A case report of an unconventional minimally invasive technique for excision of a proximal humerus enchondroma

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Received: 03 November 2022
Revised: 19 November 2022
Accepted: 11 December 2022
Published: 14 April 2023

The Egyptian Orthopaedic Journal 2023, 57:361–364

Enchondromas are cartilaginous neoplasms most commonly isolated in the medullary bone, and most of which are asymptomatic in nature not requiring any treatment. In rare cases, these tumors become symptomatic, with no universal consensus on treatment, other than the conventional pathway of conservative management followed by surgical resection, if necessary. A case of a middle-aged woman with shoulder pain is presented. She was found to have an enchondroma as the sole cause of her pain after treating and ruling out all other etiologies. This mass was excised using a minimally invasive new technique, reducing both postoperative morbidities and recovery duration.

Keywords:
cartilaginous tumors, enchondroma, minimally invasive, novel technique, shoulder

Egypt Orthop J 2023, 57:361–364

1110-1148

Introduction

Enchondromas are cartilaginous neoplasms constituting 3–17% of bone tumors [1,2] and are usually seen in the medullary bone as solitary lesions [3]. Most enchondromas develop during the third and fourth decades and are usually found among other places such as the femur, tibia, humerus, and on the ulnar-sided tubular bones of the hand [3–5]. They are usually incidental findings on radiographs after unspecified pain and raise the question of surgical therapy [6]. In most of the series, the initial presentation consisted of a pathologic fracture [7–9].

Although these tumors are active, they grow slowly and a malignant transformation is usually a rare finding [9]. The treatment is usually conservative and a surgical approach should not be attempted unless the patient is symptomatic or is presenting with a pathologic facture [10]. Presented here is a 41-year-old woman suffering from left shoulder pain of 4 months duration found to have a proximal humerus enchondroma, which was excised in a minimally invasive surgical technique in a university hospital.

Case presentation

This is a 41-year-old female patient without any relevant medical history presenting for left shoulder pain of 4 months duration. The patient presented with pain at night and during overhead activities. Upon physical examination, the patient had painful abduction and both Hawkin's and Neer's tests were positive. Otherwise shoulder range of motion was unaffected. Radiographs and MRI showed a well-defined lesion measuring ~1.5 cm involving the left humeral metaphysis, with characteristic features of an enchondroma (Fig. 1), along with moderate subacromial bursitis. No rotator cuff tear was seen, and no significant effusion, edema, or signs of muscle atrophy either.

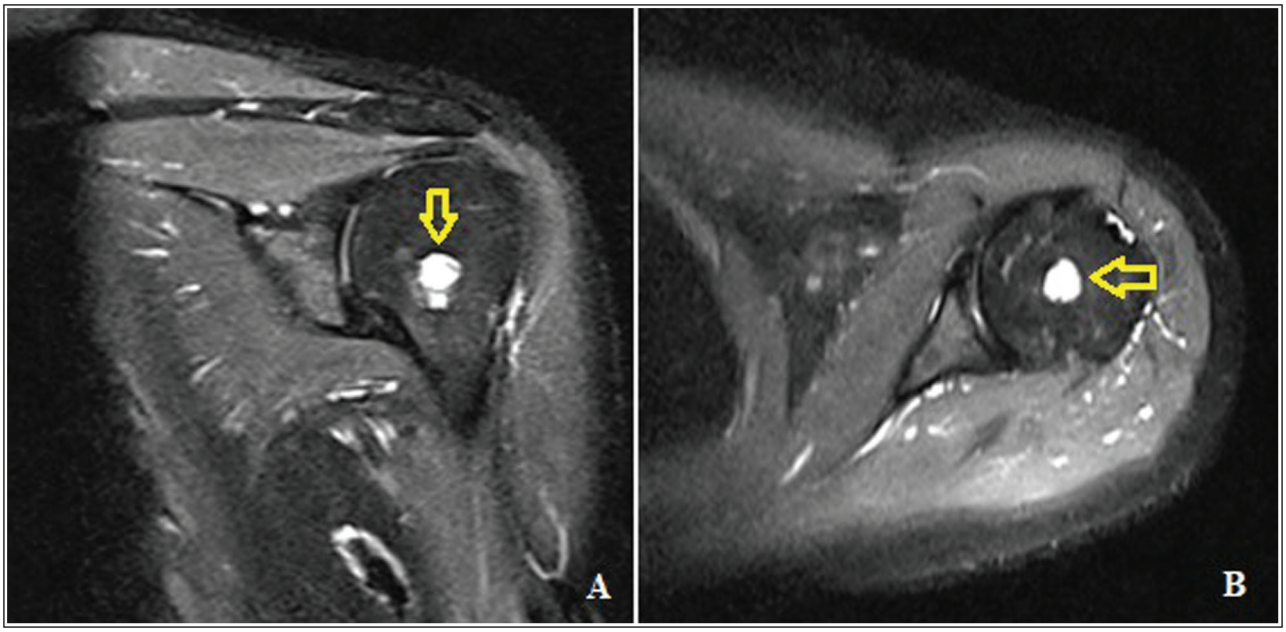
Clinical and radiological assessment showed both a mechanical cause for her pain with subacromial impingement being the direct cause. In addition, her pain is inflammatory in nature, waking her up at night during the month before presentation. Per-os medical treatment consisting of analgesics and NSAIDs have failed to relieve her symptoms. A subacromial corticosteroids infiltration was opted resulting in minimal improvement. Therefore, shoulder arthroscopy both for its diagnostic and therapeutic values was done.

