

## JUXTA-ARTICULAR BONE CYST

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Juxta-articular bone cyst was first described as a distinct clinical entity by Hicks in 1956 and called "intraosseous ganglion". Hitherto, some 150 similar cases have been described.

The cyst, which is usually solitary, occurs in the epiphysis near a weight-bearing joint in middle-aged persons. It may cause persistent pain but is easily overlooked on ordinary X-rays. The histogenesis is uncertain.

Six patients treated by thorough curettage and autologous bone transplantation are presented. All achieved immediate relief from pain.

Some theoretical aspects concerning the histogenesis are discussed.

*Key words:* juxta-articular bone cyst; painful weight-bearing joint; primary intramedullary metaplasia of mesenchymal cells

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Juxta-articular bone cyst was first described in the literature by Hicks in 1956 and called "intraosseous ganglion".

The micro- and macroscopic features are very similar to those of soft-tissue ganglia (Feldman 1973, Willems 1973, Schajowicz 1979). Synonymous terms are "subchondral bone cyst" and "synovial bone cyst".

To date, 151 cases of juxta-articular bone cysts have been reported in the literature (Verberne 1979). There is apparently no sex predominance.

The purpose of this paper is to present our material of 6 patients and to call further attention to this rare and peculiar bone lesion, especially to the clinical and pathogenetic aspects. To our knowledge a material of patients with this condition has not previously been published from the Scandinavian countries.

### PATIENTS AND METHODS

During the period 1974–1979, 6 patients with juxta-articular bone cysts were treated at Martina Hansens Hospital. The material consisted of 4 men and 2 women between 24 and 50 years of age. The duration of pain varied between 6 months and 14 years, and one patient had a local trauma 2 years before the symptoms started. None of the patients were active in any kind of sports.

The patients were admitted with the following diagnoses: solitary bone cyst (3), osteoid osteoma (2) and chronic osteomyelitis (1). They all complained of a local, persistent, moderate pain unrelated to physical activity. Joint movement was not reduced. Laboratory analysis was normal. Two of the cysts were localized in the talar bone, two in the neck of the femur, one in the lateral malleolus and one in the iliac bone.

The patients were treated by thorough curettage and autologous bone transplantation. At the operation all cysts had a whitish lining and were filled with thick, mucoid fluid, which is characteristic of a juxta-articular bone cyst. The two cysts localized in the neck of the femur communicated with the articular surface. After treatment the patients have been pain-free and without recurrences for a mean period of 2 years (Figures 1 and 2).



Figure 1. Juxta-articular cyst in the talar bone of a 41-year-old man. The cortical bone is intact and shows no protrusion or periosteal reaction on the preoperative X-ray (left). Symptom-free 2½ years after the operation (right).



Figure 2. Juxta-articular bone cyst in the neck of the femur of a 39-year-old woman. Preoperative X-ray shows a narrow border of sclerotic bone surrounding the cyst (left). Symptom-free 3 years postoperatively (right).

## DISCUSSION

According to the WHO definition, juxta-articular bone cyst is a non-neoplastic, osteolytic, epiphyseal lesion. The most frequent localization is in the ankle region. The adjacent joint remains roentgenologically normal.

Usually the cyst appears unilocular and is filled with a mucoid fluid. A communication with the articular surface is seen in about 40 per cent of the cases (Cserati 1975). Histologically the cyst wall consists of parallel bundles of collagen.

Sometimes, the fibrocytes lying along the inner wall of the cavity form an incomplete lining of flattened, synovial-like cells (Beffa 1978).

The possible differential diagnoses are listed in Table 1. By comparing clinical, roentgenological and histological findings, exclusion of the enumerated lesions should not be any problem.

The histogenesis of a juxta-articular bone cyst has not yet been quite convincingly elucidated.

One theory postulates a herniation of the synovial membrane through defects in the articular surface. However, such defects are not always found, and moreover, intra-articular fractures are rarely followed by the development of a juxta-articular bone cyst. Besides, the composition of the cyst contents is entirely different from synovia.

Another theory emphasizes an impairment of vascularization in the bone resulting in aseptic bone necrosis. However, necrosis is never encountered. Furthermore, the juxta-articular bone cyst tends to be situated in well vascularized parts of bone.

A third theory states that a mucoid degeneration of intramedullary connective tissue takes place, which may or may not be associated with trauma.

However, in most cases an injury can be excluded anamnestically, and furthermore, a degenerative process is rarely solitary and self-limiting.

Lastly, it is postulated that the cyst is caused by a primary intramedullary metaplasia of mesenchymal cells into synovial-like cells and/or fibroblasts. The secretion of a mucin-like substance

Table 1. Differential diagnoses of juxta-articular bone cyst

Arthritic and arthrotic cysts
Necrobiotic pseudocysts
Juvenile (unicameral) bone cysts
Other epiphyseal, osteolytic bone lesions:
Chondroblastoma
Chondroma
Desmoid fibroma
Eosinophilic granuloma
Osteoid osteoma
Osteoclastoma
Osteomyelitis
Pigmented, villonodular synovitis

rich in hyaluronic acid creates an increased intramedullary pressure with cyst formation. The concept of active secretion is corroborated by electronmicroscopical and histochemical examination (Kikuchi et al. 1976).

The formation of a juxta-articular bone cyst may represent a uniform reaction to different kinds of stimuli (Dick 1977). Most patients have no previous history of trauma, as in our cases. The analysis of our material favours the theory of primary intramedullary metaplasia of mesenchymal cells.

However, the origin of the induction of this metaplasia is uncertain.

The clinical implication is that one should be aware of juxta-articular bone cyst as a possible cause of otherwise unexplainable pain in a weight-bearing joint. The present series verifies that a thorough roentgenological examination with eventual tomography may be most valuable in the diagnosis of this rather little known lesion.

## REFERENCES

- Beffa, X. (1978) Subchondral cysts of the iliac acetabulum. *Arch. Orthop. Trauma Surg.* **91**, 259-265.
- Cserati, M. D. (1975) Question of post-traumatic formation of para-articular bone cysts. *Z. Unfallmed. Berufsch.* **68**, 95-103.
- Dick, W. (1977) Trauma and subchondral bone cysts. *Unfallheilkunde* **80**, 205-211.
- Feldman, F. (1973) Ganglia of bone: theories, manifestations and presentations. *Crit. Rev. Clin. Radiol. Nucl. Med.* **4**, 303-332.
- Hicks, J. D. (1956) Synovial cysts in bone. *Aust. N.Z. J. Surg.* **26**, 138-143.
- Kikuchi, S., Suda, A. & Watanabe, M. (1976) Histochemical and electronmicroscopic observations on intraosseous ganglion. *Fukushima J. Med. Sci.* **22**, 117-124.
- Schajowicz, F. (1979) Juxta-articular bone cysts (intraosseous ganglia). A clinicopathological study of eighty-eight cases. *J. Bone Joint Surg.* **61**, 107-116.
- Verberne, G. H. (1979) Intraosseous ganglia. *Arch. Chir. Neerl.* **31**, 243-247.
- Willems, D. (1973) Ganglion cysts of bone. Report of two cases and review of the literature. *Acta Orthop. Scand.* **44**, 655-662.

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