Case study

Solitary Osteochondroma of the Second Metacarpal Bone.

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ABSTRACT

Solitary osteochondroma is a common benign bone tumor, usually developed in long bones. However, it's localization in the metacarpal bones is exceptional. Only few cases have been reported in the literature.

We report the case of a 21-year-old right handed female who presented with a painful mass of the dorsal aspect of her left hand. This mass appeared at the age of 10 and was growing progressively ever since. For the last three months, she complained of an insidious and intermittent pain localized specifically over the swelling. There was no history of trauma to the hand.

On physical examination there was a swelling of 3,5 cm in diameter, hard in consistency. The mass appeared to be continuous with the second metacarpal bone.

Plain radiographs and Magnetic resonance imaging findings were consistent with a benign osteochondroma with no radiological evidence of malignancy.

An excisional biopsy with an osteotomy was performed and histological examination confirmed the diagnosis of osteochondroma.

Keywords: Osteochondroma ; Bone ; Tumor ; Benign ; Metacarpal ; Hand.

1. INTRODUCTION

Osteochondroma is a common benign bone tumor arising from the cortical surface. Osteochondromas are usually localized in the long bones particularly around the knee joint and in the upper humerus.
Solitary osteochondromas of the hand are rare, usually seen in children as part of the multiple exostoses syndromes, and extremely rare in adults.
The location in the hand has been rarely reported. Even more, the metacarpal bone is exceptionally involved; most adult solitary tumors of the hand arise either from the distal phalanx or from the carpal bones [1].

We report the case of a solitary osteochondroma of the second metacarpal bone.

2. CASE REPORT

A 21-year-old right handed female, without any significant pathological history, presented to our outpatient department with a painful mass of the dorsal aspect of her left hand. This mass appeared at the age of 10 and was growing progressively ever since. For the last three months, she complained of an insidious and intermittent pain localized specifically over the swelling. No analgesic medication was taken. There was no history of fever or any similar pain or swelling elsewhere in her body. There was no history of trauma to the hand.

On physical examination there was a swelling of 3,5 cm in diameter, hard in consistency, with no tenderness or redness (Fig.1). The mass appeared to be continuous with the second metacarpal bone. The metacarpo-phalangeal joint was mobile without any limitation. The overlying skin was freely mobile. The grip strength was normal.

