Case report

Spondylodiscal erosions due to gout: anatomico-radiological study of a case

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SUMMARY The necropsy of an 84-year-old woman with painful polyarticular gout showed a severe erosion of the L2 vertebral body due to sodium urate deposition. The radiological signs of this tophus had existed for many years; it had caused recurrent pain but no neurological complications. A small tophus and a Schmorl's node on 2 neighbouring thoracic vertebrae permitted the differentiation between vertebral plate erosion in the first, which was of bone origin, and vertebral plate remodelling in the second, which originated in the cartilaginous tissue of the disc.

Spinal pain in sufferers from gout has often been noted. However, only on rare occasions has it been shown that a vertebral lesion was due to a tophus. In a recent radiological study of the spine in 275 subjects with gout aged from 21 to 84 years Kawenoki-Minc *et al.*¹ observed only one case of vertebral erosion; this erosion, which was confirmed at necropsy, was in the cervical region. Other studies have shown lesions predominantly in the discovertebral region but also affecting the articular surfaces of the posterior intervertebral joints² and the spinal canal (in the extradural position), with urate deposition sometimes involving the ligamenta flava and possibly associated with neurological complications.³⁻⁵

Case report

The family history of this woman, a former gymnastics instructor, was unremarkable. She was alcoholic, obese, but nondiabetic. When she was about 65 pain in the limb joints associated with lumbago appeared. The symptoms became worse, sometimes with sharp lumbar pains, 12 years later. This led to a diagnosis of gout based on an increased serum uric acid level

and the radiological appearance of the hands and feet. A few days before the patient died aged 84 of acute pulmonary oedema the serum urates level was found to have increased to 835 $\mu\text{mol/l}$.

At 77 years examination had revealed kyphoscoliosis with lower back pain and tenderness at the lumbar level. Lumbar radiographs showed marked erosion of L2 (Fig. 1a, b). Neurological examination at this time showed no abnormality. On examination a few days before her death neither paresis, paralysis, nor tendon reflex abnormalities of the lower limbs were noted.

The necropsy revealed generalised arteriosclerosis, acute suppurative pyelonephritis, and gouty tophi in the kidneys and in the joints of the hands and feet. The parathyroids were macroscopically and histologically normal.

A segment (T7-L4) of the spinal column consisting of vertebral bodies and discs was examined. There was an extensive erosion on L2 containing a white pasty material which consisted of sodium urate monohydrate as demonstrated in 2 different samples by x-ray diffraction. The 2 separate lateral masses of this eroded vertebral body were composed of remodelled bone and fibrocartilaginous tissue. Impaction of L1 in L2 created a spinal angulation. The lower border of the L1 body showed fibrocartilaginous remodelling, and the lower right angle showed histological signs of tophi (Fig. 2).

No osteophytes or intervertebral bony bridges were observed elsewhere in the same specimen. The vertebral bodies and discs appeared normal except for a small tophus facing the lower vertebral plate T9 and a small cartilaginous Schmorl's node at the level of the lower plate of T8 (Fig. 3b). This T9 tophus consisted of grouped, histologically characteristic microtophi; it was limited by an arcade of lamellar bone tissue (Fig. 4a). Just in front of the tophus the vertebral plate bone cortex had disappeared and the underlying cartilaginous plate, which was otherwise normal, was eroded on its deep surface. The corresponding annulus fibrosus was normal

Accepted for publication 22 April 1982

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Fig. 1 Radiographs centred on the spondylodiscal erosion of L2. (a) Lateral view of segment T12-L3 (19 February, 1975). (b) Anteroposterior view of segment L1-L3 (19 February, 1975). (c) AP view of post-mortem anterior frontal section of segment L1-L3 (died 6 June, 1981).

Fig. 2 Pathological aspect of the spondylodiscal erosion of L2. (a) Macroscopic view of the frontal section surface from segment T12-L3 (celloidin-embedded block). The small white spots seen in L1 and in the remnants of L2 are artefacts and not urate deposits. (b) Histological image of the eroded lower right vertebral angle, with gout microtophi on the right (Haematoxylin and eosin, $\times 20$).

