching and research investigations of the Pharynx (Murray 1958), alimentary canal, (Allcock 1956 Berridge 1961; Liljendahl 1958) for cardiac catheterisation and cine-selective angiocardiology, (Astley 1956) and for cine retrograde pyelography, micturating urethrography, hystero-salpingography (Stevenson & Ferguson 1961).

For the following procedures, the following apparatus will be required :—

1. Cardiac Catheterisation or Jejunal Biopsy Work.

- (i) A 7" or 9" Image Intensifier with optical viewing system alone will cut down radiation dangers to patient and operator, but the optical system is awkward to use and may be as fatiguing to the operator over a long period as is conventional screening.
- (ii) A Vidicon T-V, Camera and 14" monitor provide an immense advantage to the doctor in that a T-V. monitor is easy to see, can be seen by multiple observers, and on it contrast and detail of the image can be varied at will.

A second or more monitors can be viewed in other rooms.

- (iii) If the screening with image intensification alone is to be done a small cheap generator is all that is required.

2. Barium Meal and Small Intestine Studies.

Rapid viewing of the small intestine every half hour or every hour for six hours may be needed.

- (i) The above Image Intensifier and T-V monitor provides the ideal method for such examination as the radiologist does not have to spend 15 minutes getting dark adapted every half hour or so.

- (ii) Cine radiographic camera.—Permanent records of the size and shape of Oesophagus, stomach, duodenum and intestinal loops are required for diagnostic, record, and research purposes. The cheapest and easiest method of recording may be to take small lengths of 35 mm. cine film, and to make prints from selected 35 mm. frames. Intestinal movements can also be studied by means of a special cine projection and editing table.

The cost of 35 mm. cine film is Re. 1/- per yard of 36 exposures as compared with Rs. 7/- per single exposure of 12 × 15" survey film of the abdomen.

- (iii) A conventional x-ray apparatus will still be required for greater detail pictures.

3. Selective Angiocardiology.

- (i) Special cardiac catheterisation table.
- (ii) Image Intensifier with 2 optical viewers or
- (iii) T-V. camera and monitor.
- (iv) Cine camera.
- (v) A rapid x-ray film changer will still be required for detailed study of the heart and vessels by angiocardiology in some cases.

The Various Types of Apparatus now available have been studied and the following points are noted :—

Image Intensifiers

5", 7", 8", 9", and 12½" models are now available. Newer models can increase the brightness by 1000 or even 3000 times.

The 5" model covers only a small area, but can give good details.

The 7" model—(a) covers adequately one loop of small intestine, the duodenal loop, the pyloric end of stomach, the caecum and terminal ileum, etc. but is inadequate for whole heart or whole stomach studies.

- (b) Details on a cine film of a 7" area may be clearer than of a 9" area.
- (c) There is a saving of expense as compared to the 9" model.
- (d) The 7" model is more manoeuvrable as it is less bulky and weighs less than the 9" intensifier.
- (e) The 7" model has a manual, rather than motor-driven, change over from one viewing system to another.

(f) The 7" model can be fitted with a T-V. and a cine camera. T-V, viewing and cine filming can go on at the same time with only about 10% loss of light energy to the cine camera.

(g) One 7" model (Siemens) has an *ionisation chamber* cine exposure timing device that is said to be sturdy, reliable and cheap, other makes use a photo timer (see below).

(h) The two channel optical system is adequate and less bulky than the three or four channel systems. One or two monocular viewers can be fitted in place of T-V. or cine camera or both.

(i) If the T-V. camera fails, viewing through the eyepiece of the cine camera may be adequate, or conventional screening may be resumed.

The 8" (Picker) and 9" (Philips) models cover a larger area, but details are slightly less easily seen, and slightly less detail can be reproduced on a 35 mm. cine film. If however an 0.3 mm. focal spot tube is used, a magnification technique can be employed in the filming of smaller areas.

(a) The advantage of these models are that adult venous angiocardiology and cine radiographs of the whole stomach or of two kidneys can be carried out.

(b) Some models have a photo-electric system as the basis of cine exposure timing devices. In the Philips model a photo electric tube is mounted behind the intensifier tube. An optical glass plate deflects 1% of the light emitted by the intensifier to this photo multiplier tube that 'sees' the whole area being viewed, and so may be more satisfactory than a big flat ionisation chamber that covers a smaller area or areas in

front of the intensifier. The photo timer can also be used for spot x-ray film exposure timing.

(c) Automatic cine film density control devices have been developed for one of the 9" Image Intensifiers. These electronic devices are costly but they enable the radiologist to turn the patient while taking a cine film and not have to bother so much about the density, control ("E" meter).

(d) The 8" model (Picker) offers two channels—mirror optical viewing and a cine radiography, but not T-V. and cine radiography together (Ball J. 1960).

(e) The 9" (Philips) model offers three channels with various combinations of mirror optical viewer, T-V. and cine cameras (Feddema 1960) (Fig. 1).

(f) The French (Universal Magnilux) 9" Image Intensifier offers four channels optical, T-V., cine and a still reflex camera. Change over from one channel to another

can be effected manually, and a beam splitting device is available. This model is offered at a very reasonable price, but details of cine density control arrangements are not known to the author.

The 12½" Image Intensifier (Cinelix) is a very bulky and costly device which views the conventional fluorescent screen by means of a concentric mirror optical system, and the brightness is then increased by a small easily replaceable light intensifying tube (Fig. 2).

This type of apparatus however can use an electronic device for doubling the size of the image and so it may be eventually enable us to replace large x-ray films with small photographic plates and prints.

Television Cameras (Jacobs 1960)

The sturdy, common, Vidicon type or the Sensitive, specialised Orthicon types are available. There are the cheaper commercial T-V. cameras that use 400 lines

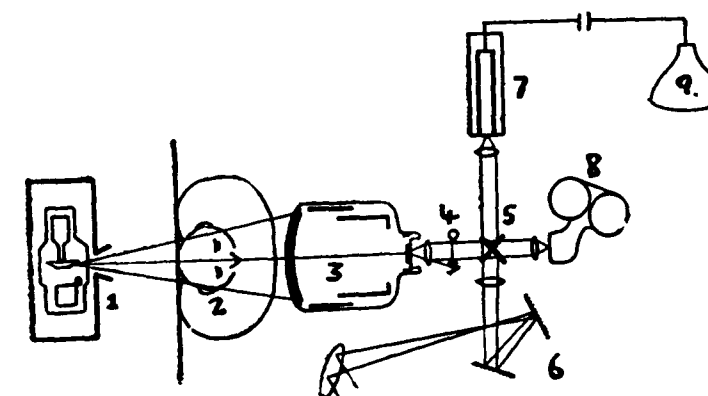


Fig. 1

Image Intensifier—Vidicon TV,—Cine.

