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Osteochondroma of the scapula: A rare case report

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Abstract
Osteochondroma, often referred to as exostosis, is the most common benign bone tumor characterized by a bony protuberance covered by a cap of hyaline cartilage. The presence of medullary and cortical bone with the continuity of the tumor is pathognomonic for osteochondroma and aid in establishing the diagnosis. Most osteochondromas are found on the metaphysis of long bones, with the dorsal aspect of the scapula being a rare site of occurrence for an osteochondroma. Radiographic imaging, preferably through MRI or CT, assists in the identification of benign growth; however, a definitive diagnosis requires a biopsy. Open surgical resection and arthroscopic excision are the definitive treatment modalities. We present a case of 7-year-old male child who presented to our OPD following her mother noticing a palpable, growing mass on his left upper back. There was no limitation in the range of motion. A large mass was seen on the dorsal aspect and palpated measuring around 5x5x4cm. Surgical excision of the mass followed by histologic examination confirmed osteochondroma. Upon follow-up, the patient had no pain and had a full range of left shoulder motion without discomfort or pain and no signs of recurrence.

Keywords: Osteochondroma, dorsal scapula, exostosis

Introduction
Osteochondromas are the most common primary bone tumor composing approximately 24–40% of all benign bone tumors. Common sites include the distal femur, proximal tibia and proximal humerus but are rarely seen on flat bones [1]. Osteochondroma occur mainly in the metaphysis and diametaphysis and projects out of the underlying bone. The cartilaginous cap is the site of growth, which normally diminishes after skeletal maturity. They are more of developmental lesions, referred to as exostosis, rather than true neoplasms. Osteochondromas emerge due to a separation of a part of the cartilage of the epiphyseal growth plate, which as a result, herniates through the periosteal bone cuff surrounding the growth plate [2]. Osteochondromas are usually discovered incidentally due to their asymptomatic nature. Malignant transformation is rare and is most commonly associated with hereditary exostosis. Osteochondromas of the scapula are rare, making up approximately 3–5% of all osteochondromas, however, it is the most common benign bone tumor of the scapula comprising 14.4% of all tumors [3]. Most reported cases in the literature present an anterior or ventral scapular location [4] and there are very few reports of posterior or dorsal surface presentation for which very little information is available. Furthermore, all reported cases have opted for excision, which was sufficient to alleviate the symptoms [4]. Surgical management is usually indicated with the presence of pain, for cosmesis, complications, high risks of malignant transformation, or uncertain diagnosis.
Here we present a case of a 7-year old male child with a large dorsal scapular osteochondroma and outline the presentation, work up and its subsequent excision.

Case Presentation
A 7-year-old male child presented to our outpatient department with complaint of swelling in the left upper back region. History revealed that the swelling was initially noticed by attendants when the child was 2 years of age but was neglected as the child wasn't complaining of pain or difficult movements of shoulder or arm.

The swelling gradually increased in size since the last 1 year. Patient still didn't complain of any pain or decreased range of motion of the left shoulder or any difficulty in weight bearing. No similar history among other family members was present. Physical examination revealed a well-defined, round, non-tender mass which was bony hard in consistency, 5x5x4 cm in size over the dorsal scapular region. Overlying skin conditions were normal. There was no sign of winging of scapula. Neurovascular examination of both upper limbs was normal.

Workup and Imaging

Radiological investigations include X-rays of the left shoulder with scapula, in particular an AP view and an axillary view perpendicular to the plane of the scapula and a scapular 'Y' view. X-rays showed a bony growth on the posteroinferior aspect of the scapula. CT scan and MRI of the left shoulder were performed for further delineating the tumor and scapular anatomy and for thickness of the cartilaginous cap. NCCT left shoulder featured large pedunculated mushroom like osseous mass from dorsal aspect of lower pole of scapula measuring 54x51mm in size showing internal calcification with no soft tissue mass. MRI left shoulder showed a large multiloculated osteochondroma arising from posteroinferior aspect of left scapula, growing exophytically, measuring 54 x 57 x 46 mm. the cartilage cap is identified on all portions and its maximum thickness measures 6mm. The imaging was consistent with the findings of a benign bone tumor. Although benign bone tumors such as enchondroma, fibroma, chondroblastoma, osteoid osteoma, osteoblastoma, and periosteal chondroma were part of the differential diagnoses, the radiographic appearance of a solitary osteochondroma was pathognomonic. The imaging showed protuberance of cortical and medullary bone from the underlying bone which confirmed the diagnosis. As due to gradual increase in size suspicion of malignant transformation was made and thus treatment options were discussed including close follow up or surgical excision, with the father opting for surgical excision of the lesion for cosmesis. Risks and benefits were discussed, particularly regarding neurovascular compromise and recurrence and informed consent was obtained for surgical excision.