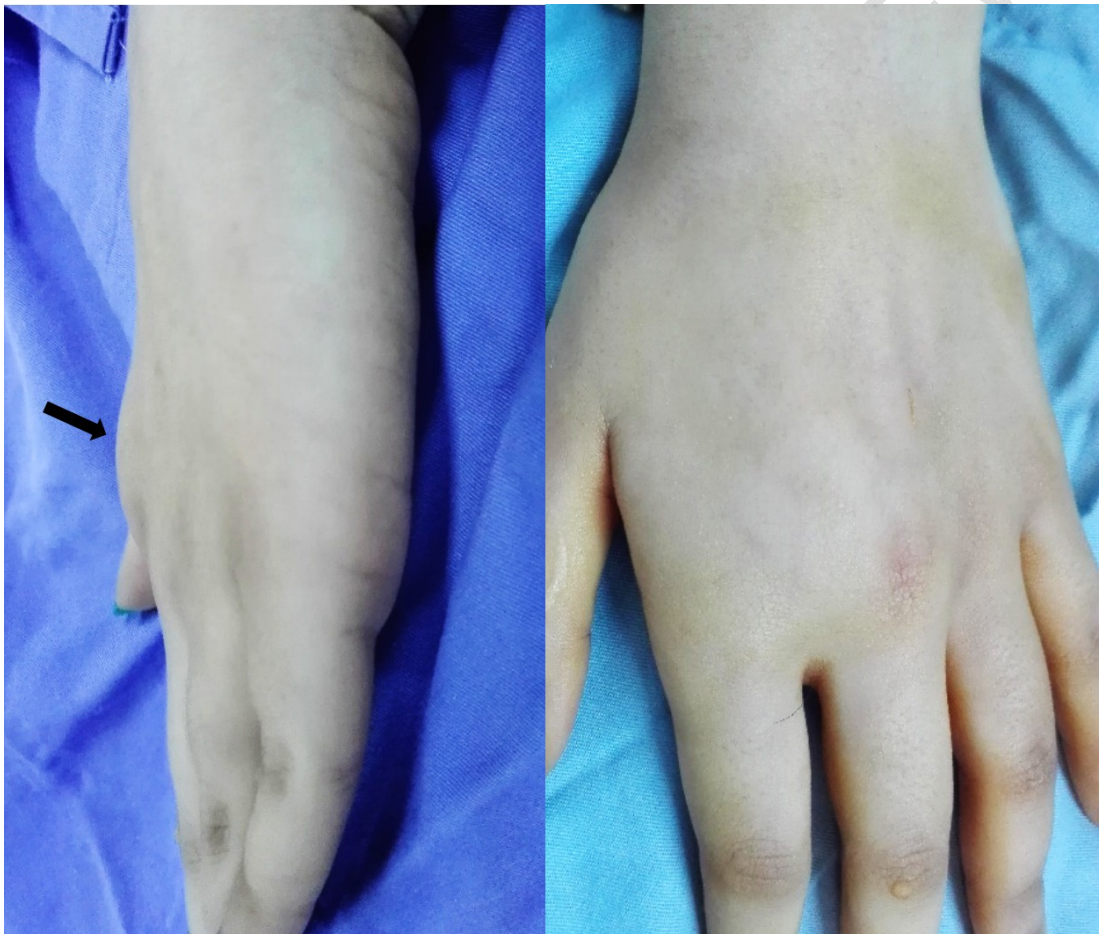

Figure 1: Clinical appearance showing the swelling on the dorsal aspect of the left hand.

Plain radiographs of the left hand revealed a well-defined and non-invasive heterogenous sessile bony lesion. It was protruding from the neck and the diaphysis of the second metacarpal bone. Cortical wall was thin but without any cortical destruction or periosteal reaction (Fig.2).

