POTT'S DISEASE OF THE SPINE WITH RUPTURE OF THE AORTA

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Death as the result of tuberculosis of the spine occurs with sufficient frequency to call for no special comment, but the clinical histories and causes of death in two patients recently treated in this hospital for tuberculous disease of the spine were of considerable interest. In the first case the diagnosis of tuberculous disease was proved, but in the second case there was some doubt.

Case 1. Mrs E. S., 22 years of age, was first seen by the local tuberculosis officer in 1943. Ulcerating tuberculous glands in the neck, previously treated in January 1942 by surgical excision and deep X-ray therapy, had subsequently broken down. Further conservative treatment had been recommended but had been refused by the patient. She was next seen in June 1945 with tuberculosis of the spine involving the tenth and eleventh dorsal vertebrae and the intervening disc. There was collapse of the bodies of both vertebrae (Fig. 3). Routine X-ray examination of the chest at that time showed a large mediastinal abscess pushing the trachea forwards (Fig. 1). This was thought to be a collection of tuberculous glands which was breaking down, or alternatively a paravertebral abscess arising from a tuberculous lesion in the upper dorsal spine, but there was no radiographic evidence of bone destruction at this level. The abscess ruptured into the oesophagus and caused mediastinitis. At that time the patient was very ill; there was pyrexia with a
temperature of 101°-102°F. She was treated on a plaster bed and her general condition improved. Radiographic examination after a barium swallow showed that the barium leaked out of the oesophagus and tracked downwards in the mediastinum (Fig. 2).

In March 1946 she was admitted to this hospital. Her general condition was poor. She had a hectic flush and evening pyrexia. She was thin and wasted, and her appetite was poor. There were scars of healed sinuses in the right side of the neck and a few small hard glands. No abscess was palpable and there was no paraplegia.

Immobilisation on a plaster bed and open air treatment was continued and although her general condition remained poor, and she developed oedema of the ankles, the spinal disease became quiescent and there was radiographic evidence of sound fusion of the affected vertebrae. Repeated X-ray examination of the upper dorsal region failed to show evidence of bone disease and the mass which had previously been noted was no longer evident. In November 1946 an abscess could be felt in the right loin; foul smelling green pus was aspirated and streptococcus viridans was grown on culture of the pus. No tubercle bacilli were found on film examination and no positive result followed inoculation into a guinea-pig. Later radiographic examination showed active disease of the body of the eighth dorsal vertebra with marked destruction and collapse (Fig. 4). The abscess refilled and was aspirated once more but nevertheless a sinus formed. There was marked anaemia (haemoglobin 30 per cent, red cells 1,800,000, colour index 0.85). Three transfusions of blood, one pint each, were given. Diarrhoea was persistent but there was no malaena and no frank blood in the stool.

On December 6, 1946, the patient suddenly felt faint. She passed three pints of blood per rectum. Shortly afterwards she passed another pint of blood. Then she died. There was no vomiting and no blood appeared in the mouth.
Post-mortem examination. At post-mortem examination a little free fluid was found in the peritoneum. There was a large abscess in the right loin extending to the mid-dorsal region. There was no dilatation of large or small intestine, and no blood within the gut, but there was a little staining of one part of the ileum. The stomach contained one and a half pints of blood, the pylorus being tightly contracted. A few tubercles were found on the walls of the small intestine. The spleen was small. The liver and kidneys were normal. In the chest a few pleural adhesions were present but there was no active disease in either lung. The heart was normal.

At the level of the eighth dorsal vertebra, and extending upwards for three inches, was a firm fusiform mass in which the oesophagus and posterior wall of the aorta were involved. There were many surrounding adhesions. This mass proved to be an abscess, the posterior wall of which was formed by carious vertebral bodies and the anterior wall by the remains of the oesophagus, which was almost unrecognisable, and the aorta. Perforating the posterior wall of the aorta was the proximal end of the eighth rib, eroded through its neck by disease, thus producing an aortic-oesophageal fistula (Figs. 5-6). The abscess, measuring three inches long by two inches wide, had a thick fibrous wall. Within it was a free sequestrum, the size of a walnut, consisting of the anterior half of the eighth dorsal vertebra. The whole of this body was destroyed and there was also erosion of the bodies
of the sixth and seventh dorsal vertebrae. The earlier lesion of the tenth and eleventh dorsal vertebrae was healed, but the bony fusion was less sound than had appeared to be the case from radiographic examination.

Comment: This case presents several features of interest.
1. In the first place, early excision of tuberculous glands in the neck appears to have disseminated the disease and accounted for a metastatic focus of tuberculous infection in the tenth and eleventh dorsal vertebrae.
2. Infection of the eighth dorsal vertebra was due to direct spread of infection from the abscess, recognised radiographically in the superior mediastinum, which was originally a tuberculous abscess from mediastinal glands but became secondarily infected with streptococcus viridans from the oesophagus, which at that time appeared intact. No evidence of bone infection in this region was found until eighteen months after the abscess was first observed.
3. The mediastinal abscess subsequently ruptured into the oesophagus, and possibly into the mediastinum as well. Although the appetite of the patient was poor there was no dysphagia; liquid and solid foods were swallowed easily. The post-mortem findings show that the food must have passed actually through the abscess cavity.
4. The next unusual occurrence was erosion of a rib through its neck so that the rib sprang forward and perforated both the wall of the oesophagus and the aorta, thus causing death.
5. Finally the manner of death presents problems for consideration. It would seem reasonable to expect that if a communication was established between oesophagus and aorta, haemorrhage would occur through the mouth. This, however, was not the case; the blood travelled downwards through the intestine and was passed per rectum. Clearly some valvular action had taken place at the upper end of abscess which closed the oesophagus. It is suggested that the large sequestrum lying free in the abscess may have been forced upwards by the influx of blood, thus blocking the oesophagus at its upper end and acting as a ball-valve. It is also interesting that although the stomach was full of blood there was no trace of blood, apart from a little staining in the ileum, from the pylorus to the anus.

