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Intraosseous Ganglion Cyst of the Scaphoid Treated by Curettage and Zaidemberg's Vascularized Radial Bone Graft

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Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

An intraosseous ganglion cyst is an uncommon pathologic condition with histological similarities to the soft tissue ganglion cyst. Carpal bones especially the scaphoid is a rare location of an intraosseous ganglion cyst.

We report the case of a 42-year-old right-handed man who presented with a painful left wrist evolving for nine months. The pain was localized at the anatomical snuff-box. It was increased with activity and slightly relieved with analgesic medication.

Plain radiographs of the left wrist revealed a radiolucent cystic lesion of the scaphoid without any fracture, loss of joint space or degenerative changes. CT-scan confirmed the lucent area with a sclerotic margin within the scaphoid, communicating with the joint space.

Through a volar approach, curettage and a Zaidemberg's vascularized radial bone grafting was performed.

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Keywords: Intraosseous; ganglion cyst; scaphoid; carpal; vascularized bone graft; Zaidemberg.

1. INTRODUCTION

Intraosseous ganglion cyst (IGC) is an uncommon pathologic condition with histological similarities to the soft tissue ganglion cyst. Carpal bones are a rare location for IGC [1,2].

Sporadic cases of IGC in the carpal bones have been reported, most commonly in the lunate and the scaphoid. Their etiopathogeny is still discussed; 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 [2,3].

It is usually symptom-free, but sometimes it could cause chronic wrist pain, then surgery could be indicated [4]. Through this case report of an IGC of the scaphoid, we discuss the etiopathology of this rare entity and its diagnosis and management specifications.

2. CASE REPORT

A right-handed 42-year-old man presented to our outpatient department with chronic pain in his left wrist during the past nine months. The pain was localized at the anatomical snuff-box. It was increased with activity and slightly relieved with analgesic medication. His medical history included diabetes and hypertension. There was no history of fever or any similar pain or swelling elsewhere in the body. But he remembered being a victim of a trauma to the left wrist one month prior to the beginning of the symptoms. There was no swelling, redness or palpable mass on physical examination of the left wrist, but minimal tenderness was overlying the anatomical snuff-box. The grip strength was normal and the wrist motion was slightly painful at extreme ranges and limited compared to the contralateral side.

Plain radiographs of the left wrist revealed a radiolucent cystic lesion of the scaphoid without any fracture, loss of joint space or degenerative changes (Fig. 1).

CT-scan confirmed the lucent area with a sclerotic margin within the scaphoid, communicating with the joint space. The other carpal bones and soft tissue were normal (Fig. 2).