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|------------------------------------|--------------------------------|
| 1. X-ray tube 0.3 mm. focal spot. | 6. Mirror optic viewer. |
| 2. Patient. | 7. Vidicon TV Camera. |
| 3. 7 or 9" Image Intensifier tube. | 8. 35 mm. Cine camera. |
| 4. Photo timer tube. | 9. TV. Monitor with 625 lines. |
| 5. Image distributor. | |

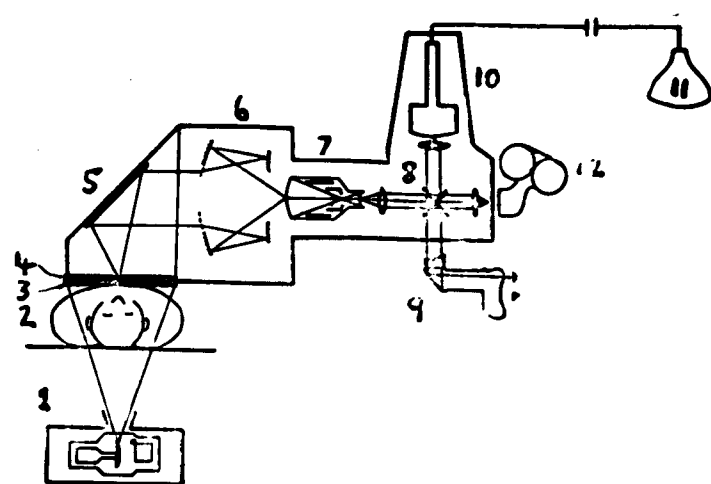


Fig. 2

Mirror Camera—Light Intensifier—Orthicon TV—Cine.

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|-----------------------------------|---------------------------------|
| 1. X-ray tube 0.5 mm. focal spot. | 7. Light Intensifier tube. |
| 2. Patient. | 8. Image Distributor. |
| 3. Grid. | 9. Binocular viewer. |
| 4. Screen. | 10. Orthicon TV. Camera. |
| 5. Rotating head. | 11. TV monitor with 1024 lines. |
| 6. Concentric mirrors. | 12. 35 mm. Cine Camera. |

inch and there are Vidicons specially made for radiography that use 600 lines.

The Vidicon camera can operate at 0.3 M.A. for examinations above the diaphragm, but below the diaphragm it usually requires 0.5 to 2 M.A. at 100 K. V. Dosages of radiation at high K. V. however never exceed 3r/minute (Stevenson 1961) whereas with conventional screening and low K. V., dosages may be as high as 17r/minute. With the T. V. camera contrast can be altered manually, so high K. V. can be used and the grid dispensed with. There is also a saving of time, and certainly there will be saving of radiologists' physical labour, and so a great gain is made over conventional fluoroscopy.

Picker use an Orthicon camera to view an 8". Image Intensifier (Fig. 3). This orthicon system is more sensitive, it uses 1000 lines per inch, and can operate at less

than 1 M. A. even below the diaphragm, (Stauffer and Henry 1961) but it may not stand up well to vertical and horizontal movements — (Film studio Orthicons are always kept horizontal). The Picker Morgan Image Intensifier and Orthicon camera system does not allow for simultaneous T-V. viewing and fine filming, and the cine camera gains nothing from the Orthicon. The Orthicon camera coupled to an Image Intensifier has proved better than the Vidicon for the Stereo T. V. localisation of calculi (Lindblom 1960). Now it is being used for T. V. tape recording (Girdany et al 1961).

The Marconi 12" Image amplifier uses an Orthicon T-V. camera to view an optically reduced image of the conventional fluorescent screen, this again is a bulky device but it has many advantages. (Hanley et al 1961), (Fig. 4).

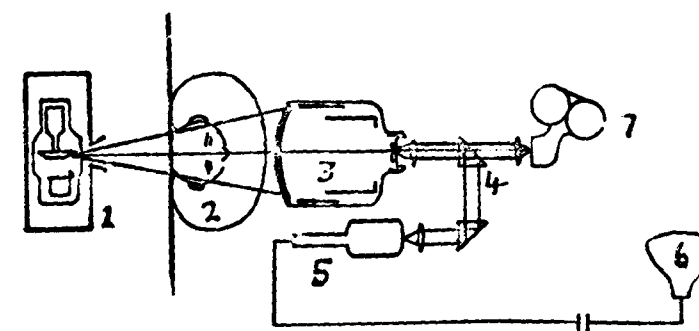


Fig. 3

Image Intensifier—TV—Cine

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|-----------------------------------|------------------------------------|
| 1. X-ray tube 0.5 mm. focal spot | 5. Orthicon TV camera. |
| 2. Patient. | 6. TV Monitor 1024 lines. |
| 3. 8" Image Intensifier tube. | 7. Synchronous 16 mm. Cine Camera. |
| 4. Image distributor, Prism type. | |

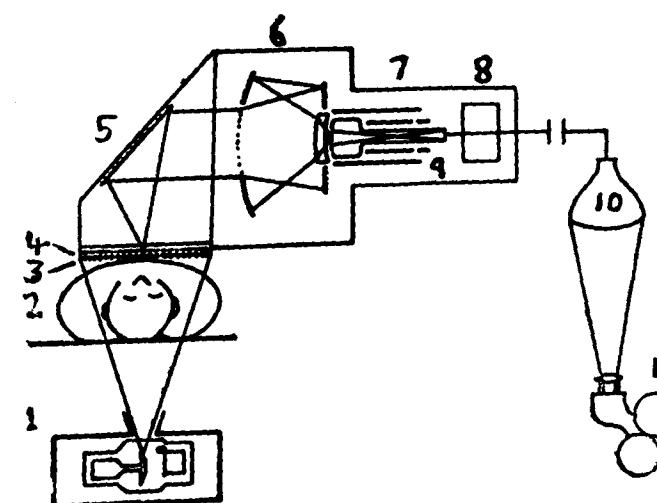


Fig. 4

Mirror Camera Orthicon TV—Cine of Monitor

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|--------------------------------|---|
| 1. X-ray tube fine focal spot. | 7. TV Orthicon camera. |
| 2. Patient. | 8. Electronic amplifier. |
| 3. Anti-scatter grid. | 9. Electronic focussing coils |
| 4. 12" fluorescent screen. | 10. TV Monitor 1024 lines. |
| 5. Rotating head. | 11. Cine Camera synchronous motor 16 mm |
| 6. Concentric mirror system. | |

The "Cinelix" and Marconi Orthicons have to be kept always horizontal. The orthicon camera tube life may be shorter than the Vidicon, and a replacement tube costs much more than that of the Vidicon.

Cine Cameras (O'Brien 1960)

There are three systems of cine radiography available for 16 mm. or 35 mm. cameras.

The 16 mm. camera is favoured in the U. S. A. because a bigger lens can be used with it, radiation to the patient is thereby reduced, the cost is less, and the film handling is easier (Campbell et al 1960). In Europe the 35 mm. Camera is preferred because of slightly greater detail available on a 35 mm. film (Greenwood 1956).

