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Case report

Intraosseous ganglion cyst of the lunate: A case report

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ABSTRACT

Intraosseous ganglion cyst of the carpal bones represents a rare cause of wrist pain. We report a case of a 42 year-old, right-handed female, who presented with pain of the right wrist following a fall on the palm of the hand. Clinical study revealed a moderate swelling over the mid-section of the palmar face and pain through extreme ranges of motion of the wrist. Plain radiographs and CT-scan of the wrist have revealed an intraosseous ganglion cyst of the lunate bone. Curetting-filling by Kuhlman's vascularized radial bone graft allowed a good functional recovery. The clinical, radiological and therapeutic aspects are discussed.

Introduction

Intraosseous ganglion cyst (IGC) is a benign, no neoplastic bone lesion with histological similarity to the soft tissue ganglion cyst.[1,2] Intraosseous ganglion contains mucoid viscous material with no epithelial or synovial lining.[3]

IGC is not uncommon in the carpal bones. The radiolucent carpal lesions are usually symptom-free found incidentally on radiographs of the wrist performed for other reasons. Detecting a single radiolucent lesion in the lunate accompanied by pain is rare, and detecting a pathological fracture of the lunate revealing an intraosseous ganglion cyst is exceptional.[4] Isolated rare cases of intraosseous ganglion cysts in the carpal bones have been reported, most commonly in the lunate and the scaphoid.[5–9] Their etiology remains largely unknown; however trauma, herniation of the joint capsule, mucoid degeneration, intramedullary metaplasia of mesenchymal cells, and congenital rests of synovial producing cells have been suggested to play a part.[10] We report a case of a pathological fracture of the lunate revealing an intraosseous ganglion cyst.

Case report

A 42-year-old female, with a history of right distal radius fracture, presented with right wrist pain following a fall on the palm of the right hand. Clinical study revealed a moderate swelling over the mid-section of the palmar face and pain through extreme ranges of motion of the wrist. Wrist motion was not limited. Radiographic studies of the right wrist revealed a round-shaped defect with a fracture of the lunate (Fig. 1). This lesion was solitary, well-defined, with a thin marginal sclerosis. The adjacent joints were normal. CT scan confirmed a cystic lesion of the lunate and was able to localize the lesion and the fracture precisely (Fig. 2). The patient was operated upon using anterior surgical approach with a medial palmar extension; both the lunate and the distal radius were exposed for harvesting vascularized bone. A soft-tissue ganglion cyst communicating with the lunate intraosseous ganglion cyst was identified through a defect on the anterior side of the lunate. Through the cortical defect, typical yellow gelatinous ganglion material was curetted out. The cavity was rinsed with saline solution and packed using a vascularized bone graft based on the volar carpal artery, e.g. Kuhlman's vascularized radial bone graft (Fig. 3). After closing the joint capsule, the subcutaneous and cutaneous tissues, a removable wrist cast was applied for six weeks. The content of the cyst was described anatomopathologically as a cystic formation with walls constituted by flattened, synovial-like, fibro-connective tissue cells with

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Fig. 1. X-ray showing a round-shaped defect with a fracture of the lunate.

Fig. 3. X-ray after Kuhlman's vascularized radial bone graft.

no true epithelial lining. Neither mucoid nor myxoid degeneration was observed. Macroscopic and microscopic findings were characteristics of an intraosseous ganglion cyst. The patient was successfully treated surgically. After a ten-month follow-up period she was completely relieved of pain without any limitation of the wrist motion.

Discussion

In 1956, Hicks[11] described radiolucencies with a sclerotic margin within bones as "synovial bone cysts". In 1966 Crabbe[2] first used the term "intraosseous ganglion". Synonymous terms include synovial bone cyst, ganglionic cystic defect of bone, subchondral bone cyst and juxta-articular bone cyst.