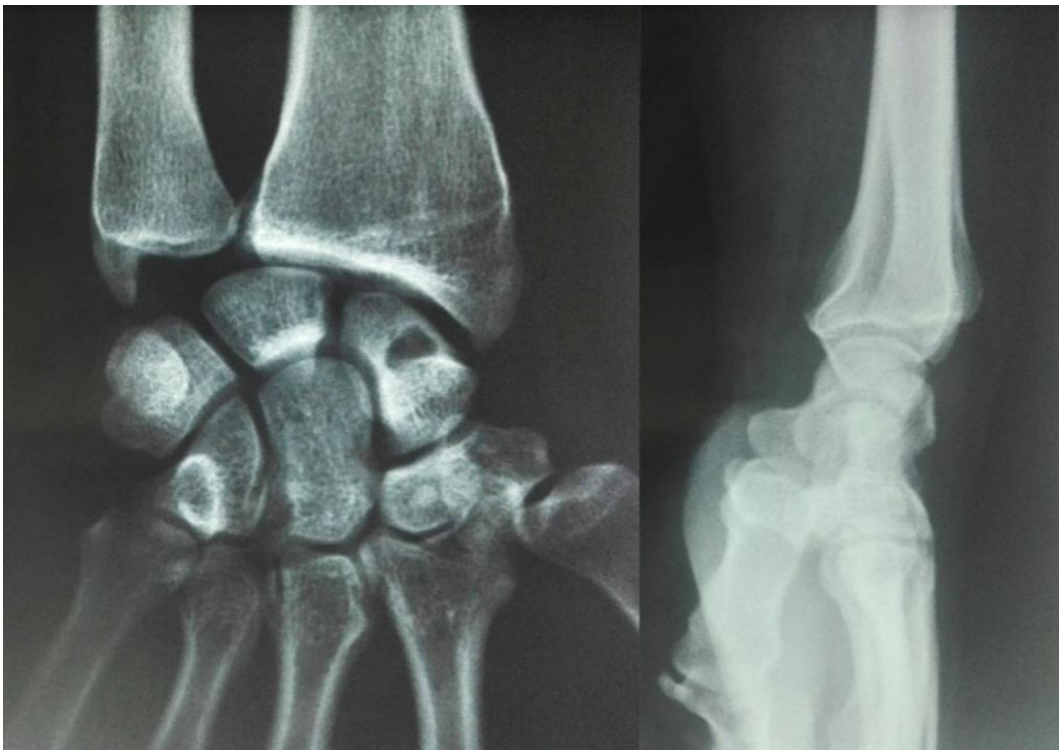

Fig. 1. Plain radiographs of the left wrist revealed a radiolucent cystic lesion of the scaphoid without any fracture, loss of joint space or degenerative changes

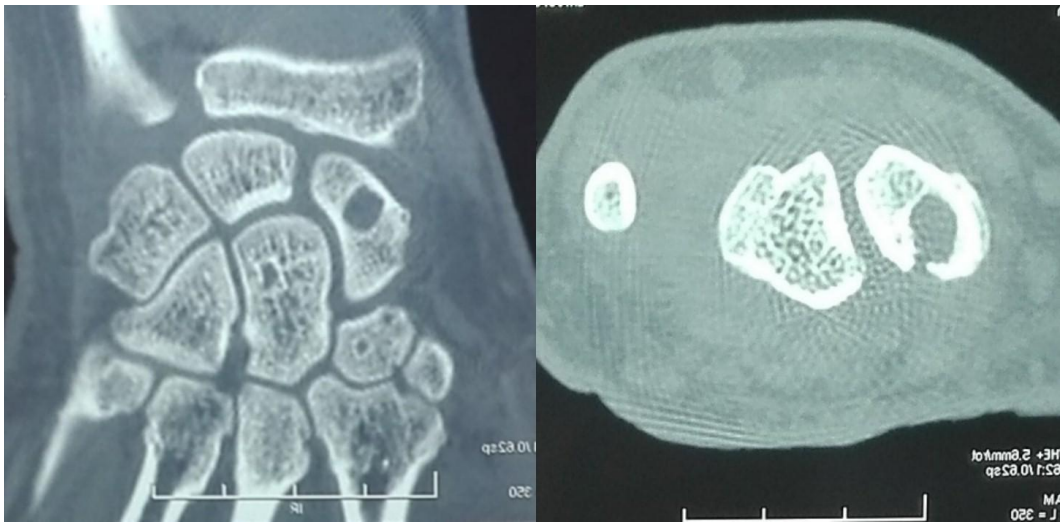

Fig. 2. CT-scan showing the lucent area with a sclerotic margin within the scaphoid, communicating with the joint space. The other carpal bones and soft tissue were normal