Fig. 3 Anterior frontal section surface T8-T10. (a) AP post-mortem radiograph. (b) Macroscopic view of frontal section surface ($\times 1.4$ celloidin-embedded block). Gout tophus against the lower plateau of T9 (arrow indicates the same region as also indicated by short arrow in Fig. 4a, b). Schmorl's node at the level of the lower plate of T8.

Fig. 4 Histological details (haematoxylin and eosin) of Fig. 3b. (a, b) Tophus against the lower plateau T9. Bone cortex (short arrows) as well as the deep surface of the underlying cartilaginous plate (long arrows) have been eroded. The cartilaginous plate is otherwise undamaged. (a) Ordinary light ($\times 7$), (b) polarised light ($\times 14$). (c, d) Schmorl's node opposite a disc showing signs of chondrosis (fissuring). Interruption of cartilaginous plate (arrows) and bone cortex in front of which a node of remodelled fibrocartilage and bone is seen surrounded by haemopoietic marrow. (c) Ordinary light ($\times 7$), (d) polarised light ($\times 14$).

(Fig. 4a, b). The Schmorl's node was represented by an islet of remodelled fibrocartilaginous and bone tissue surrounded by haemopoietic marrow, opposite a disruption in the cartilaginous plate and in the vertebral plate bone cortex; the corresponding annulus fibrosus showed fissuring (Fig. 4c, d).

Discussion

The presence of only 2 tophi (one large, the other quite small) on this segment of spinal column is related to the extreme rarity of spinal lesions in subjects with gout. This is probably because in addition

to a high serum uric acid level certain local conditions, still undefined, are necessary for the formation of these tophi.

Radiological data illustrate a very slow evolution of the lesion over the years, although the exact number of years involved cannot be determined. The architectural rearrangement in a lamellar pattern of the cancellous bone in contact with the T9 tophus (Fig. 4) gives evidence of this gradual development and also indicates, at least in the medium term, an evolution different from that observed for the erosion in L2.

In addition to the slow evolution of the lesion it was noted that clinical manifestations were relatively slight, which is in agreement with the observations of Tkach.⁶ However, a case has been reported of severe bone erosion in the upper cervical region with subluxation of the atlas vertebra.⁷

The small T9 tophus was situated in the somatodiscal region, as also noted by Lichtenstein *et al.*⁸ This location suggests that urate deposition is related to the special vascular conditions⁹ which may also permit blood-borne bacteria to reach a vertebral body.

The presence of this tophus had induced a gradual destruction of the vertebral plate bone cortex, followed by erosion on the deep surface of the cartilaginous plate, which otherwise appeared undamaged and was flanked by a normal annulus fibrosus. A process of this kind may be a possible preliminary stage of a severe erosion like that of L1–L2.

The mechanism of this erosion, reminiscent of that seen in somatodiscal infectious conditions, is different from the process which characterises intervertebral osteochondrosis (particularly in Schmorl's node formation), where there is evidence of disc deterioration, cartilaginous plate interruption, and intraosseous development of fibrocartilaginous tissue. Thus the pathogenesis of somatodiscal erosion in gout is fundamentally different from that of vertebral erosion in chondrocalcinosis, an erosion that we considered to be a severe form of intervertebral osteochondrosis.¹⁰ In cases of gout erosion the cavity was filled with a mass of monosodium urate crystals, while in chondrocalcinosis erosion the cavity was found to contain no mass of calcium pyrophosphate dihydrate crystals.

Although it is necessary in evaluating cases of ver-

tebral erosion to note the presence of coexisting gout or hyperuricaemia, it must be borne in mind that other conditions resulting in radiologically similar erosions are far more frequent. The differential diagnosis must be made with regard to infectious spondylitis rather than intervertebral osteochondrosis, in which the spondylodiscal lesions are usually more diffuse.

When a surgical biopsy or punch biopsy is performed a part of the specimen—according to the size and aspect of this specimen—should be fixed in absolute alcohol to preserve the urate crystals. X-ray diffraction of 'chalky' material could also be useful. Although a careful surveillance of vertebral erosions in patients suffering from gout is obviously important, these lesions do not necessarily seem to have a poor prognosis.

The authors thank Professor C. A. Baud and Dr A. Schoenboerner, Institute of Morphology, Genève Medical School, who did the x-ray diffraction analysis, and Mrs. M. Maunoir, who made the histological preparations.

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