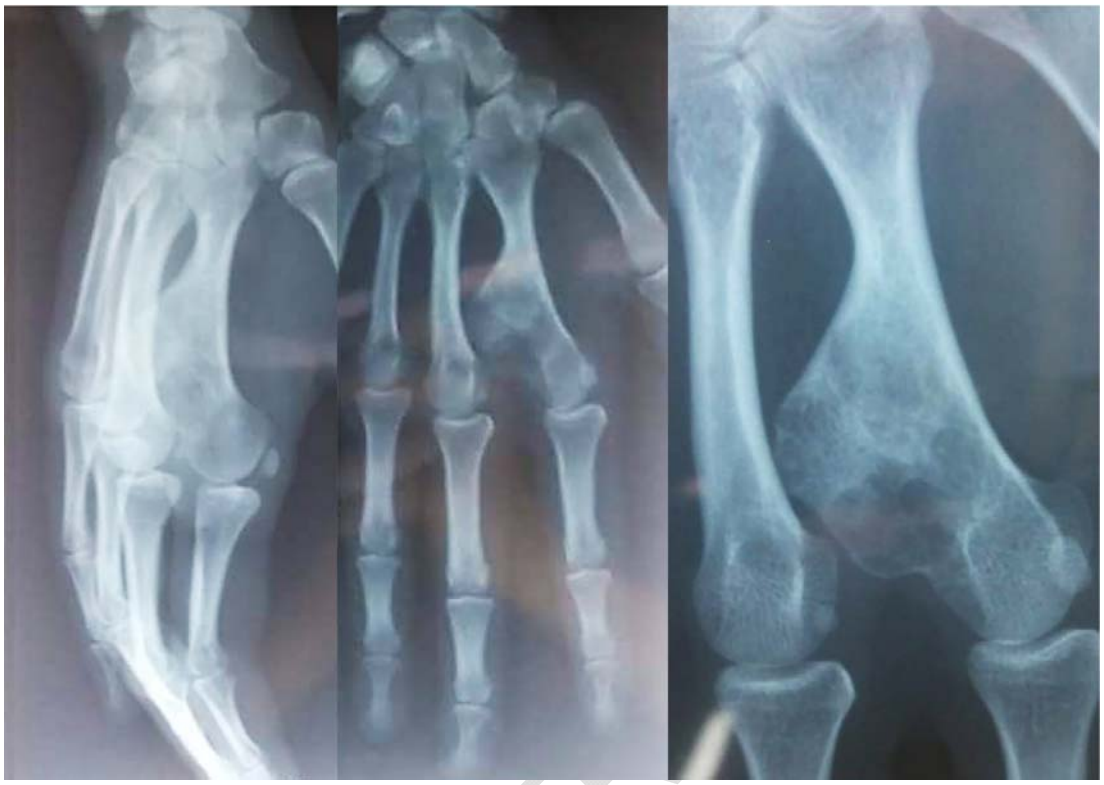

Figure 2: X-rays of the left hand showing a well-defined and non-invasive heterogenous sessile bony lesion, protruding from the neck and the diaphysis of the second metacarpal bone.

Magnetic resonance imaging (MRI) of the left hand showed a bone forming tumor with a large implantation area developing from the diaphysis of the second metacarpal bone and having the same signal as the adjacent bone. The lesion was continuous with the medullar cavity. A cartilage cap, measuring 10 mm in thickness, was found overlying the bony lesion with high signal intensity on T2 weighted images. A signal enhancement was present on the periphery after gadolinium administration. Adjacent bone and joints but also soft tissues were normal. These findings are characteristic of a benign osteochondroma with no radiological evidence of malignancy (Fig.3).

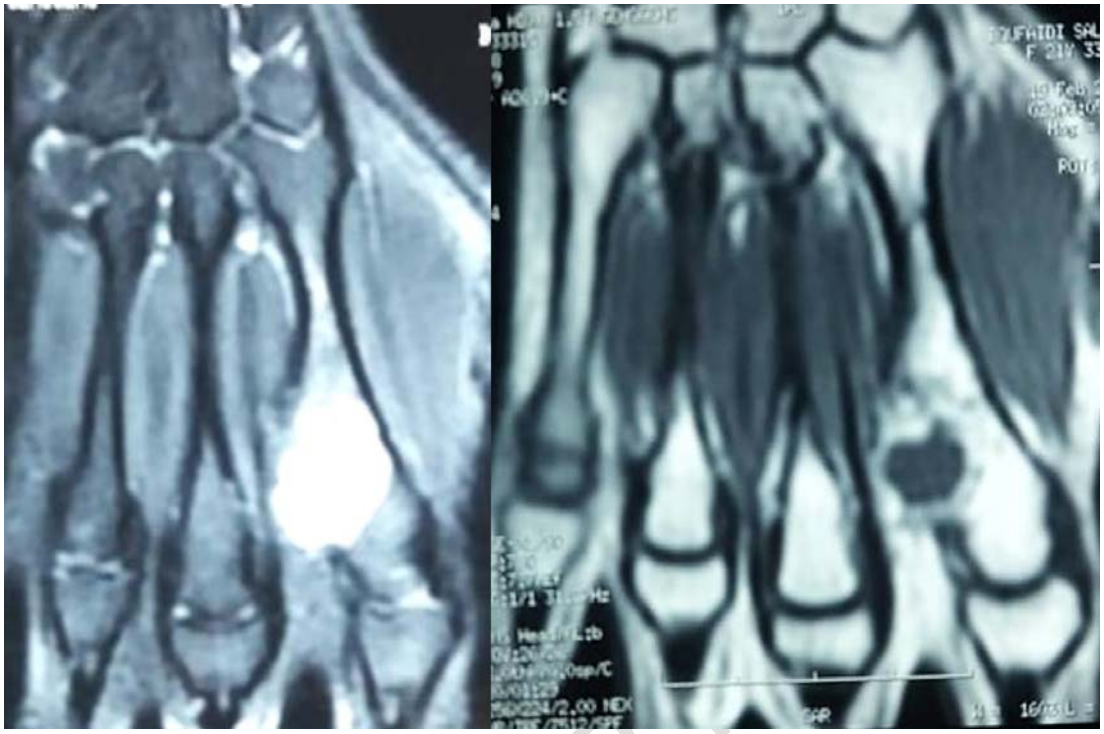

Figure 3: MRI of the left hand showing the cartilage cap overlying the bony lesion, measuring 10 mm in thickness, with high signal intensity on T2 weighted images. A signal enhancement was present on the periphery after gadolinium administration.

