VERTEBRAL OSTEOARTHRPATHY OR CHARCOT'S DISEASE OF THE SPINE

Review of the Literature and a Report of Two Cases

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Charcot joints are said to occur in from 3 to 10 per cent of tabetics. When Rotter reviewed 112 cases of Charcot joints in 1887, he reported no case in which the spine was involved. Since then, however, many cases of vertebral osteoarthropathy have been reported in the literature. The condition is probably more common than is usually believed. Garvey and Glass (1927) reported that in the University of Michigan Hospital, over a period of eight months, every tabetic was subjected to radiographic examination of the spine and four unquestioned cases of vertebral osteoarthropathy were found. I have seen two cases within one year. These are reported here, together with the salient features of the condition described in the literature.

CLINICAL FEATURES

Age and sex—Vertebral osteoarthropathy probably occurs most commonly in the fifth and sixth decades. This, at least, is the age at which it is usually discovered, and as the condition appears to develop over a short period it can be said to occur most commonly in the same age periods. It is more common in men than women, perhaps because of the greater incidence of trauma on the male spine.

Evidence of syphilis and tabes dorsalis—In many of the reports in the literature, there is a description of the clinical evidence of tabes dorsalis and in others the presence of such evidence is explicitly mentioned. The serological tests are not always positive.

Site—The common site is the lumbar region, especially the second, third, fourth and fifth vertebrae. The lower thoracic spine is sometimes involved, either alone or in association with lumbar disease. In one case (Garvey and Glass 1927) the first sacral vertebra was involved. A single vertebra may be affected (Garvey and Glass 1927, Brailsford 1948). Cutting (1949) reported a case in which the cervical spine was affected.

Clinical signs—There is a kyphosis or kyphoscoliosis of the lumbar or thoraco-lumbar spine. The irregularity caused by deformity of the vertebral bodies and by new bone formation is sometimes palpable. There is no local tenderness. Spinal movements are excessively free because of the hypotonia of tabes dorsalis, but the affected segment of the spine may remain rigid (Fig. 2). Movement is painless. A short sharp thud on flexion-extension movement is a characteristic feature.

Radiographic appearances—The chief features are gross disorganisation and destruction together with massive new bone formation. The disorganisation is sometimes characterised by subluxation of a vertebral body laterally. The new bone formation occurs either as very large beaked osteophytes or as massive paravertebral new bone formations. The formation of new bone may lead to ankylosis. The disc spaces are narrowed. The transverse processes are sometimes involved in the destructive and proliferative processes. Hodges, Phemister and Brunschwig (1941) mention sclerosis of the bone end beneath the articular cortex as an important diagnostic sign. The smaller osteophytes of osteoarthritis may be present simultaneously.

Post-mortem findings—In addition to the changes noted above, post-mortem examination has revealed thickening of the spinous processes and vertebral fractures.
Neuropathic lesions of other joints—One or more of the other joints may be affected by a neuropathic lesion in association with the spinal lesion. The larger joints, especially the hip, are more commonly involved and the condition may be bilateral.

Influence of trauma—Trauma may be a factor in determining the development of spinal osteoarthropathy in a tabetic subject. King (1930) quotes Eloesser as having shown that anaesthesia from section of the posterior nerve roots did not of itself produce joint changes, but trauma to the anaesthetic joints did so.

Differential Diagnosis

Vertebral osteoarthropathy may be diagnosed when the characteristic clinical and radiographic signs are found in a tabetic subject. In osteoarthritis the osteophyte formation is not so gross; the progress is less rapid; there are pain and restriction of movement, and gross destruction and disorganisation are absent.

King (1938) believed that hypertrophic Charcot disease is a grotesque form of osteoarthritis occurring because of the more frequent trauma permitted by the anaesthesia. Syphilitic infection of the lumbar spine is uncommon. It occurs either as a diffuse osteitis with thickening and hardening of adjacent vertebrae or as gummatous formation with breaking down of the vertebrae. Tuberculous disease does not show the new bone formation or sclerosis and it will be associated with pain and restriction of movement. Calcification of paravertebral lymph glands may simulate the massive new bone formation, but the vertebrae are unaffected.

