

RADIOLOGICAL EXAMINATION OF THE LIVER IN CASES OF SUSPECTED AMŒBIC ABSCESS.

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Quetta.

A PERUSAL of the more recent textbooks which deal with tropical diseases reveals the fact that the radiographic diagnosis of amœbic abscess has scarcely been considered at all. To me this omission seems a great pity. There are certainly many cases where the *x*-ray method, carefully carried out, may afford the greatest help. These may be conveniently classified as follows:—

(i) *The obscure case without well-marked symptoms.*—A patient comes to hospital complaining of vague subcostal pain, slight temperature, headache, furred tongue. There may or may not be a history of dysentery. Laboratory examination of the stools may reveal nothing abnormal. Perhaps the blood picture is inconclusive and the total leucocyte count may be about 12,000 to 14,000 per c.mm. The blood is often negative to malarial parasites. Clinically there may be sufficient signs to warrant a diagnosis of either (a) hepatitis, (b) diaphragmatic pleurisy, (c) gall-stones, or possibly of simple intercostal neuralgia, or again of a small liver abscess. What then can radiology do? The clinician has little to fear from either hepatitis or a simple diaphragmatic pleurisy. He is more concerned with the exclusion of gall-stones, cysts, liver abscess, local pleurisy with small effusion, or possibly malignant disease. In those cases surgery may have to be employed, and it is in such a case that *x*-rays will usually afford him the greatest help. Radiology will often decide for him whether the case is a surgical one or not. It may be pointed out at once that the *x*-ray findings are only contributory links and must be taken into consideration with the rest of the chain of evidence. The *x*-ray link may be the most powerful of all.

(ii) *Cases which have been diagnosed as hepatitis.*—The physician has made a diagnosis of hepatitis, yet for some reason progress, in spite of emetine, is slow. He wants to know whether there is some other condition present as well, to explain the lack of reaction to treatment. The radiologist may be able to give valuable assistance in this way. Suppose he finds both domes of the diaphragm of normal contour, and elevation, and moving actively with respiration and with perfectly clear lung-fields above, then he is justified in stating that there is no *x*-ray evidence of either pleurisy with effusion, basal pneumonia, or liver abscess affecting the diaphragmatic surface. The exclusion of such conditions is valuable in giving a prognosis on the case. If on the other hand the radiologist finds a high dome, displacement of the heart, local bulge and dome fixation and definite obscuring of the basal lung fields or possibly a costo-phrenic or cardio-phrenic fluid

line, then it becomes at once apparent that the case is something more than a simple hepatitis, and the question of employing the exploratory needle for either liver or pleura will have to be decided. The *x*-ray findings will help in this decision, as it is usually difficult to mistake free fluid or pus in the pleura for anything else.

After radiological examination of a number of cases of liver abscess, I have come to the conclusion that a fair sized abscess of the liver, adjacent to the right dome of the diaphragm, always produces a basal œdema of the lung. With a soft *x*-ray tube and an electric current of 3-4 m.a. this can usually be demonstrated on the fluoroscopic screen, provided the other lung is normal and lights up well to enable a comparison to be made.

(iii) *Cases in which a doubtful diagnosis of liver abscess has been made.*—These are the cases which have been diagnosed clinically and the surgeon seeks radiological confirmation before operating. Also he wishes to exclude possible complications, especially with regard to the adjacent lungs and pleuræ. These radiological examinations are important, and may reveal the unexpected. One case in my experience had a quiescent tubercular focus in the left lung apex. Another had a whole rifle bullet behind the heart. Another had a small metal screw (inhaled) near the diaphragm. Another had a calcified hydatid in the lung, and yet another had an un-resolved pneumonic patch at the lung base. These are cases which may give rise to no symptoms, therefore it is well to have an *x*-ray investigation before operation.

THE RADIOLOGICAL EXAMINATION.

Posture.—The patient is first *x*-rayed on the couch lying face downwards. The tube target is centred over the 5th dorsal vertebra. Two photographs are taken, one in inspiration and one in expiration. The patient holds his breath during the exposure, which should be as short as possible. A further photograph is taken with the patient lying on his back. Centering is effected over the centre of sternum opposite the fourth costo-chondral junction. This photograph is taken in inspiration.

Next, if the patient is not too ill, he is examined in the upright position (fluoroscopic) for about three minutes, and a rapid inspection made of the region of the domes of the diaphragm. If the patient is too ill this examination may be made in the sitting position. In routine examination I do not think stereography or teleo-rœntgenography are necessary.

