

Conservative treatment of a pathologic fracture of the scaphoid bone in a child

A case report

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Abstract

Rationale: Tumors of the scaphoid are rare, and some can cause pathological fractures. No cases of pathological fractures of the scaphoid have been reported in children. The most common treatment for pathological fractures of the scaphoid bone associated with a benign lesion in adults is surgical, with intralesional curettage associated with autologous bone grafting and internal fixation.

Patient concerns: A 10-year-old boy presented with wrist pain after falling from his height.

Diagnoses: X-ray, CT-scan and MRI showed a pathological undisplaced fracture of the scaphoid on a benign lytic lesion.

Interventions: The arm was immobilized in a below-elbow cast.

Outcomes: The fracture healed within 4 months of immobilization. 3 years after the fracture, the functional status was normal, and the lytic lesion could not be seen on radiographs.

Lessons: Retrospectively, the most probable etiology was a ganglion cyst. Our case suggests that some pathological fractures of the scaphoid may not need surgery, especially not in children.

Abbreviation: PFS = pathological fractures of scaphoid.

Keywords: benign tumor, child, conservative, orthopedic treatment, pathologic fracture, scaphoid

1. Introduction

Tumors or tumor-like lesions of scaphoid bone are rare and mostly benign in scientific literature.^[1–8] Some of these lesions can entail pathological fractures. To our knowledge, 9 cases of pathological fractures of scaphoid (PFS) bone have been reported in the literature,^[1–8] all concerning adults with benign tumors. Diagnosis of radiolucent lesions of carpal bones includes enchondromas, giant cell tumors, simple bone cysts, posttraumatic cysts, and intraosseous ganglia. In the pediatric population, tumors of carpal bones are mostly enchondromas or intraosseous ganglion cysts.^[1,8]

PFS in adults are commonly treated surgically by intralesional curettage of the tumor (for pathologic diagnosis) associated with autologous bone graft and internal fixation.^[1–5] A similar treatment is also proposed for chronic pain of the scaphoid due to a benign tumor,^[5] with or without internal fixation.

To our knowledge, only 2 cases of orthopedic treatment for PFS with benign tumors have been reported, both concerning adult patients; they completely healed with a below-elbow cast and the lesion disappeared over time.^[6,7]

We found no pediatric cases of PFS in literature. We hereby present a case of pathological fracture of the scaphoid on a benign tumor in a 10-year-old boy and discuss the therapeutic options.

2. Case report

A healthy, right-handed, 10-year-old boy was admitted to the emergency room of our institution after a minor traumatic event on the left wrist. He presented with pain and tenderness in the wrist, which were more intense in the anatomic snuffbox area. The radiograms (Fig. 1) showed an undisplaced left scaphoid fracture,^[10] coming through a well-limited lytic lesion. The arm was temporarily immobilized in a below-elbow cast. A magnetic resonance imaging (MRI) was planned for the following week, and it showed a diffuse T1 hyposignal of the scaphoid bone, potentially indicating an enchondroma (Fig. 2). On day 20, a computed tomographic scan (Fig. 3) showed a central round-shaped lysis, probably indicating an enchondroma or an intraosseous ganglion cyst. No criteria of malignancy, namely extension to the soft tissues, periosteal apposition, or cortical erosion, were found. The laboratory studies and the general examination were normal.

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Figure 1. Radiograph of the scaphoid, the day of the injury.



Figure 3. Computed tomographic scan, day 20: pathologic fracture of the scaphoid.

After discussion with the patient and his parents, the conservative treatment was confirmed: a below-elbow cast for 1 month, followed by a wrist cast for 2 months, and finally a removable splint for 30 days. The healing first became visible in a radiographic study on the 90th day (Fig. 4) with a medial periosteal reaction and a progressive obliteration of the bone defect.

One year after the fracture, the functional status was normal: no pain, wrist extension 90°/flexion 80°, full pronation and supination, and normal strength of the intrinsic and extrinsic muscles. On radiograms, the lesion was still visible (Fig. 5), but the bone neo-formation on the medial side was considered sufficient. The patient was therefore allowed to resume normal sports practice. He was rapidly able to play tennis or any other sport without pain or restriction.

The patient had a clinical and radiological follow-up once a year. At last follow-up, 40 months after the fracture, the

functional status was normal and his quality of life was subjectively considered excellent. The lytic lesion could not be seen on radiograms (Fig. 6).

The patient and his parents provided formal consent to this article.

The procedures followed the ethical standards of the institutional review boards and the Helsinki Declaration of 1975 as revised in 2013. The ethical approval was waived for this study because it is not necessary for retrospective description of clinical cases.

3. Discussion

It was initially unclear whether the lesion was an enchondroma or a ganglion cyst, despite complete imaging. An enchondroma is a benign tumor of hyaline cartilage. In the hand, enchondromas are generally located in the phalanges or the metacarpal bones, and



Figure 2. MRI, T1 sequence, day 6: hyposignal of the scaphoid. MRI = magnetic resonance imaging.



Figure 4. Radiogram at 3 months showing medial periosteal reaction and a progressive obliteration of the bone defect.



Figure 5. Radiogram at 1 year: bone healing on medial side.

they are rarely found in the scaphoid bone.^[9] They might be completely asymptomatic or may reveal with pain or pathological fracture. An intraosseous ganglion is a benign cystic lesion that contains fibrous tissue with mucoid changes and is often located in subchondral bone adjacent to a joint. Both lesions are completely benign and do not require surgery for oncologic concerns. The most common surgical treatment of PFS is an intralesional curettage associated with a cancellous autologous bone grafting from the proximal radius metaphysis, as well as an internal fixation with screws or pins.^[2-4] In our case, conservative and surgical treatments were both discussed. The main argument



Figure 6. Radiogram 3 years after the fracture: normal aspect.

for the surgical treatment was that it is supported by scientific literature, even though there is a low level of evidence. Moreover, the biopsy should have provided a precise diagnosis. However, we found more arguments in favor of the conservative treatment. Indeed, facing a child with an undisplaced fracture of a non-dominant upper limb with no criteria of malignancy, for example, a humeral fracture on a cyst or a metacarpal fracture on an enchondroma, the usual treatment is orthopedic. Furthermore, we considered that the risk of malunion could be greater in the case of surgical treatment because of the inherent risk of pseudarthrosis of scaphoid fractures associated with the small amount of healthy bone that would be left after curettage.^[10] Thus, we first opted for a well-conducted orthopedic treatment and close follow up, with the possibility of performing surgery in case of a failure of orthopedic treatment, that is, pseudarthrosis or necrosis. Our good clinical and radiological results allow for discussion of the systematic resort to surgery for PFS associated with benign tumors, above all for children. In our opinion, it seems reasonable to propose orthopedic treatment and a close follow-up for undisplaced PFS associated with benign lesions.

In retrospect, the most probable diagnosis was an intraosseous ganglion because of the complete disappearance of the lytic lesion after 3 years, more likely in the case of a bone cyst than in enchondromas.

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