The patient underwent surgery under general anesthesia. The lesion was approached by a dorsal incision. The vascular elements and tendons were dissected and the lesion was exposed (Fig.4). We performed an excisional biopsy with an osteotomy (Fig.5). The void was curetted and rinsed using a saline solution.

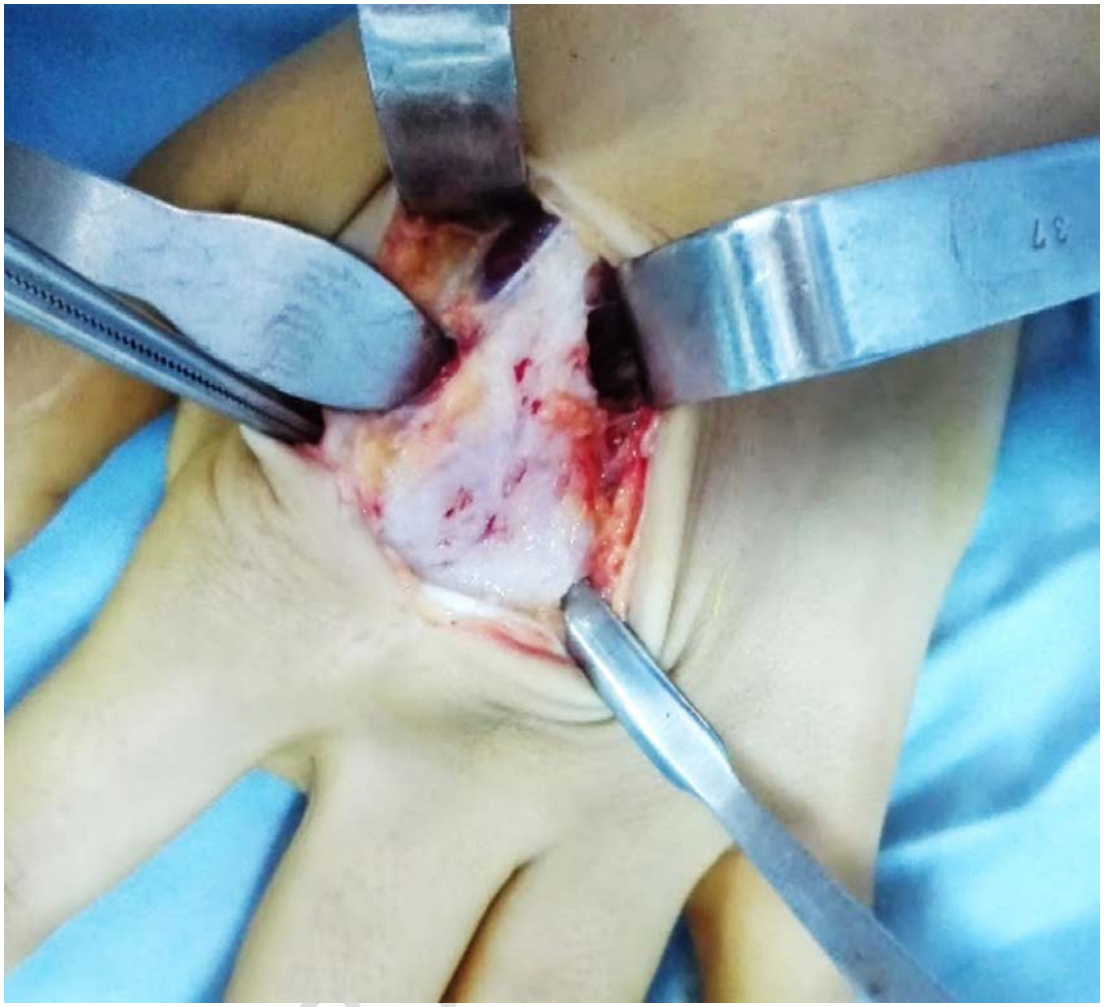

Figure 4: Intraoperative image showing the aspect of the lesion before excision.