A tube with 0.3 focal spot is desirable (Critchlow 1956). The three systems are :

1. Camera mounted direct on the Image intensifier—with a continuous beam of x-rays. Continuous output of x-rays is gained by means of (a) a constant potential fully smoothed three phase generator (Siemens 12 barrier layer rectifier or (b) by a single phase generator with a condenser smoothing device (Philips).

2. A synchronous motor camera mounted direct on the Image Intensifier. The synchronous motor opens and closes the camera shutter in time with the 50 cycle mains supply. (Flashes of x-rays) and so the dosage of radiation to the patient is reduced. Grid control of the flashes of x-rays from the tube has been developed by some companies (Matchlett).

Electronic valve switches in a constant potential H. T. circuit have also been developed (Doter & Rogers 1956; Astley 1956) for a series of rapid short x-ray exposures.

3. Cine radiography of the T. V. monitor (Marconi) (with a synchronous motor).

The first system has the advantage of simplicity (Astley 1956) and is less likely to mechanical breakdown, but there is more dosage of radiation to the patient. It requires a more expensive generator (which may be useful for other purposes, angio cardiography, etc.) but it uses a less expensive camera (No synchronisation).

The constant potential three phase generator is generally more reliable and useful machine—especially in areas such as ours where one phase of the mains may fail. The single phase generator is cheaper but for cine radiography it requires an expensive voltage (condenser) stabiliser that can only be used for cine work as its maximum output is 50 M. A. at 150 K. V.

The synchronous motor cine camera and/or the grid control x-ray tube are both complicated and costly devices that are likely to go wrong and require more servicing. It is doubtful if the saving of radiation to the patient effected by this method is worthwhile because in cine radiography dosages of 10 M.A. for 30 seconds or 300 M. A. S. at high K. V. are the maximum that are likely to be applied to a patient even in a thick abdomen. Synchronised film speeds are limited to certain ratios of the 50 cycle mains supply.

Cine radiography of a T-V. screen has the advantage that brightness and contrast can be altered at will by electronic controls and that a cheaper camera can be used but it has the disadvantages that raster lines will be seen, and that details will be less than on cine records taken direct from the Image Intensifier. Other disadvantages of this method are that a second operator with a second monitor in a different room may be needed, and again that a synchronous

motor is desirable to prevent occasional stroboscopic effects. Film speeds are limited to certain ratios of the 50 cycle mains supply that also operates the T-V. camera and monitor scanning system.

Generator

A low cost single Phase generator is adequate for image intensifier or screening examinations alone, but if spot films with short exposure time (0.07 seconds) and 250-300 M. A. and 110-150 K. V. or rapid serial films are to be taken, a much more powerful and reliable generator is required.

The following points must be considered :—

(a) Metal oxide rectifiers are less likely to go wrong than valve rectifiers, but are usually more expensive.

(b) When using the serial film changer, there should be separate controls for screening and radiography. Some models have only one set of M. A. values available when screening is being done.

(c) There should be a separate mains compensator that controls not only the incoming voltage to the tube (auto transformer) but also the voltage supplied to the electronic timer and to all relays, locks, gadgets, on the table.

(d) There should be an M. A. stabiliser that of course stabilises M. A. regardless of K. V. during the actual exposure. This should act apart from the conventional filament stabiliser that prevents M.A. falling when K. V. is raised.

(e) There should be a foolproof device that prevents overloading of the tube in any circumstances yet allows the maximum percentage load of the tube as and when required. Some makes have mechanical

locks on the control, and others have a trip switch on the tube that cuts off when the tube gets hot.

Table

The following points must be considered :—

(a) 45° Trendelenburg is needed in myelography and in some jejunal intubation work. 90° is not often needed. 15° is not always enough.

(b) A robust well protected table is needed.

(c) A serial changer in which cassettes can be inserted from the left hand side is useful, especially with the bulky 9" image intensifier. A good serial film changer that takes at least 12 × 15" films as well as small serial spot films is needed (Picker takes maximum size 12 × 12", Siemens 17 × 14").

(d) A rotary cradle for easy turning of the patient up to 90° may in some examinations save time and energy, but in it, the patient may not easily be placed prone.

(e) A moving table top will save radiologists' time and energy, especially when using the ocular viewer of an image intensifier or of a cine camera.

(f) An over couch tube, ceiling suspension, bucky, etc. are not always needed.

(g) If the undercouch tube swivels round to allow 6 foot chest films to be taken on a wall stand this will be useful.

(h) An intercommunication microphone-loud speaker is useful for teaching (with extra monitor) and dictating purposes.

(i) Special tables in which the table top moves in two directions are useful for cardiac catheterisation with an image intensifier and Optical viewer only.

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Costs and Delivery Times

Costs of above apparatus in India should be compared strictly under detailed headings as follows :—

1. *Generator*.—(Rs. 30-40,000).

3 phase or single phase, K. V. and M. A. ratings. Valve or metal rectification. Condenser smoothing device for cine.

2. *Table* 45° or 90° Trendelenburg (about Rs. 50-70,000). Single tube or two tube model. Moving top. Details of serial film changer.

Rotary cradle.

Ceiling or floor mounted over couch tube.

Tube with 0.3 mm. or 0.5 mm. focal spot.

3. *Image Intensifier* Size and No. of channels etc. (about Rs. 30-40,000).

4. *T-V. chain* with details of lines per inch, controls supplied, etc. (about Rs. 30-40,000).

5. *Cine camera* with details of synchronous motor, etc. (about Rs. 16,000).
Film density or brightness controls... (about Rs. 18,000).

6. *Cine projector* with film splicer etc. (about Rs. 15-18,000).

7. *Cine Developer outfit* with dryer (about Rs. 3-4,000).

Freight, Insurance, Customs duty, installation charges, clearance charges, etc. must be given.

The time taken to get Import licences, Customs clearance permits, etc. must be ascertained (about 3 months).

The time of delivery at the foreign port, the shipping time, and the installation must be ascertained.

The facilities for servicing the apparatus in India may be judged by finding out the number of foreign trained service engineers that the company has in your local area.

The value of the stock of spare parts held by the company in India will give us an indication of the speed with which replacements etc. are likely to be effected.

Facilities for replacement of tube inserts in India are useful.

The guarantee terms and period must be known. No firm guarantees the tubes, but most allow concession on replacement of tubes that break down after very little use.

Tropicalisation of equipment is important especially with electronic gear.

For Installation of such apparatus in an air conditioned room of size at least 15×15×12' is needed and an adjacent dark room. Air conditioning is justified in order to preserve the function of electronic gear. It will usually not be possible to cope with both gastrointestinal and cardio-thoracic work in the same room. Two entirely different sets of apparatus may be planned from the start.

Last but not least sufficient money must be available to pay for the apparatus, and adequately trained radiographers and radiologists must have the time and ability to use it carefully, efficiently and economically. Hospital or departmental electrical and electronic engineers and technicians are almost essential for day to day maintenance work.

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Abstracts of Radiological Literature

J. A. Gleeson and P. G. I. Stovin, Mediastinal enterogenous cysts associated with vertebral anomalies, *Jour. Fac. Radiologists*, January 1961, Vol. 12, 41-48.