Under general and locoregional anesthesia, in beach chair position, an arthroscopic evaluation of the glenohumeral joint was performed, along with an examination of the biceps, the rotator cuff, the posteroinferior quadrant, the glenoid cartilage, the labral attachment, the peripheral capsule, the synovial tissue, and the entire labral rim. Other than a moderately inflamed bursa, the inspection revealed normal structures. Subacromial bursectomy with acromioplasty was then performed for decompression using a shaver and a burr.

From the lateral portal and under fluoroscopy, the humeral head mass was identified. A large bore needle was inserted into the mass through the lateral part of the

 DOI: 10.4103/eoj.eoj_58_22

Figure 1



MRI of the left shoulder showing (a) on the coronal cut a well defined intraosseous lesion of the proximal humeral metaphysis measuring 1.5 cm and (b) the axial cut showing the previously described lesion (black and white).

humeral head under direct vision using the anterolateral portal extra-articularly from the lateral edge of the bicipital groove followed by a needle aspiration from the mass itself, sending it to the pathology laoratory. A curette was then inserted and extensive curettage of the intraosseous lesion was carried out (Fig. 2). Fluoroscopy was used to both guide the insertion of the curette and to do the curettage.

A shaver was also used as adjunct to the curette for further debridement. A final aspiration was achieved and sent to pathology, which confirmed the lesion as enchondroma. Lavage was then done using an arthroscopic metal cannula, and a bone graft (Fig. 3) was inserted using a large needle and a cannula into the defect. Fluoroscopic control showed good diffusion of the bone graft. The wound was flushed out, and the portals were closed with a single stitch.

Final pathology showed few small, scattered fragments of hypocellular hyaline cartilage showing cytologically bland chondrocytes compatible with a benign enchondroma.

At 1 and 3 months follow-up, the patient reported resolution of her symptoms with return to previous daily activities. Postoperative plain radiographs showed no filling defect and good bone diffusion in the previously affected site (Fig. 4).