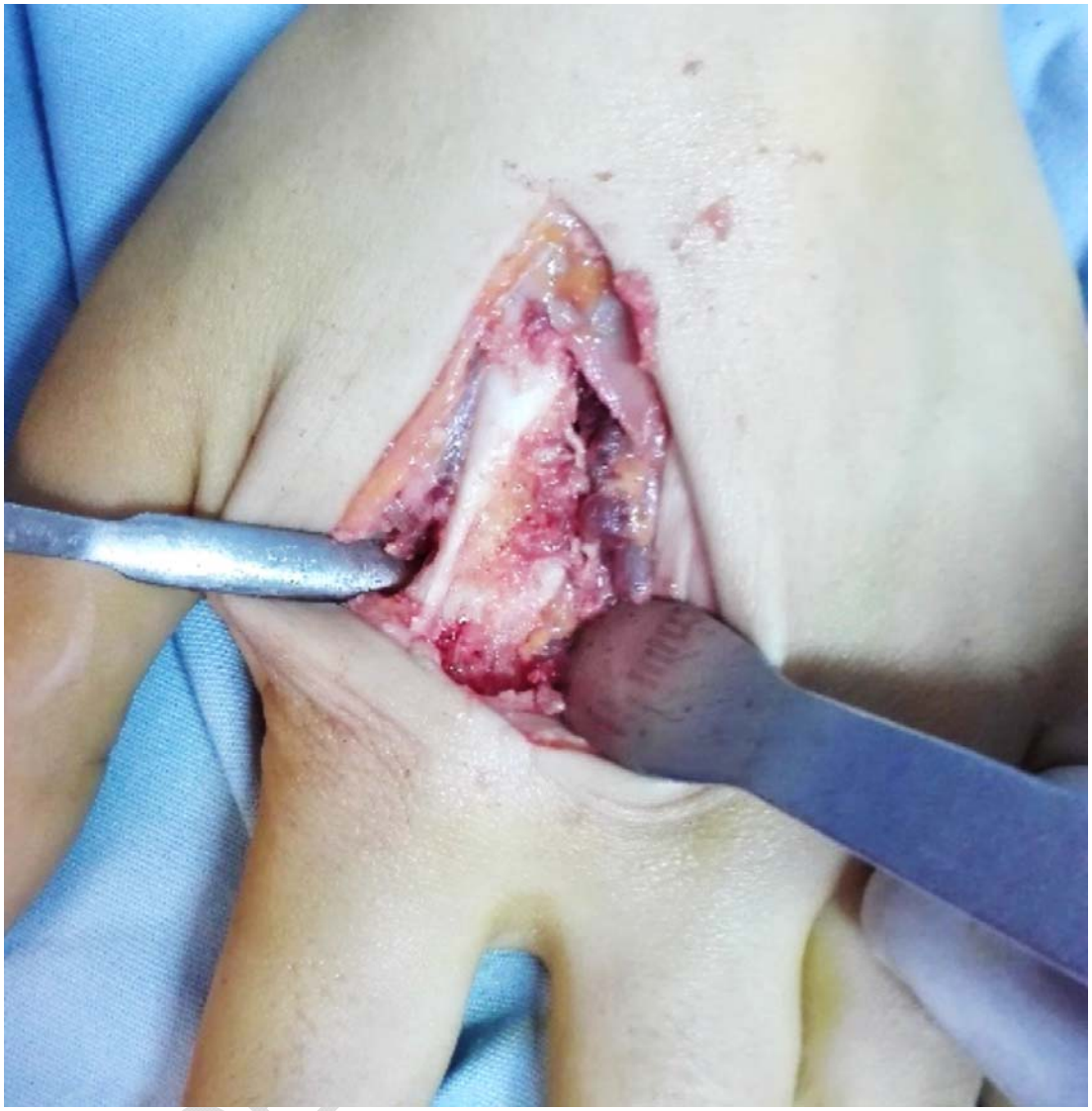

Figure 5: Intraoperative image after performing an excisional biopsy with an osteotomy.

Immediate post-operative radiographs of the left hand showed complete resection of the lesion. (Fig.6)

Histological examination confirmed the diagnosis of osteochondroma.

Healing was uneventful; the patient had a satisfactory recovery from surgery and a good range of motion of the metacarpo-phalangeal joint.
She has been on regular follow-ups. At the last follow-up of 2 years post-operatory there was no clinical evidence of recurrence and the patient was satisfied with a good functional and esthetic result.