Three cases of mediastinal enterogenous cysts associated with cervico-dorsal spinal vertebral anomalies are described. Cases from the recent English and American literature are analysed.

Most cases present in the first decade of life and usually within the first year. Sometimes symptoms date from birth. Presenting symptoms are variable, but are grouped under 5 headings.

1. Respiratory: Cyanotic attacks, dyspnoea, stridor, respiratory infection, hemoptysis or combinations of 2 or more of these.

2. Gastrointestinal symptoms: Haemorrhage into the alimentary tract, pain in abdomen related to meals or combination of these.

3. Neurological symptoms are more rarely encountered. Symptoms suggestive of cord compression in one case, spinal malformation such as myelocoele in another case.

4. Skeletal deformity is rarely the cause seeking medical attention.

5. An incidental finding on a routine chest x-ray.

The cyst usually lies on the right side in the posterior mediastinum. A left sided cyst was present in their third case. An x-ray may show the presence of gas and a

fluid level, in which case the cyst communicates with the intestine, and is in reality a duplication of part of the intestine. Occasionally calcification is seen in the wall of cyst. A radiograph will show the vertebral anomalies. Tomography is of special value in studying the vertebral anomalies in the Klippel-Feil syndrome. Chest x-rays may show secondary lung changes, such as emphysema, collapse, and pneumonic changes. In cases of gastrointestinal haemorrhage, in infants, x-ray of cervicodorsal spine may show an anomaly indicating probability of an intestinal duplication. Barium swallow demonstrated para-oesophageal diverticulum or an anterior displacement of the oesophagus. Barium meal and follow-through has not proved useful in the diagnosis of cases with intestinal symptoms. Myelography may reveal a diasternatomyelia.

The vertebral anomalies associated with mediastinal enterogenous cysts have been either hemi- or bifid-vertebrae, occurring usually in the cervical or upper thoracic region. The defect is due to a persistence of the neur-enteric canal either in toto, in part or its incomplete resorption with the persistence of adhesions between the spinal cord and the gut.

S. N. Deboo, Bombay.

Melvin L. Samuels, Clifton D. Howe, Gerald D. Dodd., Lilian M. Fuller, C. C. Shullenberger and William L. Leary, Endobronchial Malignant Lymphomas, A report of 5 cases in adults, *Am. Jour. Roentgenol.*, Jan. '61, Vol. 85, 87-95.

Four cases of malignant lymphomas presenting as mass endobronchial lesions and one case presenting as bronchostenosis are presented. Literature on the subject has been ably reviewed. The disease is characterised by a persistent dry irritating cough, frequently quite severe, and associated with dyspnoea. Hemoptysis was the initial complaint in case IV. The physical and roentgen findings are of atelectasis, but other potential causes of collapse must be excluded by detailed clinical histories. The atelectasis may be lobar or segmental or may involve the entire lung. Detectable mediastinal lymphadenopathy need not be present, nor is the lung collapse often related to mechanical pressure by enlarged or matted lymph nodes.

Bronchoscopy revealed obstructive nodular lesions in 4 cases and an extramucosal constriction in the remaining case. Bronchoscopic biopsy was definite in one case only.

Roentgen finding of Case I showed complete atelectasis of the left lung. Case II showed massive opacification of the left lung with a shift of heart and mediastinum to the left. Case III showed a large mediastinal mass, predominantly left sided and a definitely enlarged right hilar shadow. Case IV showed a large thick-walled cavity in the right parahilar area with a zone of solid infiltrational inferiorly and medially. Case V showed a right hilar and mediastinal mass with infiltration in the right lung.

The preferred treatment here is roentgen therapy, either in palliative or definitive fashion, depending on the general condition of the patient and the degree of spread. A tumour dose of 3000 r in 3 to 5 weeks with an additional 1000 to 1500 r to residual masses, is required to achieve sterilisation. Doses when delivered initially in this manner seldom result in recurrence in the

treated area. Failure to give such doses may result in recurrence of the disease in the treated area with complicating endobronchial involvement. This was believed to have occurred in 2 of the presented cases.

S. N. Deboo, Bombay.

Sten Cronqvist. Renal Osteonephropathy, *Acta Radiologica*, January 1961, Vol. 55, 17-31.

There are skeletal changes in association with chronic renal disease. Two types of skeletal changes in connection with chronic renal insufficiency, each of which appears to have a different pathogenesis, have been described. One type occurs in children, the changes are regarded as rachitic, and the term renal rickets is used. These are of 2 types, the rachitic and the wooly type. In the former, the changes were considered identical with those of rickets, in the latter they were thought to be characteristic of renal infantilism.

In adults with chronic renal insufficiency, the osseous alterations were found to coincide with those seen in osteitis fibrosa cystica. In advanced cases, the roentgenographic appearance was identical with that of hyperparathyroidism.

The lesions resembling those seen in rickets occur before the closure of the epiphyseal line, the changes resembling osteitis fibrosa cystica occur after the closure of epiphyseal line. Before closure of the epiphyseal line, the lesions are limited to the distal parts of the long bones, especially the radius and the ulna, where the metaphyses are increased in width and cupped, and in advanced cases, there is general rarefaction, obliteration of compact bones and coarsening of the trabeculae in cancellous bone.

Deformation of limbs may occur following epiphyseolysis, at times resulting in dwarfism.

A generalised or granular decalcification may also be seen in adults. Subperiosteal erosion is common, and is seen both in renal rickets, and in hyperparathyroidism, and in renal osteodystrophy, the change is mostly located in the middle phalanges of the fingers, but is also seen in the medial part of the upper third of tibia, in the corresponding parts of the humerus and femur, in the acromion and lateral end of the clavicle and the distal part of the ulna.

In advanced cases, published in recent years, the changes consisted of osteosclerosis, involving the major part of the skeleton, but is most frequently localised to the spine, especially lumbar spine. The changes may involve the entire spine, but they may also be localised to a single vertebra.

Roentgen examination may also show metastatic calcification of soft tissue in

various regions. They may be physiologic vascular or pathologic. 7 cases are reported with histories.

S. N. Deboo, Bombay.

F. H. Kemp and F. W. Bright, Biloptin—Report on preliminary trial, *Br. Jour. Radiology*, January 1961, Vol. 34, 63-64.

The authors describe a trial of Biloptin, the cholecystographic medium in 88 cases, 49 had six capsules in one dose the evening before the examination, and 39 had 12 capsules, six the evening before, and six at 6 a.m. on the day of the examination. Of the 88 patients, in abdominals, with 12 capsules, 2 showed nausea, one showed vomiting, and one showed diarrhoea. In only one there was a severe reaction, where the patient had colicky abdominal pain.

Table of radiographic appearances following Biloptin.

Table of radiographic appearances following Biloptin.