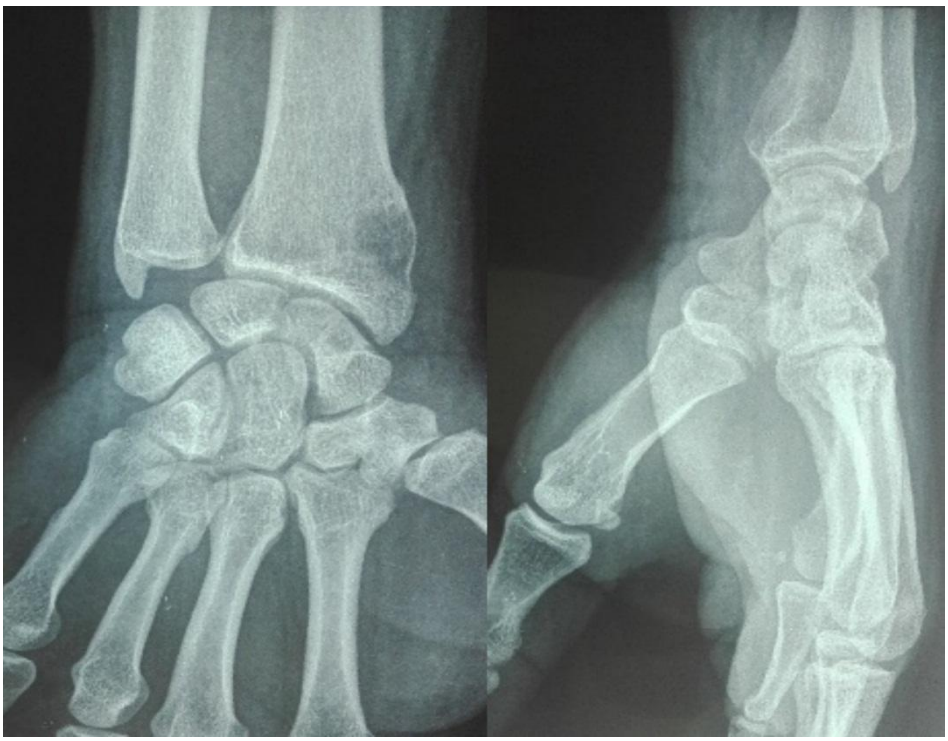

Fig. 3. Plain radiographs of the left wrist showed the complete disappearance of the lucent area with excellent osteointegration of the bone graft

The patient underwent surgery under general anaesthesia and tourniquet control. The scaphoid lesion was approached by a volar approach. Both the scaphoid and the distal radius have to be exposed to obtain the vascularized bone graft. The flexor carpi radialis (FCR) and the radial artery were spotted then the wrist was flexed to release the tension of the FCR and the flexor pollicis longus. Palmar carpal artery was spotted in front of and along the edge of the Pronator Quadratus (PQ). Dissection of the superficial aponeurosis of the PQ until periosteum was performed. The lateral half of the pedicle was subperiosteally dissected followed by the harvesting of the graft with an osteotome. The medial half of the pedicle attached to the