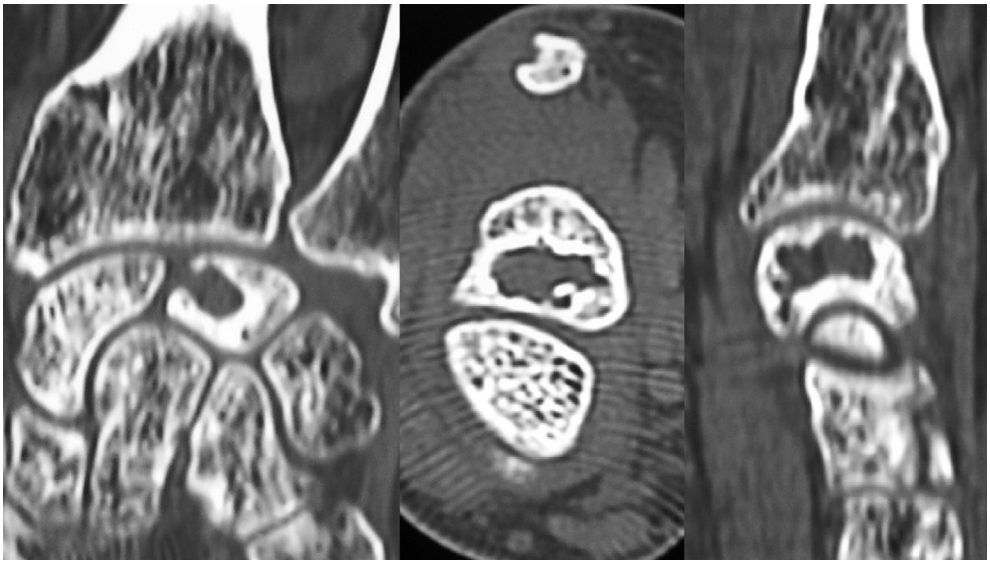

Fig. 2. CT scan of the wrist can localize the lesion precisely.

Radiolucent carpal bone lesions are usually symptom-free found incidentally on radiographs of the wrist performed for other reasons. Their differential diagnosis includes IGC, osteoarthritic cyst, post-traumatic cyst, simple bone cysts, and aneurysmal bone cyst. When they present themselves as painful wrist, Kienbock's disease, osteoid osteoma and osteoblastoma should be included in a differential diagnosis list.[10]

Intraosseous ganglions have a predilection for particular sites. Ganglia in the lunate is mostly located near the radiocarpal joint in the proximal part of the bone, and in the majority of cases turned toward the scaphoid. Most intraosseous ganglions in the scaphoid are located in the proximal portion near the lunate because about 70% of hand tissue-ganglia arise from the posterior side of the scapho-lunate joint.[12,13]

A lesion was classified as an intraosseous ganglion when histopathology was identical to soft-tissue ganglion cysts. The wall of the cysts consists of fibrous, collagenous fibers similar to flattened histiocytes, partly mucoid-degenerated without epithelial cells and without synovial lining. The cyst wall in general is surrounded by sclerotic bone with necrotic and regenerated bone tissue.[6,14]

The causes of both soft tissue and intraosseous ganglion remain unsettled. There seem to be two fundamental types of intraosseous ganglia: one originating by penetration of an extra-osseous ganglion into the underlying bone, the other being idiopathic.[15] Erosion of an extraosseous ganglion through bone is the generally agreed-on mechanism for the penetrating type.[10] The primary or idiopathic type has no apparent extraosseous communication. It seems that idiopathic type of ganglion cyst originates from modified mesenchymal or synovial cells at the capsule–synovial interface in response to repeated minor injury, explaining high prevalence of ganglion cyst in the scapho-lunate site where the motion and force is concentrated.[13] Repetitive minor trauma and mechanical stress cause intramedullary vascular disturbance and consequently aseptic bone necrosis. Then proliferation of fibroblasts and histocytes and production of hyaluronic acid with mucoid degeneration during tissue revitalization occur to form a cyst.[13]

The choice of treatment depends on the clinical and the radiological study. Surgical treatment is indicated if the IGC is symptomatic or if its size is growing in imaging findings.[16] Growing IGC can result in traumatic and collapsing fracture in the lunate with serious complications.[16] When IGC has been completely stopped growing and there is no cortical defects or collapsing fractures, regular follow-up with radiography is recommended. CT scan has a special role in decision-making process in this regard. Increased uptake in lunate area in a painful wrist indicates surgical treatment.[17,18]

Treatment of IGC consists in the curettage of the cyst, injection of saline solution and packing the cavity with cancellous bone graft. In our case an anterior approach was preferred and a Kuhlman's vascularized radial bone grafting was performed because of the palmar localization of the ganglion cyst within the lunate bone. In addition to this approach, a dorsal approach or some alternative surgical techniques such as excision of the lunate, dorsal flap arthroplasty, prosthetic replacement, radiocarpal or intercarpal fusion are also used.[19] Recurrence has been reported but is rare.[5] We found no recurrence during the 18-month follow-up period. An IGC should be suspected when patients present with pain or swelling of the wrist following a trauma along with a cyst with fine marginal sclerosis close to the scapholunate joint. Although CT scan shows the bony architecture, MRI may better demarcate the tissues surrounding the bones.[18]

In conclusion, Intraosseous ganglion cysts of the carpal bones are rare. This case shows an unusual presentation of an intraosseous ganglion cyst of the lunate revealed by a pathological fracture. Surgical treatment provided excellent outcome.

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