Particulars	6 Capsules		12 Capsules	
	Normal	Abnormal	Normal	Abnormal
Gallbladder:				
Good Filling ...	35	3	28	6
Poor Filling ...	2	4	—	3
No Filling ...	Nil	5	—	2
Gallbladder:				
Stones ...	—	8	—	5
Papillomata ...	—	—	—	1
Aschoff-Rokitansky ...	—	—	—	1
Common Bile-duct (as seen on first films and not after a fatty meal:				
Good ...	—	—	14	2
Poor ...	6	2	14	6
Pyclogram obtained ...	—	—	—	1

The impression of the authors is that more gallbladders filled with stones are demonstrated with this medium than with Telepaque. The results show that Biloptin is a safe and reliable medium for cholecystography. The shadow given by Biloptin is more homogenous in the gallbladder than that from other contrast media and does not appear to form layers as readily as Telepaque, though layering of calculi has been shown. They feel that it is easier to demonstrate calculi and papillomata as negative filling defects with this medium.

The performance of barium meal immediately following the taking of cholecystographic films shows that it has not been interfered with by the medium except when nausea has occurred, the stomach is slow to commence emptying.

S. N. Deboo, Bombay.

J. Colquhoun, Adenomyomatosis of the gallbladder (Intramural diverticulosis), Br. Jour. Radiol. February 1961, Vol. 35, 101-112.

Adenomyomatosis is a hyperplastic condition of the epithelial and muscular elements of gallbladder wall. It is thought to predispose to stone formation and cholecystitis, but may be found without either. Chronic infection will give rise to fibrosis which may cause further thickening of the gallbladder wall. Intramural stone and abscess formation are complicating factors, which may lead to perforation of the gallbladder wall. Malignant changes are rather very rare. In 7 to 10 per cent of cases of adenomyomatosis, cholesterosis is found.

It is probably a degenerative condition, the incidence increases with age. The lesions are of main 3 types—generalised, segmental and fundal. The segmental type

almost always forms a stricture, and when stones form, they are often incarcerated in the distal loculus. The gallbladder may be permanently kinked at the site of the stricture, or at the junction between the normal part of the gallbladder and the thickened adenomyomatous part.

It may be demonstrated by oral or intravenous cholecystography. The use of the newer oral contrast media which leave little or no residues in the gut is preferable. Rokitsansky-Aschoff sinuses may be demonstrable radiologically if they are fairly large, provided the necks of the sinuses are not occluded, and the sinuses are not obstructed with debris, stones or bile pigment. They are seen best after the gallbladder has contracted about half an hour after fatty meal, appearing as bead like shadows forming a rim around the gallbladder or in a cluster at the site of the stricture or at the fundus. In some cases, they will be separated from the main gallbladder shadow by a translucent zone. Occasionally a narrow neck is seen connecting a diverticulum to the rest of the gallbladder lumen. The contraction after a fatty meal is usually excessive and may empty the gallbladder completely. Visualisation of the dilated Rokitsansky-Aschoff sinuses is not essential for diagnosis of adenomyomatosis. The nature of the fundal deformities or septa may suffice. The condition may be suspected when persistent angulation of the gallbladder is found. Irregularity of the gallbladder outline associated with good concentration and contraction is also suggestive. Congenital anomalies of the gallbladder should be regarded as rare and no deformity should be dismissed as an anomaly until adenomyomatosis has been excluded, preferably by a histological examination.

Of the present 38 cases of adenomyomatosis, 18 percent were generalised, 40 per

cent were segmental, and 42 per cent were fundal.

S. N. Deboo, Bombay.

Yoe Ming Ting, Osteomyelitis of the spine, Radiology, January 1961, Vol. 76, 27-31.

Four cases of osteomyelitis of the spine are reported, 3 cases in which the causative agent was found and a fourth in which the organism was not identified.

The most prominent symptom is localised pain and point tenderness at the level of involvement. The lumbar spine is the most frequent site of involvement. In the cervical region, with prevertebral abscess formation, dysphagia and respiratory embarrassment may occur. If the abscess extends into the extradural space, compression of the spinal cord may result in paraplegia and quadriplegia.

The most common causative agent is staphylococcus aureus. In one of the 4 cases, Pseudomonas was found to be the causative agent which is considered rare.

The films of the spine show areas of localised destructive changes in the anterior or lateral aspect of the vertebral bodies with associated narrowing of the intervertebral disc spaces. The destruction is seen to extend throughout the entire superior and inferior intervertebral disc plates. Near the areas of localised destruction, there is usually parosteal calcification and reactive new bone formation. This new bone formation or proliferative change takes place early in the course of the disease almost simultaneously with destructive changes. There may be associated abscess formation in the soft tissues in the pre or paravertebral area. In the healing stage, there are further new bone production, increased

sclerosis and large osteophytes bridging the involved vertebrae. Calcification and ossification of the anterior and lateral longitudinal ligaments often accompany healing.

Treatment consists in immobilisation of the involved part of the spine and the proper use of the antibiotics for the causative bacteria as determined by sensitivity studies.

S. N. Deboo, Bombay.

James Cleon Hunt and David G. Pugh, Skeletal lesions in neurofibromatosis, Radiology, January 1961, Vol. 76, 1-20.

Most of the skeletal defects in neurofibromatosis are expressions of the mesodermal dysplasia. Of the 192 cases of neurofibromatosis included in this study, 97 (51 per cent) displayed some skeletal abnormality. They are as follows:—

Severe angular scoliosis with dysplasia of vertebral bodies (14 cases).

The severe kyphoscoliosis is distinguished by predominance of the kyphotic element over the scoliotic phase, the primary curve being most frequent in the thoracic portion. The vertebral dysplasia may be accompanied by erosion of the intervertebral foramina caused by neurofibromas of the spinal nerves. These neurofibromas are dumbbell in shape and the intraspinal part may erode the posterior wall of the vertebral body. Ribs arising from the abnormal vertebrae are attenuated.

(2) Defects of posterosuperior wall of orbit (13 cases). The defect consists of absence of or failure of development of that part of the membranous bone separating the cranial contents from those of the orbit. Without the rigid normal orbital bulwark, the vascular pulsations of the brain are transferred to

the orbit leading to progressive exophthalmos, and to a grotesque facial deformity and loss of vision in the affected eye. The x-ray shows an enlarged orbit, with a "blank" appearance, with loss of the usual landmarks, temporal line being absent and the sphenoidal ridge elevated. Maxillary antrum may be small. Anterior and posterior clinoids may be absent or deformed. Rarely associated defects of the calvarium are seen.

(3) Disorders of bone growth with elephantoid hypertrophy of overlying soft tissue (18 cases). In lower extremity, sinuous elongation of the underlying long bones is present with a wavy irregularity of the cortex, a coxa valga of the femur, and dysplasia of femoral epiphysis.

(4) Congenital bowing and pseudarthrosis: (4 cases). The bowing of the bones in the leg is in an anterior direction. Pseudarthrosis is seen near the junction of the middle and lower thirds of tibia, and fibula and in the clavicle, and in femur.

(5) Erosive defects of bone caused by contiguous neurogenic tumours (36 cases).

