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P G Bullough

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## Pigmented Villonodular Synovitis and Synovial Cysts of the Spine

Peter G. Bullough<sup>1</sup>

The most commonly diagnosed tumor in the spine is metastatic carcinoma and it is often stated that primary tumors are rare in this location. In Dahlin's series of 1,447 surgically diagnosed benign skeletal tumors, 5.0% were in the vertebral column excluding the sacrum and of 4,774 surgically diagnosed malignant tumors, 8% (1). However, it must be borne in mind that tumors in the spine may have been underdiagnosed because of their location, and this was especially likely before the introduction of modern imaging techniques. On the other hand, perhaps we have a tendency to overestimate the mass of the vertebral column with respect to total skeletal mass and the incidence of primary tumors is, after all, proportional to the mass of bone. Be that as it may, it is certain that some tumors predilect the spine. For example, osteoblastoma is twice as common in the spine as in the appendicular skeleton, myeloma is more likely to be diagnosed in the spine than elsewhere, and chondroma is unique to the vertebral column. Furthermore, lesions that are very common in the appendicular skeleton, such as nonossifying fibroma, are not seen in the spine.

In this issue of the *American Journal of Neuroradiology*, there are two case reports (2, 3) of benign lesions that, though not that uncommon in the peripheral skeleton, have rarely been reported in the spine.

The first of these two reports (2) deals with a case of pigmented villonodular synovitis (PVNS), a condition more likely to be diagnosed in the fingers than elsewhere, possibly because a small lump in the finger is much more obvious and likely to cause problems than when it involves the synovium elsewhere, such as in the knee joint. (In this latter location, at least in some cases, the lesion may only be discovered accidentally.) In our department, which specializes in orthopaedic pathology, we see approximately 60 cases

of PVNS a year, mostly of the fingers. We have seen no cases originating in the spine, thus supporting the contention that this lesion is rare in the vertebral column. Because this is a synovial lesion, it can only arise in structures lined by synovium, such as tendon sheath or a diarthrodial joint. Considering the number of synovial-lined joints in the vertebral column, it is perhaps surprising that the condition is so rare in this location.

In the case reported by Titelbaum et al (2), the patient was initially thought to have a disk herniation and, in our experience as well as that of others (4), a number of cases that were subsequently diagnosed histologically as tumors had been diagnosed initially both clinically and radiographically as disk herniation. With a lesion in the neural arch, the radiologic differential diagnosis may also have included osteoblastoma. As is pointed out in this paper, it is likely that MR imaging, had it been done in this case, would not only have provided excellent localization but also that the iron present in the lesion would have given a characteristic T2-dephasing quality, producing a low signal on long TR/TE images.

Lesions of PVNS may on occasion be seen to erode the underlying bone, as was the case in the lesion reported; this is more likely to occur with a tight joint such as a facet joint than it is with a looser structure such as the knee. In a hip, also a tight joint, which has been involved with PVNS, we have observed not only erosion of bone but joint-space narrowing, suggesting radiographically an inflammatory arthritis (5).

In the discussion of the case, it is suggested that PVNS is closely related to nodular tenosynovitis. I believe many pathologists would go further and say that they are identical lesions. In our opinion, PVNS is best regarded as a neoplasm, albeit a benign neoplasm of histiocytic origin (6, 7). A few cases have been reported with malignant degeneration and metastasis (8).

Another benign lesion that also may erode bone and lead to problems of differential diag-

<sup>1</sup> Professor of Pathology, Cornell University Medical College, and Director of Laboratory Medicine, Hospital for Special Surgery, 535 E. 70th Street, New York, NY 10021.

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nosis is a ganglion and two cases of this condition are reported here by Gorey and his colleagues (3). Ganglion cysts are most commonly seen at the wrist and they may arise either as a myxoid degeneration within the connective tissue or on the other hand as a herniation of the synovial membrane. Microscopically, by the time they are usually examined, the two types are similar in appearance. The cyst is filled by a thick glairy fluid and the wall is formed of a dense fibrous connective tissue without an obvious synovial lining.

Bone involvement was first reported by Fisk in 1949 (9) and later by Crabbe in 1966 (10), and is most likely to be seen at the ankle in the medial malleolus (11). Ganglia involving the bone are to be distinguished from the juxta-articular cysts that are seen in association with osteoarthritis and that are always associated with absence of the overlying articular cartilage and eburnation of the bone. Osteoarthritis is such a common condition of the lumbar facet joints that before one can diagnose an intraosseous ganglion or synovial cyst eroding the bone, one must exclude osteoarthritis from consideration (12, 13).

Both the cases reported would seem to have shown osteoarthritis from the radiographs and, in the first case, there is also clear cut evidence of trauma indicated radiographically by a fracture and histologically by the presence of hemosiderin. In both cases, there was apparently a hyperplasia and cystic degeneration of the synovium sufficient to cause an obvious defect on the anterior surface of the lamina which certainly could be mistaken radiologically for a tumor. Strictly speaking, the lesions reported here are not truly ganglions but are synovial lesions secondary to trauma and lumbar spondylosis.

However, two important points should be stressed. First, soft tissue lesions in this location may erode the bone giving rise to a mistaken diagnosis of a primary bone tumor. Second, the newer imaging modalities are much more likely to show these lesions, possibly as incidental findings, giving rise to problems both in differential diagnosis and management.

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