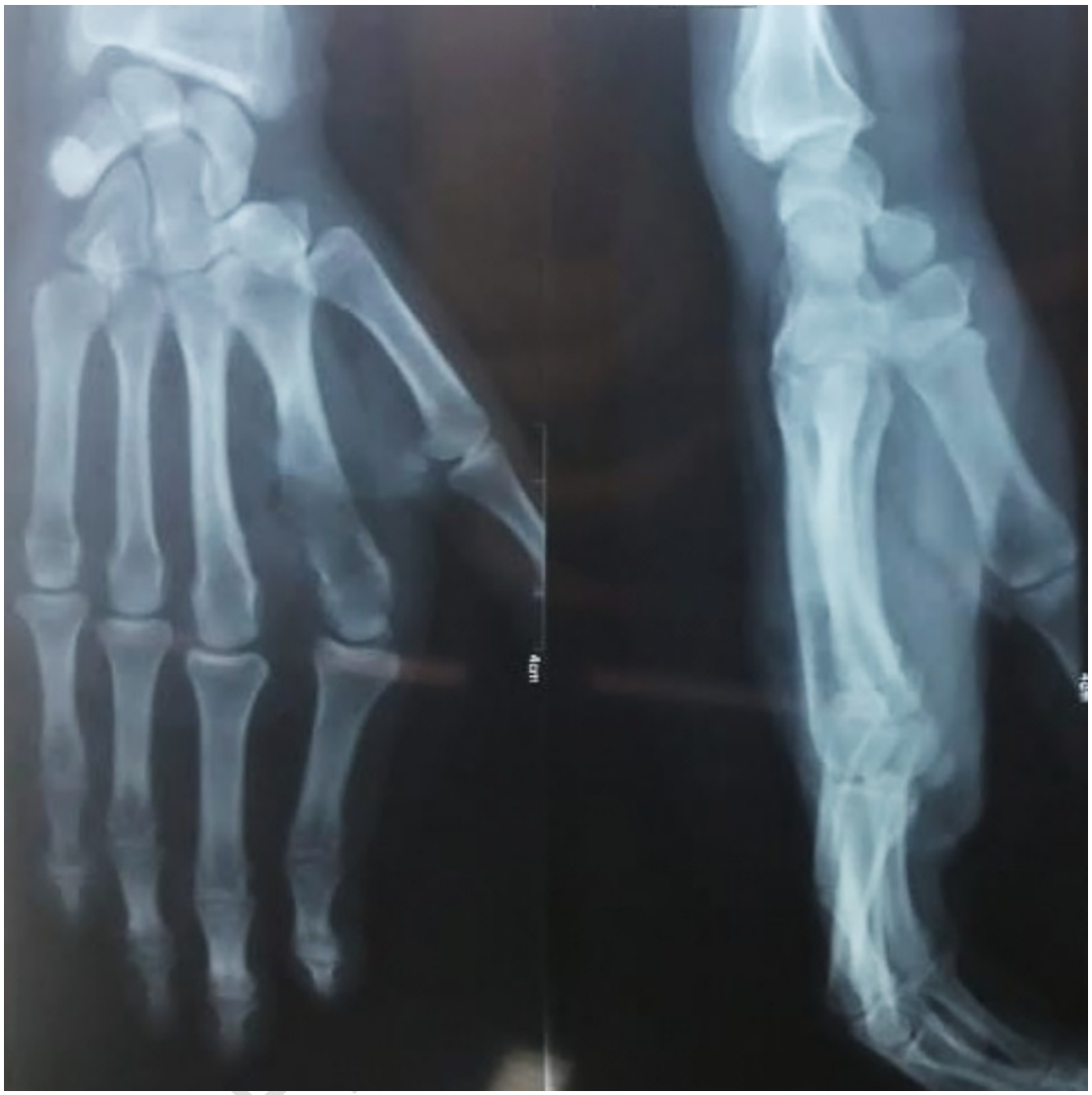

Figure 6: Immediate post-operative X-rays of the left hand showing complete resection of the lesion.

3. DISCUSSION

Solitary osteochondroma is the most common primary bone tumor, usually developed in long bones, mainly localized on the lower femur and the upper tibia [1,2]. However, it develops exceptionally in the metacarpal bones. In a study of 1024 solitary osteochondromas, only 4 cases were situated in the metacarpal bones [3].