(6) Intrathoracic meningoceles (1 case, unproved) Other skeletal defects not characteristic, but possibly representing mesodermal dysplasia: (33 cases) Mild scoliosis, intraosseous cystic lesions.

S. N. Deboo, Bombay.

Irvan Yentis, Radiological aspects of myelomatosis, Jour. Fac. Radiologists, January 1961, 1-7, Vol. XII.

There are 3 varieties, the main first variety is in bone marrow (a) multiple myeloma (b) solitary myeloma. There are 2 other varieties (i) extramedullary myeloma (ii) plasma-cell leukaemia. The lesions are

multiple, arising primarily in the medulla either as nodules of growth or as a diffuse plasma-cell infiltration. They destroy bone trabeculae, erode cortex secondarily from within, tend to expand bone, tend to breach the periosteum, and form soft tissue mass. They tend to facilitate a pathological fracture.

The punched-out clearcut, rounded translucencies typical of myelomatosis are seen best in the skull vault, where the bone is thin. The internal erosion of the cortex may produce a characteristic sharply scalloped appearance. Osteolytic foci may coalesce to form large areas of destruction which invite pathological fracture. Mandibular deposits are common. Soft tissue extensions are so frequent that their presence is a useful pointer to diagnosis, particularly so in the ribs where they form subpleural nodules and masses. Taking the skeleton as a whole, pathological fractures occurred in 62 per cent of the patients. Myelomatous destruction of a vertebra may produce a paraspinal soft tissue mass. The appearances may be confusing, but a myeloma should be considered when the destructive features of a secondary deposit are combined with the tuberculous tendency to form a paravertebral swelling.

Occasionally a plasma-cell tumour may show a trabeculated appearance, such a lesion, if single, may simulate an osteoclastoma. A very common feature of bone change is osteoporosis, seen best in the spine, where the uniform trabecular absorption and cortical thinning are often associated with vertebral collapse. Less frequently a coarse type of change is found which may lead to an extensive honey-combed pattern of bone destruction.

It has been suggested that a solitary benign plasma-cell myeloma exists which is unrelated to multiple myeloma, and is said

to be free from the risk of recurrence or dissemination and so curable by local surgery or radiotherapy. The author feels that such apparently localised lesions, whether in bone or soft tissue are part of a generalised disease. Therefore there are no clear-cut boundaries between various forms of myelomatosis; the threat of frank dissemination hangs over every patient with a "solitary" lesion.

S. N. Deboo, Bombay.

Saul A. Rosenberg, Henry D. Diamond and Lloyd F. Craver, Lymphosarcoma: Survival and the effects of Therapy, American Jour. Roentgenol, March 1961, Vol. 85, 521-532.

A review has been completed of histologically proved cases of 1269 cases of lymphosarcoma. They are divided into 3 groups Giant follicular lymphosarcoma 162 cases; Lymphosarcoma 553 cases; and reticulum cells sarcoma 554 cases.

Age and sex distribution shows the preponderance in males. The greatest number of cases is seen during the fifth decade of life, and the median age for the entire group is 49.7 years.

There is an apparent leukemic transformation in this group of diseases, and the fact that such a transformation can occur is important. 7.6 per cent of total group demonstrated leukemic changes. This occurred more often in children, the changes were seen less often in reticulum cell sarcoma than in other histological categories. There is a group of patients showing atypical leukemic pictures, often with recognisable sarcoma cells in the bone marrow and peripheral blood.

The objective and subjective response to treatment is presented for radiation therapy

1102 cases, alkylating agents 326 cases; antimetabolic drugs, 41 cases; Adrenal steroids and/or ACTH 158 cases; and radioactive phosphorus 71 cases.

The first course of radiation therapy resulted in objective improvement in 78.4 per cent of 1102 patients, the benefit was complete. The second course of treatment gave almost equal results. In most cases, the usefulness of radiation therapy was limited by the general spread of the disease, by increased radioresistance of the tumour and diminished tolerance of the patient.

Of the alkylating agents (Nitrogen mustard and related drugs) in only 2 instances there was complete benefit. Objective benefit was observed in 19.3 per cent. Of the antimetabolic drugs, objective benefit was observed in 29.3 per cent, and it was partial only. Of the Adrenal steroids and ACTH, in 8.9 per cent of cases, partial benefit resulted. Of the use of radioactive phosphorus, 14.1 per cent showed objective improvement. In the group of radical surgery, the data indicate that the non-surgically treated group did significantly better than those treated with surgery.

Complications: Of the 1102 patients, who received radiation therapy, 1.9 percent developed radiation osteitis, radiation pneumonitis and fibrosis, skin ulcers, severe iritis and glaucoma. The use of alkylating agents resulted in irreversible bone marrow damage, in 3.1 per cent. Bone marrow aplasia was encountered in 2.4 per cent of the people who received antimetabolite drugs. 10.1 per cent of the persons who received adrenal steroids or ACTH developed gastrointestinal ulcers, bacterial infections, psychoses, severe fractures and aggravation of diabetes. Of those who received radioactive phosphorus, 15.5 per cent developed irreversible bone marrow aplasia.

It is concluded that radiation therapy remains the treatment of choice for lymphosarcoma.

S. N. Deboo, Bombay.

R. C. S. Pointon, Chemotherapy of multiple myelomatosis, *Jour. Fac. Radiologists*, January 1961, Vol. 12, 17-19.

The disease is universally fatal, death occurs within 24 months of the onset of the disease. The treatment is therefore palliative and at present remains unsatisfactory. Various drugs are used in the treatment such as diamidine compounds, Urethane, alkylating agents, ACTH and adrenocortical hormones.

Among the diamidine compounds, Stilbamidine shows a subjective improvement in the condition. It is given intravenously, the patient being on a diet low in animal protein. This is followed by generalised itching, and a fall in blood pressure. A late sign is the development of a dissociated anaesthesia, in the distribution of the trigeminal nerve. It has also an adverse influence on the function of the kidneys. It relieves bone pain either partially or completely. 2-hydroxystilbamidine did not produce trigeminal neuralgia and had no unfavourable influence on kidney function. The relief of pain was marked in 7 cases. While these compounds may relieve bone pain, they have no effect on the disease. Recently a new compound is reported—M. & B. 938, where one patient had complete relief of symptoms and recalcification of bone lesions, but no further evidence of this compound is published.

Urethane is given orally, starting daily dose is 4 to 6 gms, treatment being given as long as improvement is maintained or toxicity prevents further treatment. It produces vomiting, leucopenia.

Alkylating agents, such as Nitrogen mustard have little effect on the condition. But when given with urethane—R. 151, it produces relief of bone pain, and improvement of anaemia, and evidence of bone healing. When Nitrogen mustard was combined with urethane the patients were rendered symptomless for approximately 12 months.

With ACTH and Adrenocortical hormones, subjective improvement may be obtained with occasional improvement in the hyperglobulinaemia and proteinuria. Their main effect appears to be in improving the anaemia and inducing a sense of well-being.