Case 2. Mr W. R., aged 37 years, was first seen in June 1944 complaining of pain in the back. Radiographs showed a destructive lesion of the intervertebral joint between the twelfth dorsal and first lumbar vertebrae which was diagnosed as tuberculous (Fig. 7). He was treated in recumbency on a spinal frame for sixteen months and was discharged from hospital in November 1945 wearing a back support.

In April 1946 it was found that the disease had extended (Fig. 8) and antero-posterior radiographs showed a soft tissue shadow which was suggestive of abscess formation. Further in-patient treatment was recommended but this was refused.

In January 1947 he was readmitted and put on a frame. His general condition was fairly good and there was no pain in the back, no kyphosis, and no palpable abscess. Radiographs showed that the area of destruction had increased. Moreover, an extraordinary hollowing of the twelfth dorsal vertebral body had developed (Fig. 9) and the possibility of neoplasm of the spine was suspected. Punch biopsy in October 1947 showed no evidence of tumour. There was pus, with cellular debris, but no micro-organisms, and cultures remained sterile. The Wassermann and Kahn reactions were found to be strongly positive and a course of anti-syphilitic treatment was instituted.

In November 1947 the patient complained of pain in the left loin, of sudden onset, accompanied by nausea, vomiting, and a sensation of fullness in the abdomen. Clinical examination revealed a large, firm mass in the epigastrium extending under the left costal margin with an upper limit which could not be reached. The swelling pulsed but it was difficult to determine whether the pulsation was expansile or transmitted. Radiographs
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Case 2. A destructive lesion at the level of the D12, L1, was diagnosed as tuberculosis (Fig. 7). During the next ten months the disease extended (Fig. 8). Unusual hollowing of the twelfth dorsal vertebra then developed (Fig. 9). Two months later typical aneurismal erosion was obvious (Fig. 10).
showed still further destruction of the front of the vertebral bodies which by then was characteristic of aneurismal erosion (Fig. 10). The question remained whether the erosion was due to an aneurism of the abdominal aorta, coincident with a tuberculous or gummatous lesion of the spine which happened to be at the same level; or whether vertebral erosion might be due to the transmitted pulsation of a tuberculous spinal abscess. If the latter alternative was correct the abscess was obviously approximating so closely to the abdominal aorta that there was danger of erosion of the wall of the artery with secondary rupture into the abscess cavity such as had occurred in the first case. In this event evacuation of the abscess through a posterior approach was desirable; on the other hand such a procedure was not to be undertaken until the surgeon was sure that he might not open an aneurism! An abdominal laparotomy was therefore carried out and the mass was found to be a large aneurism of the abdominal aorta extending above the diaphragm. The patient made an uneventful recovery from the operation. On January 12, 1947, he complained of sudden dyspnoea and pain in the left side of the chest. He died in twenty minutes.

Post-mortem findings—Post-mortem examination showed that the left pleural cavity was full of blood. The arch of the aorta showed extensive syphilitic aortitis but no aortic incompetence. The heart was normal but there was excessive fluid in the pericardium. A large mass, extending through the diaphragm, proved to be a very large aneurism of the aorta extending from the level of the third lumbar vertebra to that of the seventh dorsal vertebra, lying chiefly in the left side but also extending to the right side of the mid-line below the diaphragm. In the intra-thoracic part there was a perforation rather more than two centimetres in diameter. The wall of the aneurism was very friable indeed. It was not opened. The whole specimen including the vertebral column was removed in one piece and preserved in fixative.

Most unfortunately, two days later the hospital was destroyed by fire. The pathological department and this particular specimen were lost. No dissection has been possible.

Discussion—Owing to loss of the specimen the diagnosis cannot be stated with certainty, and even the correct sequence of events is left in some doubt. The initial radiographs (Fig. 7) suggested that in the first place there was a simple destructive lesion of the spine which was probably tuberculous but might have been gummatous in origin. Later radiographs showed striking increase in the destructive process, with change in its nature from that of a simple intervertebral inflammatory lesion to that of typical aneurismal erosion. It is believed that a syphilitic aneurism of the aorta developed at a later date than the spinal lesion, and because the bone behind it was softened by incompletely healed disease the aneurism caused secondary pressure erosion. It is interesting to note that although the aneurism extended over eight vertebral bodies only those involved in disease showed erosion.

Re-examination of the antero-posterior radiographs taken in September 1946 shows evidence of two soft tissue shadows, one overlying the other; presumably one was due to the spinal abscess and the other to the aneurism. The radiographs taken three months later, and two weeks after the sudden onset of pain in the left loin, show loss of the clear-cut shadow on the left side, a more fusiform shadow on the right, and a new shadow of a large mass in the left chest. It may be that the sudden attack of pain was due to rupture of the aneurism into the abscess cavity, with subsequent upward extension of a false aneurism into the mediastinum which finally ruptured into the left pleura.

Unfortunately there are a number of points which cannot be determined with certainty. 1) Was the bone lesion of the spine tuberculous or syphilitic? 2) Was the aortic aneurism secondary to the spinal lesion or was it coincidental? 3) Did the aneurism rupture into an abscess cavity and into extra-peritoneal tissue causing a false aneurism, or was it a true fusiform aneurism which increased rapidly in size until it ruptured?

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