Although cases vary considerably, I think if the investigator will look for the signs tabulated, he will be able frequently to give useful information to the clinician.

Cases examined radiologically.—Forty-two cases were examined radiologically during the period 1st May 1925 to 1st May 1928. Out of these cases five were reported as liver abscess

and three of these were subsequently proved to be such at operation. Twenty-three cases were definitely reported negative to liver abscess. Of the remaining fourteen cases eight were suspected clinically of having gall-stones; these eight were negative radiographically to liver abscess or gall-stones and they got well subsequently without operation. Out of the remaining six cases examined the *x*-ray signs were indefinite in five, and one case was diagnosed hydatid of the liver, and the cyst was demonstrated on the *x*-ray film.

Radiological findings in the Routine Examination of cases suspected of Amœbic Abscess of the Liver.

Normal.	Hepatitis.	Liver abscess.
(1) Lung fields clear.	Lung fields may or may not be clear.	Lung fields usually obscured at the right base.
(2) Diaphragm silhouette clear.	Diaphragm silhouette may or may not be clear.	Diaphragm silhouette (right) usually obscured.
(3) Diaphragm movement range may reach 2 inches.	Diaphragm movement range rarely more than 1 inch.	Diaphragm movement range (right) practically always under 1 inch and commonly practically immobile.
(4) Diaphragm, no local bulge.	Diaphragm, local bulge.	Diaphragm often local bulge on right dome.
(5) Palpation, no subcostal pain.	Palpation, subcostal pain usual.	Palpation, subcostal pain may be considerable.
(6) Diaphragm silhouette always seen.	Diaphragm silhouette always seen.	Diaphragm silhouette may be completely obscured.
(7) Heart and lungs no displacement.	Heart and lungs no displacement.	Heart and lungs may be displaced.
(8) See-saw movement never present.	See-saw movement not usual.	See-saw movement (right dome up and left dome down) may be present.
(9) No lung complications present.	Lung complications rare.	Lung complications (pleurisy, etc.) are not uncommon.
(10) Diaphragm position normal.	Diaphragm position usually normal.	Diaphragm often abnormally high.

REMARKS.

1. The diaphragm range is measured on the screen with a compass.
2. The trunk-vertical position is the best.
3. The fluoroscopic part of the examination need not take more than a few minutes.
4. An opinion cannot be given on fluoroscopy alone. Skiagrams are essential.
5. In fluoroscopy use an electric current of 3 m.a. I found that larger currents are unnecessary; besides they may give rise to screen-lag.

CONCLUSIONS.

In cases suspected of liver abscess the *x*-ray method of examination affords valuable information in the following manner:—

(a) A doubtful diagnosis of amœbic abscess made on the clinical signs may be cleared up.

(b) The presence or absence of lung complications may be indicated.

(c) Cases negative to amœbic abscess, radiographically usually yield to non-operative measures, i.e., emetine, etc.

(d) The *x*-ray examination aids prognosis, e.g., lung complications add to the gravity of the disease and clear lung fields are indicative of more favourable prognosis.

(e) Within my experience no case where the *x*-ray evidence was wholly negative has subsequently been proved to have been a case of amœbic abscess.

PARIS GREEN AS AN ANOPHELINE LARVICIDE.

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THIS paper has been written mainly for the information of practical malariologists and in it the observations on Paris green of Drs. Gosio, Missiroli, Chalam, Hacket, Dalal and others as well as of our own have been put together. The merits and demerits of this remedy and its probable cost of operation in Bengal have been discussed, which may be of interest to the field workers.

Paris green or Schweinfurt's green is a chemical compound of arsenic, copper and acetic acid. Its chemical name is copper aceto-arsenite, its formula being $3 \text{ Cu H As O}_3 + \text{Cu} (\text{C}_2 \text{ H}_3 \text{ O}_2)_2$. It is therefore a double salt of copper arsenite and acetate. It is a microcrystalline powder of emerald green colour. It is practically insoluble in water. It is perfectly soluble in ammonia and concentrated acids. In the pure state it contains 58.6 per cent. of arsenious anhydride ($\text{As}_2 \text{ O}_3$). Paris green is often adulterated. The percentage content of arsenious anhydride should therefore be ascertained from the dealer when ordering it for larvicidal purposes. Some manufacturers guarantee it to contain 55 to 58 per cent. of arsenious anhydride.

It has been used with great success as an anopheline larvicide in America and Southern Europe. It has also been used with success by Dr. Chalam, Dr. Dalal and others in India.

For use Paris green is diluted with some inert dust in the proportion of 1 part of Paris green to 99 parts of road dust by weight. In the