In conclusion, they say that there is as yet no really effective chemotherapeutic agent for treatment of multiple myelomatosis. Urethane in combination with Nitrogen mustard is most effective. Radiotherapy therefore remains the principal method of palliation, and chemotherapy should be reserved for cases where radiotherapy has failed to produce palliation.

S. N. Deboo, Bombay.

J. F. Bromley, Myelomatosis and the radiotherapy, *Jour. Fac. Radiologists*, January 1961, Vol. XII, 8-16.

The author reviews a series of 87 patients suffering from myelomatosis. Backache is the main symptom, others are bone pains, chest symptoms like cough, bronchitis, pains like pleurisy, certain forms of haemorrhage, such as haemoptysis, epistaxis, haematemesis. Other patients showed a painful lump on the sternum.

Of the various diagnostic tests, examination of the bone marrow is the most reliable single test. It is the sternal marrow examination which reveals the true nature

of the illness. The radiologist may draw attention to previously unsuspected possibilities of cystic or osteolytic areas in bones

result as effectively as larger doses which may involve troublesome skin reactions.

S. N. Deboo, Bombay.

There are different methods of treatment, but in the present state of our knowledge, there is no one successful method of treating the disease. They are (1) No treatment: here one woman was alive at 3 years, others survived for 36 months. (2) Surgery only: this was undertaken where the tumour was apparently solitary and its true nature was not apparent or when the diagnosis was in error. (3) Transfusion: this is a supporting treatment at all stages, so that all treatment methods will include transfusion at some stage. (4) Urethane: here the longest survival was 34 months. (5) Stilbamidine one patient survived a week, and the other 14 months. (6) Nitrogen mustard: Here one patient lived for 13 months, the other survived six months only. (7) Cortisone, T. E. M. and Cytamen: here the longest survival was 12 months. (8) Radiotherapy: 32 patients were treated by radiotherapy. 31 were by x-rays and one with P. 32. Five are alive and well at 4, 5, 6, 8 and 9 years respectively.

The author believes that radiotherapy offers the most effective method of relieving and keeping the patient moving. Dosage is very variable. The solitary or apparently solitary tumour is worth a more radical dosage, even in the presence of a positive bone marrow examination. In the presence of severe anaemia and weakness in the age groups, it is a mistake to aim for the higher doses. Our ideal is to keep the patient free from pain and encourage him to leave his bed. The bedfast patient is the one who quickly succumbs from complications such as renal failure. Tumour doses of the order of 1000 r over 10 to 14 days to individual painful lesions in bone can achieve this

M. Lederman, Radiotherapy of malignant melanomata of eye, *Brit. Jour. Radiology*, January 1961, Vol. 34, 21-42.

Pigmented tumours of the eye may arise from a variety of cells (a) the Schwann cell (b) naevus cells (c) basal cells of skin and conjunctiva (d) the stromal cells of the Uvea (e) pigment epithelium of the retina, ciliary body and iris (f) the dendritic pigment cells of the leptomeninges. The malignant melanomata arising from the limbus and conjunctiva are sometimes preceded by a benign mole, but most of them arise de novo. Many of the patients suffering from malignant limbal melanomata are women, who seek advice at or about menopause. The possibility of a hormonal factor has to be considered in these cases.

The malignant melanoma arising from the melanoblasts of the basal epithelium of the conjunctiva is radiosensitive, where as the intraocular melanoma which is of neuroectodermal origin is radio-resistant, according to the experience of the radiation treatment by the author. The melanoma arising from the skin of the lid is radio-resistant.

In intra-ocular malignant melanomata, the treatment of choice must remain surgical, but there are indications for radio-therapy namely (a) the recurrent cases no longer amenable to further surgery (b) the inoperable cases (c) post-operative cases (d) monocular cases. The technique of treatment of the recurrent or post-operative case involves irradiation of the socket and orbital tissues. Technique of treating monocular patient resembles that employed in

treatment of retinoblastoma and metastatic carcinoma of the choroid.

In radiation treatment of the epibulbar melanomata, local excision of any exuberant tumour is an essential preliminary to radiation treatment. Here 4 technical methods of treatment are available (1) β radiation (2) γ radiation (3) β and γ radiation in combination (4) x-radiation. An x-ray technique has recently been developed for irradiation of the whole conjunctival sac and lids using indirect and partial protection of the cornea, using a dose of 5000 r in 3 weeks at 140 kV, H. V. L. 8 mm of Al. In low voltage x-ray therapy (60 kV) with a protective shield into the conjunctival sac, a surface dose of 6000 r is given in 10 to 14 days. The complications were (1) cataract (2) epilation of the lashes (3) atrophy of the lids and fibrosis (4) glaucoma is uncommon (5) 4 cases of corneal damage (6) loss of eye in 9 cases.

S. N. Deboo, Bombay.

Ward A. Soanes, Robert S. Cox Jr. and John R. Maher, The Effects of roentgen irradiation on adrenal cortical function in man, Am. Jour. Roentgenol, Jan. 1961, Vol. 85, 133-144.

Nine cases of patients with testicular tumours receiving therapeutic doses of roentgen rays to the region of the adrenal gland are presented. The 17-ketosteroid and 17-hydroxycorticosteroid excretion studies were carried out prior to the initiation of radiation therapy, during therapy, and for a follow up period. Adrenal steroidogenesis was evaluated by the response of the adrenal to stimulation with 40 units of ACTH administered intravenously over a ten hour period on one day or on 2 successive days.

Surgical orchiectomy was performed by the usual procedure and retroperitoneal

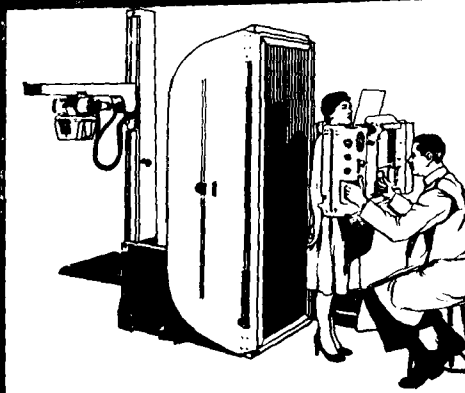
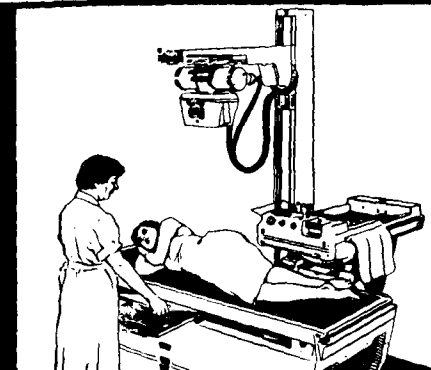
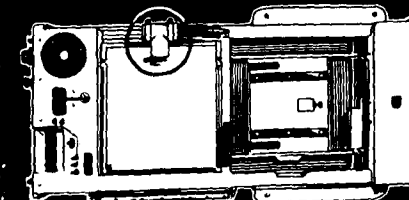
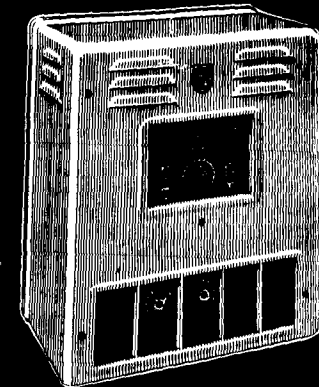
lymph node dissection was also done in cases I, VI, VII, and VIII. Postoperatively the adrenal glands were anatomically defined, using the upper poles of the kidney shadows on a flat roentgenogram of the abdomen as a guide for their location. Perimeters of portals for radiation therapy were outlined, care being taken to ensure that the renal shadows were within the confines of the portals. Treatment was then administered with the following physical factors: 220 kV, 0.5 mm. Cu. 1 mm. Alfilter, 1.35 mm. Cu. half-value layer, 15 m. A., 70 cm, target source distance, 21.6 r/min (air). Paired anteroposterior and posteroanterior fields were irradiated on alternate days.