Solitary osteochondromas of the hand are rare in children, usually seen as part of the multiple exostoses syndromes like hereditary multiple exostoses and Muenke Syndrome.

Solitary osteochondromas localized in the hand and developing in adulthood are extremely rare and have different presentations depending on the site of origin of these tumors. Most adult solitary tumors arise either from the distal phalanx or in the carpal bones, exceptionally in the metacarpals [2].

Distal phalangeal tumors almost always arise subungually and cause nail deformity. Tumors arising from the carpal or metacarpal bones may cause extensor tendon rupture or carpal tunnel syndrome [2].

It's a benign bone tumor usually asymptomatic. Indeed, occurring pain and swelling are actually the symptoms of a fractured osteochondroma [4] which usually occurs around the knee and in pedunculated lesions. In contrast, large based osteochondromas (non-pedunculated lesions as in our case) should not be at risk of fracture.

Because of insufficient data, there are no established criteria to predict whether an osteochondroma will fracture or not [5].

Even though it is usually asymptomatic, a slight pain and swelling can occur in other sites (but the knee) because of the fact that osteochondroma can't bear loads [4] and because of the irritation of surrounding tissues.

X-ray is helpful for the primary diagnosis. For further investigations, CT-scan and MRI are equivalent for distinguishing the type of the bone tumor, its differential diagnosis and particularly for the measurement of the cartilage cap thickness with a better specificity with MRI [6].

Its differential diagnosis includes Nora's lesion, florid reactive periostitis and Turrent exostosis [7] but chondrosarcoma should also be suspected.

Nora's lesion or Bizarre Paraosteal Osteochondromatous Proliferation is a soft tissue ossified tumor with a typically absent medullary involvement [8].

Turrent exostosis develops following a trauma [6]. Florid reactive exostosis occurs also following a trauma but physical examination is characterized by the presence of swelling/pain and a periosteal reaction is found on radiologic findings.

Malignant degeneration is possible even though it is rare in the hand compared to pelvic and spinal location [6].The prevalence of malignant transformation of benign osteochondromas varies from less than 1% for solitary tumors and 2-5% for hereditary multiple exostoses [9].

Ongoing growth and pain, after skeletal maturity has been reached, are suspicious for malignant degeneration.

Malignancy is also suspected if radiological images note the presence of radio-lucency, thick trabeculations, cortical destruction or irregularity, an encroachment of the soft tissue and adjacent elements, signal anomalies and if the cartilage cap thickness measures over 20 mm [6].

In our case, these radiological criteria weren't found but ongoing growth and intermittent pain were noted.

Besides, it's important to notice that radiological investigations aren't a truly reliable method for identifying or excluding an osteochondroma due to the presence of equivocal findings.

Thus, surgical removal should be planned. Indeed, histological examination is essential and still necessary for the correct differential diagnosis of this disease.

Currently, complete resection is the treatment of choice for symptomatic solitary osteochondromas in adults. [2]

However, some authors suggest conservative treatment and observation with regular follow-ups for asymptomatic lesions [2].

Errani and al. [10] suggested avoiding surgical excision of osteochondromas in pediatric population specifically in long bones which can lead to angular and gross deformity. In short bones, such as the metacarpal, it is still controversial as long as only few cases have been reported.

Cartilage cap thickness of 2 cm or greater could be used as a good argument for recommending resection for malignant concerns [6].

Recurrence is possible and may be due to incomplete excision [7].

Complications are bone deformity, fractures, vasculo-nervous compression and malignant transformation which can be prevented by a complete excision of the lesion.

4. CONCLUSION

In conclusion, osteochondromas are rarely located in the metacarpal bones. Proper radiologic investigation is necessary to aid the differential diagnosis and the surgical planning. MRI and CT scan are quite helpful for differential diagnosing and assessing the risk of malignant transformation. Current treatment for asymptomatic lesions is based on observation. In the others cases, surgical approach relying on osteotomy is recommended in order to prevent bone deformity, fracture and malignant degeneration.

Disclaimer regarding Consent/Ethical Approval:

As per university standard guideline participant consent and ethical approval has been collected and preserved by the authors.

COMPETING INTERESTS

None

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