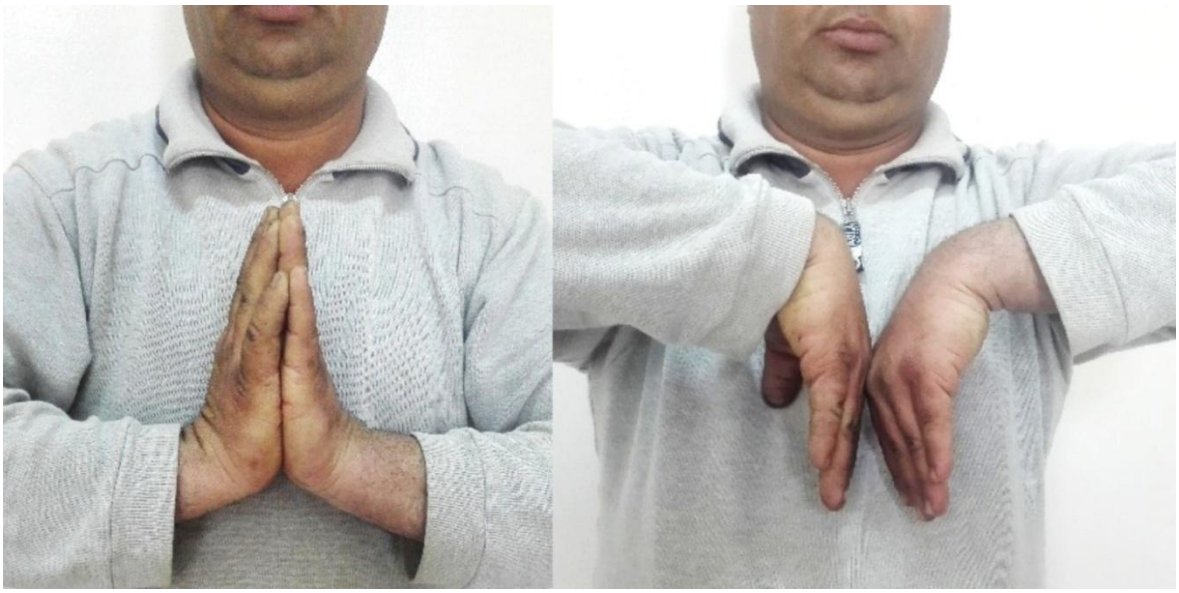

Fig. 4. The patient was satisfied with a good painless range of motion of the wrist

graft was not detached. The graft and the pedicle were dissected back to the radial artery then the tourniquet is released.

The ganglion was observed through a defect in the scaphoid bone surface. The cyst was evacuated, pale yellow gelatinous fluid was curetted. The void was rinsed using a saline solution and then packed with the Zaidemberg's vascularized radial bone graft. After closing the joint capsule and wound, a removable extension cast was applied for 6 weeks. Gross and microscopic findings were characteristics of an IGC.

Healing was uneventful. The patient recovered from surgery, he was painless with a good range of motion and he has been on regular follow-ups.

At 3 months follow-up, plain radiographs of the left wrist showed the complete disappearance of the lucent area with excellent osteointegration of the bone graft (Fig. 3).

At the last follow-up, the patient was satisfied with the result without any evidence of recurrence (Fig. 4).

3. DISCUSSION

Intraosseous ganglion cysts are considered as benign osteolytic bone tumours. IGC has been reported to be located mainly in the epiphyses of long bones most commonly in the hip, knee and ankle [1]. Isolated cases of ganglion cysts occurring in the carpal and metacarpal bones have also been reported. Among carpal bones, the lunate is the most commonly affected, nearly 70% of hand ganglia arise from the posterior side of scapholunate ligament. The scaphoid is rarely involved [2,3].

Etiology remains uncertain, it appears eventually that there are two fundamental types of intraosseous ganglia. one theory suggests that it is originating by penetration of a soft tissue ganglion into the underlying bone or herniation of the joint capsule. The second theory suggests that they are idiopathic cysts. Intra-medullary metaplasia of mesenchymal cells, congenital rests of synovial producing cells and ischemic bone necrosis resulting from mechanical stress or repeated micro-traumatisms have been suggested to play a role in the idiopathic theory [2,4].

The primary or idiopathic origin has no apparent extraosseous communication. In this presented case, as the CT-scan and the operative exploration findings showed a defect and a communication with the joint space, the IGC seems to be secondary or a penetrating type. But it was not associated with co-occurrence of the soft-tissue ganglion. Herniation of the joint capsule seems to be a reliable theory [5].

A recent review of the literature showed that the intraosseous ganglia are the most frequently identified lesions among scaphoid cysts [6]. However, IGC can be confused with other

differential diagnosis It includes simple bone cysts, osteoarthritic cysts, giant cell tumours, post-traumatic cysts, and aneurysmal bone cysts. The painful wrist is usually associated with osteoid osteoma and osteoblastoma which should be considered as differential diagnosis of painful IGC of the scaphoid [5].

IGC is more commonly asymptomatic, but it might be revealed by a moderate and progressive wrist pain which could result from intraosseous hyper-pressure. Increased wrist pain is usually correlated with pathologic fracture occurring after cortical erosion [5]. Wrist swelling, when it rarely occurs, is secondary to the rupture of the IGC and the spreading of its content into the joint space.

Occasionally, there is a history of recent trauma which is present in our case. Acute trauma doesn't contribute to causing the appearance of the cyst but can actually lead to a diagnosis of asymptomatic cysts [4].