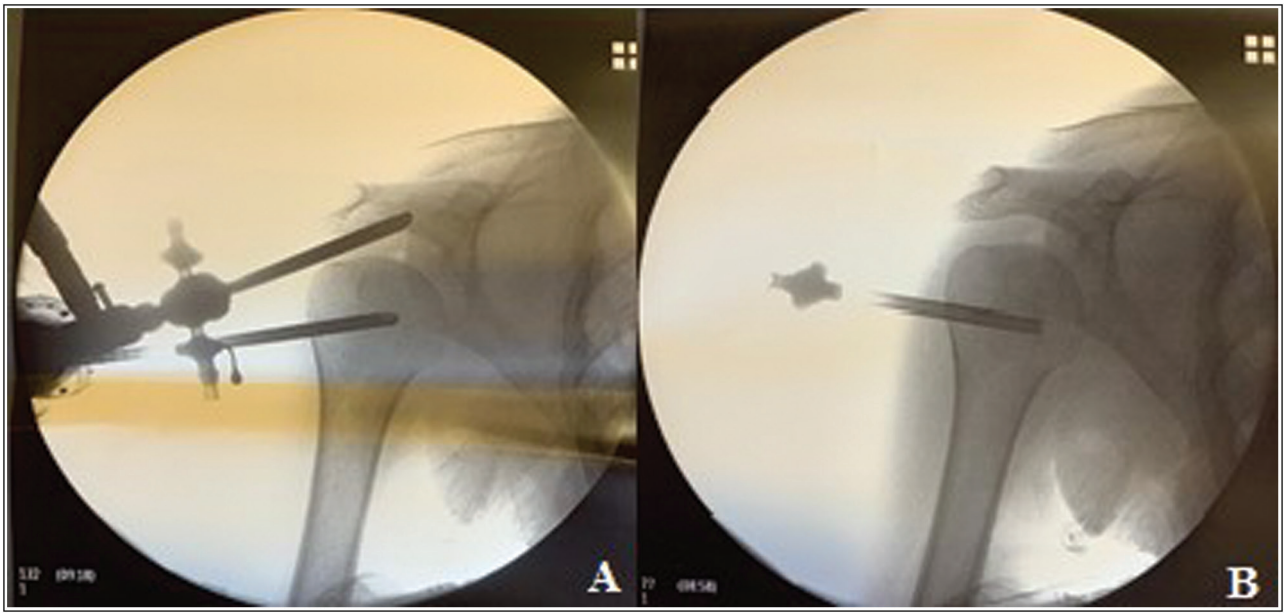
Figure 2

Curettage of the intraosseous lesion done under fluoroscopy through the lateral aspect of the proximal humerus (black and white).

Discussion

Even though enchondromas are benign, they can transform into chondrosarcomas in 1–9% of the cases [11]. Whether to do surgery or not is based on the aggressiveness assessed by clinical examination and imaging as well as the presence of endosteal scalloping, the extension to the surrounding soft tissue, the growth and size of the lesion, and the pain being not related to other shoulder pathologies [11]. Since the patient failed multiple modalities of conservative treatment

Figure 3



(a) Insertion of the cannula under direct vision and fluoroscopy through the axis of the intraosseous lesion. (b) Advancement of the cannula under fluoroscopy into the vicinity of the lesion (black and white).

Figure 4

Postoperative radiograph of the shoulder showing the homogeneous spreading of the bone graft through the cavity of the lesion without any filling defects (in color).

for impingement syndrome, arthroscopic intervention was opted for subacromial bursectomy, acromioplasty, and enchondroma excision using the lateral portal under fluoroscopy followed by bone graft filling of the cavity. Bone substitute was found reliable for filling and avoids the use of iliac bone in a series of 15 patients [12]. Also, intraosseuous curettage of the lesion had low rates of recurrence in the literature regardless of whether the tumor was an enchondroma or a low-grade chondrosarcoma [13,14]. Although this technique has several advantages, it also has some drawbacks (Table 1).

Table 1 Advantages and disadvantages of the enchondroma excision technique described in this article

Advantages	Disadvantages
Minimally invasive and extracapsular	High learning curve
Lower risk on the surrounding soft tissue and neurovascular structures	Risk of intraosseous instrument breakage
Faster rehabilitation and return to activities	
Minimal blood loss and lower risk of wound infection	
Use of cannula to aim at correct axis to access lesion with minimum trials, hence lower risk of seeding	
Lower risk of fracture since the point of entry is in the lateral cancellous bone instead of the anterior	

Conclusion

There is scarcity of information in the literature concerning conservative versus surgical treatment of benign humeral neoplasms. In some cases, this technique can be used as it showed satisfactory results.

Acknowledgements

Statement of ethics: this study protocol was reviewed and approved by Saint George's Hospital Ethics Committee. Written informed consent was obtained from the patient for publication of the details of their medical case and any accompanying images.

Author contributions: Dany K. Aouad: data collection, writing of the manuscript. Nabil G. Dib: writing of the manuscript. Mohammad Daher: writing and submission of the manuscript. Georges El Rassi: surgeon who did the surgery.

Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

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