Vertebral osteoarthropathy must also be differentiated from an old traumatic condition—as, for instance, the so-called Kümmel’s disease. There may be a history of trauma in both conditions, but the changes are more gross in the Charcot lesion, movement is very free and painless and the condition progresses more rapidly.
Case 1—Early radiographs of the lumbar spine. Changes affect third, fourth and fifth vertebrae. Note subluxation of third lumbar vertebra and extensive new bone formation.

Case 1—Radiographs one year later. Note new bone formation and involvement of the second lumbar vertebra.
CASE REPORTS

Case 1—Man aged forty-nine years. In January 1948 he developed pain in his left buttock. The pain radiated down the lateral side of the left thigh and behind the neck of the fibula and into the foot. There was subjective numbness of the outer side of the leg and foot. These symptoms gradually improved. He resumed work one year after the onset. Nine months later he suddenly developed pain in the low back region and difficulty in moving his legs, though he had no pain in the legs.

On examination, there was clinical evidence of tabes dorsalis. When he stood in the erect position there was a well marked central groove in the back (Fig. 1). Spinal movements were abnormally free. He could place his hands flat on the ground when flexing the spine and in this position a sharp lumbar kyphosis was visible (Fig. 2). The right elbow was falk from excision for gunshot wound.

Radiographic examination—The third, fourth and fifth lumbar vertebrae were affected. The third vertebra was subluxated to the left side. There was massive new bone formation in front of the fourth and fifth vertebrae and the lower part of the third vertebra (Fig. 3). The new bone was dense. The vertebral bodies were dense and irregular in shape. The disc spaces were narrowed, especially the space between the fourth and fifth lumbar vertebrae. These vertebrae appeared fused by the new bone formation. There was also some new bone formation around the third left transverse process and to the left of the second lumbar. Further radiographs one year later showed increased changes in the third lumbar vertebra and involvement of the second lumbar vertebra. There was new bone formation in front of the narrowed disc space between them (Figs. 4 and 5). New bone formation to the left of the second lumbar vertebra was increased and denser.

Serological tests. Blood—September 1949: Wassermann reaction negative; Kahn +; Meinfecke +. November 1949: Wassermann reaction negative; Kahn negative; Meinfecke negative. Cerebrospinal fluid—October 1949: Wassermann reaction unsatisfactory; Lange 0000000000. December 1949: Wassermann reaction negative; Lange 0000000000. The results of the lumbar punctures were unsatisfactory because of the difficulty of the technique in a spine so deformed.

Case 2—Woman aged forty-six years. Complained of low backache in March and April 1950. There was a history of syphilitic infection with uncompleted treatment in 1930.

On examination, the only abnormal findings in the central nervous system were absence of both knee and ankle jerks and failure of the pupils to react to light: the pupils were equal and they reacted to accommodation. The movements of the spine were free and painless but there was a well marked, palpable and audible "thud" in the lumbar region on flexion and extension. There was a deformity of the left foot which the patient attributed to traction applied for a fracture of the femur twenty-five years previously. The radiographs showed gross disorganisation of the midtarsal and subtalar joints with massive new bone formation—appearances consistent with a neuropathic condition (Fig. 6).

Radiographs of the spine showed that the second and third lumbar vertebrae were involved. The third lumbar vertebra was subluxated to the left. The third left transverse process had a defect resembling an old ununited fracture (Fig. 7). The disc space between the second and third lumbar vertebrae was narrowed and there was sclerosis of the adjoining parts of the bodies of these vertebrae (Fig. 8). There was moderate new bone formation in front and to each side of the second and third vertebrae. There were small osteophytes on the fourth and fifth lumbar vertebrae.

Fig. 6

Case 2—Changes in the left subtalar and midtarsal joints suggestive of neuropathic osteoarthropathy.
Case 2—Early radiographs of the lumbar spine. Note defect of the third left transverse process (Fig. 7) and narrowing of the 2–3 lumbar disc space, with adjacent sclerosis (Fig. 8). New bone formation is seen.

Case 2—Radiographs six months later. Increased sclerosis and new bone formation.
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Six months later there was increased sclerosis of the two affected vertebrae and increase of the new bone formation in front of them (Figs. 9 and 10). The defect in the left transverse process of the third lumbar was more defined. There were opaque shadows in the right buttock, at the site of bismuth injections.


TREATMENT

Anti-syphilitic treatment is probably of no avail in controlling the progress of neuropathic joints. Spinal fusion may be justifiable in spinal osteoarthropathy. Support by a suitable corset is probably the best measure and was used in the writer’s two cases with good effect.

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