The data indicate a variable degree of enhancement of adrenal cortical steroidogenesis during or immediately following radiation therapy to the adrenals. The data indicate that the administration of more than 2000 r tissue dose to the adrenals produces increased adrenal cortical steroidogenesis during irradiation in response to the one-day intravenous ACTH stimulation test. Less than 2000 r tissue dose produces no impairment or stimulation of adrenal steroidogenesis as measured by one or two day intravenous ACTH Stimulation. Administration of 2000-3000 r tissue dose produces a transient stimulation with a simultaneous loss of adrenal cortical reserve as shown by intravenous ACTH administration on two consecutive days. More than 3000 r tissue dose results in transient stimulation followed by subsequent adrenocortical impairment as manifested by one day of ACTH administration. Following 3500 r tumour dose, the adrenal glands still appear to have a normal amount of steroidogenesis under non-stress conditions, but their ability to respond to stress is markedly limited.

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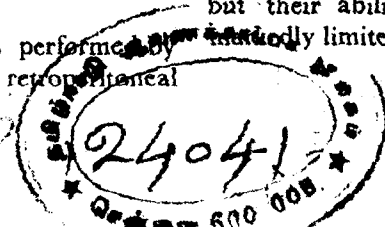
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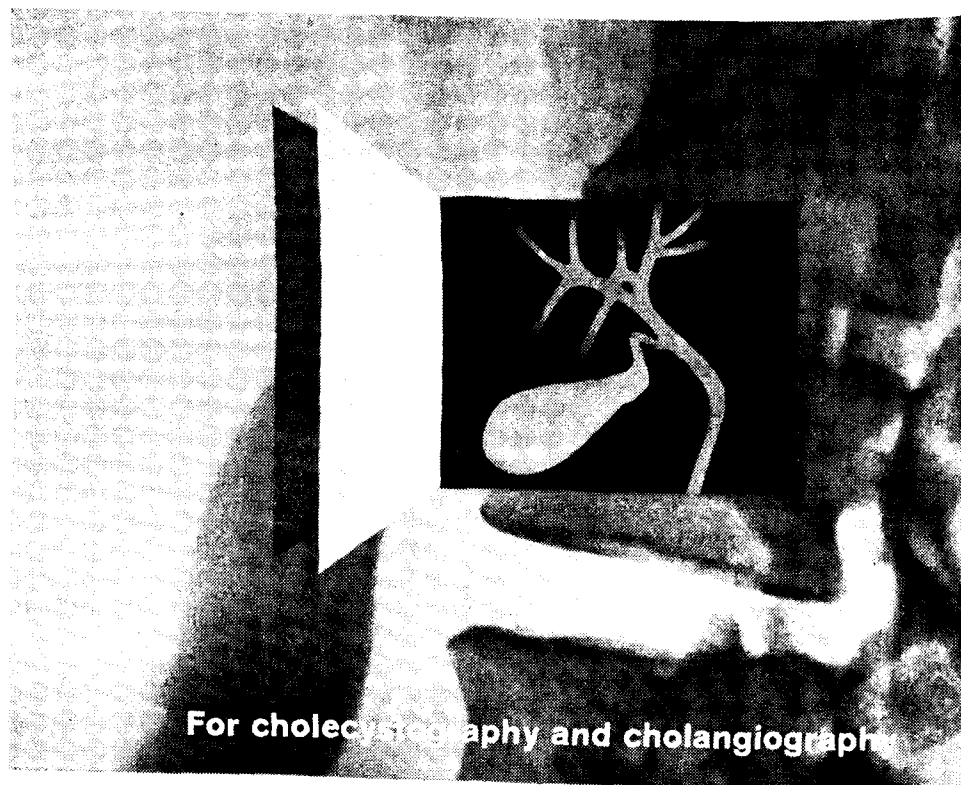
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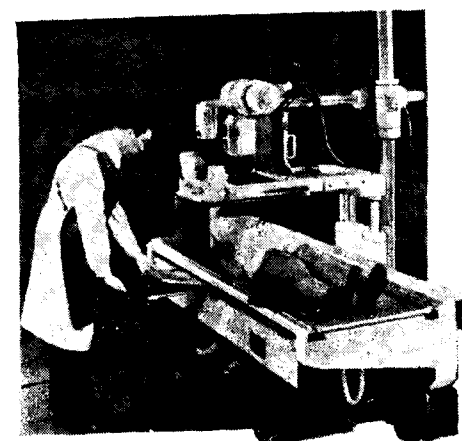
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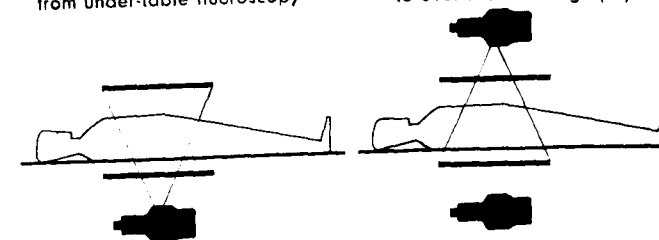


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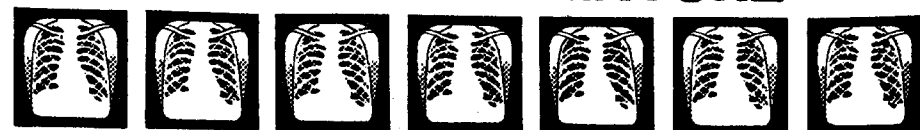
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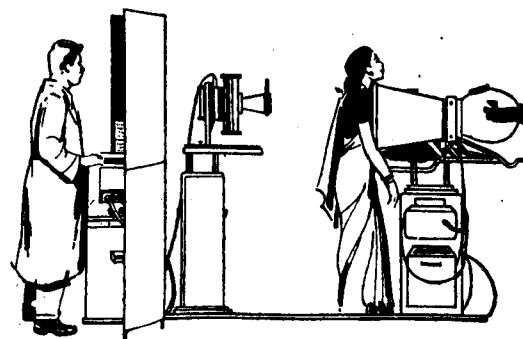


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