It's important to notice that repeated overuse of the hand can be found as one of the predisposing factors, which explains the theory of ischemic bone necrosis due to micro-traumatisms.

Physical examination is usually non-conclusive, as in our case. Plain radiographs reveal a well-defined osteolytic lesion with a surrounding sclerotic margin. The cyst is usually non-expansile and unilocular as in our case but can be multilocular.

CT-scan and Magnetic Resonance Imaging (MRI) are useful to analyze the extent of the lesion and its communication with the joint. These imaging tools can help in diagnosing the hidden fractures and furthermore in the assessment of the fracture risk. They are also important in planning the treatment and the surgical approach [7].

The diagnostic radiologic features of the intraosseous ganglion cyst are the absence of other stigmata of joint disease, solitary cyst, large size, myxoid tissue and a sclerotic margin [4].

IGC is usually asymptomatic, asymptomatic lesions require repeated and periodic clinical and radiographic evaluation. If any significant increase in the size or any cortical erosion of the cyst appears, surgical treatment is required before the pathological fracture occurs.

In symptomatic lesions, a conservative treatment using analgesics could be useful, surgery is indicated if the patient suffers from invalidating pain resistant to conservative treatment. Surgery is also indicated when the cyst is associated with a high risk of fracture to prevent irreversible damage to the wrist, such as the size of the intramedullary cavity and the size of the cortical defect [7].

Current surgical treatment consists in intralesional curettage of the IGC associated with autologous bone grafting to repair the defect after curettage and to maintain bone volume in order to prevent any recurrence and the risk of collapsing fracture of the scaphoid [3,8]. Curettage alone is not enough and exposes to persistent pain and a high risk of collapsing fracture of the scaphoid. When compared with simple curettage, associated bone grafting implicates significant and enduring improvement in pain scores and functional activity [5,6].

The bone graft is usually harvested from the iliac crest. Fealy [8] preconized bone grafting from the radial styloid bone after a radial styloidectomy for the treatment of IGC of the scaphoid.

A vascularized bone graft from the volar carpal artery is an alternative surgical technique. This surgical option reveals to be particularly well-adapted and a reliable treatment simultaneously of bone cysts and an associated fracture [5]. Vascularized bone graft has significantly higher blood flow and provides better healing rates then non-vascularized bone [6,9]. In our case, even though there was no fracture associated, an anterior approach was preferred and a zaidemberg's vascularized radial bone grafting was performed with an excellent result at 3 months follow-up.

In order to prevent donor site complications and to limit the period of immobilization, Chen [10] used a new method consisting in intralesional curettage with autogenous bone marrow graft which contains osteoprogenitor cells associated with autogenous fibrin clot graft including a large amount of the aggregated platelets.

Compared to open techniques, an arthroscopic procedure, as developed by Bain [11], demonstrated better results with low complication rates, less surgical dissection, less postoperative pain, a shorter recovery time and earlier return to work. It's a minimally invasive technique but it needs expertise.

Recurrence of the cyst was rarely reported after bone graft. The most frequent complication of IGC of the scaphoid is the fracture. Sbai reported a case of a pathological fracture of the scaphoid revealing an intraosseous ganglion cyst [5].

4. CONCLUSION

In conclusion, IGC is rarely located in the scaphoid. The diagnosis could be missed. Even though it is mostly asymptomatic, IGC should be considered as differential diagnosis of chronic wrist pain. The proper radiologic investigation is necessary to aid the diagnosis, evaluate the risk of fracture and the surgical planning. Histopathology is essential and is the only way to confirm the diagnosis.

The mainstay of treatment is surgical curettage and bone grafting. In our case, we performed successfully a surgical curettage with zaidemberg's vascularized radial bone grafting. Arthroscopic surgery is a minimally invasive technique which demonstrated excellent results but needs expertise.

CONSENT

As per international standard or university standard, the patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard was written ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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