Surgical procedure

The decision for surgical removal with a safety margin was made. Routine investigations and pre anesthetic checkup were done. The patient was placed in a prone position under general anesthesia. The left shoulder, arm and chest were prepped and draped in a sterile fashion. An incision was made right above the mass, soft tissue dissection was done carefully separating the muscle directly from the mass, and excising the mass from the base so that no residual part of the mass is left behind. The stalk of the exostosis was excised at the base with an osteotome from the posteroinferior surface of the scapula and the remaining stump was nibbled. The specimen measured 5 × 5 cm was sent for HPE. Closure was done in layers and adhesive sterile bandage was applied. Histologic examination confirmed that the specimen was an osteochondroma with no signs of atypia or malignant transformation and normal underlying trabecular bone. Post op period was uneventful. The patient was followed up in the OPD at 10th day for suture removal, then regularly at 6 weeks, 3-months, 6 months for signs of any recurrence. At yearly follow up, the patient had no pain, and had a full range of left shoulder motion without discomfort or pain. Follow-up X-rays showed no evidence of recurrence. The patient has not developed any recurrence as of now and will be continuously followed up to check for any recurrence.

Discussion

Osteochondromas are the most common primary bone tumor accounting for 24–40% of all benign bone tumors. They commonly affect proximal humerus, pelvis and knee but are rarely seen on flat bones [5]. Classification is based on the morphology of the base, defined as either pedunculated (with a stalk, growing away from the epiphysis or sessile (broad based). Sessile variants occur more commonly than pedunculated ones. Usually these are asymptomatic painless slow growing mass but sometimes may present with symptoms of pain when compressing nearby neurovascular structures or impeding joint motion. Growth of the lesion generally parallels the growth of the individual, with a lesion rapidly expanding along with a child's growth. It is rare for an osteochondroma to substantially grow after skeletal maturity; however, some exostoses can have continued growth into the third decade of life, without any malignant change [6]. Although there is no metastatic potential, malignant transformation to chondrosarcoma or osteosarcoma can occur. Malignant transformation occurs in approximately 1–2% of lesions over a life time in solitary lesions and occurs more frequently in individuals with EXT1 mutations as compared with EXT2 mutations [7]. Signs that would suggest malignant transformation on radiography include new cortical irregularity, continued growth after skeletal maturity, bony destruction, back growth of the cartilaginous cap into the stalk or medullary canal, lysis of calcifications in the cap, focal regions of radiolucency inside the lesion and a large soft tissue mass [8]. It is important to recognize that cartilage cap size is highly affected by skeletal maturity, with increased cap size being a recognized feature in the skeletally immature as a reflection of active growth, and should not be used as a sign of malignant transformation [8]. Clinical signs correlating with malignant transformation include pain, swelling, irregular boarders and an enlargement of the mass, particularly after a period of dormancy [9]. Locations of osteochondromas that should raise concern regarding their malignant potential include the ilium, scapula and pubic rami, as these are the most common sites associated with malignant change [7].

Osteochondroma of the scapula is a rare tumor. It constitutes 14.4% of all tumors of the scapula with the ventral surface being the more common site of presentation than the dorsal [10]. Larger lesions tend to be situated in the inferior aspect of the scapula due to a lack of space restriction. A painless bony mass is the most commonly reported symptom as presented in our case, but pain if present, is mostly due to the mass effect of tumor on the surrounding tissue. A wide range of other presentations includes a decreased range of motion, nerve impingement, underlying bursitis, fracture of the stalk of the tumor, and "pseudo-winging" of the scapula [11]. Snapping scapula syndrome, which is a syndrome of painful, audible, and/or palpable abnormal scapula thoracic motion, can develop when the osteochondroma is presented on the anterior surface of the scapula, especially in adolescence or early adulthood [12]. Osteochondromas of the ventral surface of the scapula lead to potential problems such as bursa formation, pseudo-winging of the scapula, snapping syndrome, and restricted movements of the shoulder, most of which are relieved by excision of the tumor [13-16]. Osteochondromas are usually not difficult to diagnose clinically, but confirmation is a must by histopathological studies of the biopsy taken.

Radiographic studies such as X-ray and CT scan are essential for isolating the location of the mass and planning surgical approach [17]. The only definitive treatment of osteochondroma is enbloc excision of the tumor. We presented a case of 7-year-old boy with a large osteochondroma of dorsolateral scapula for which enbloc excision was done and histopathology showed no signs of malignant transformation.

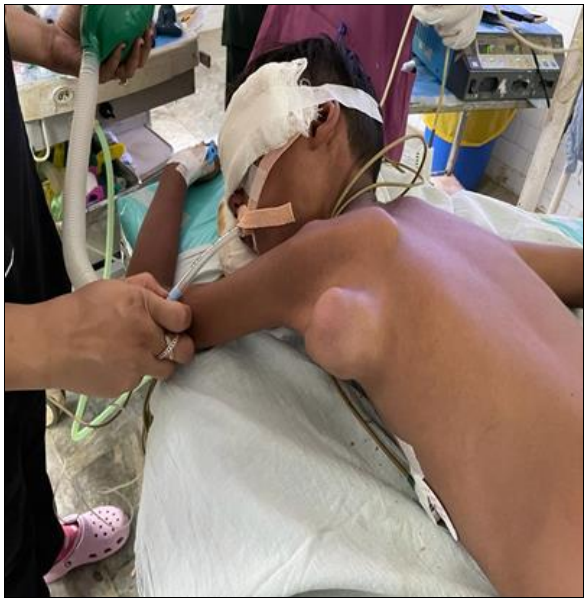


Fig 1: Pre-operative clinical photograph

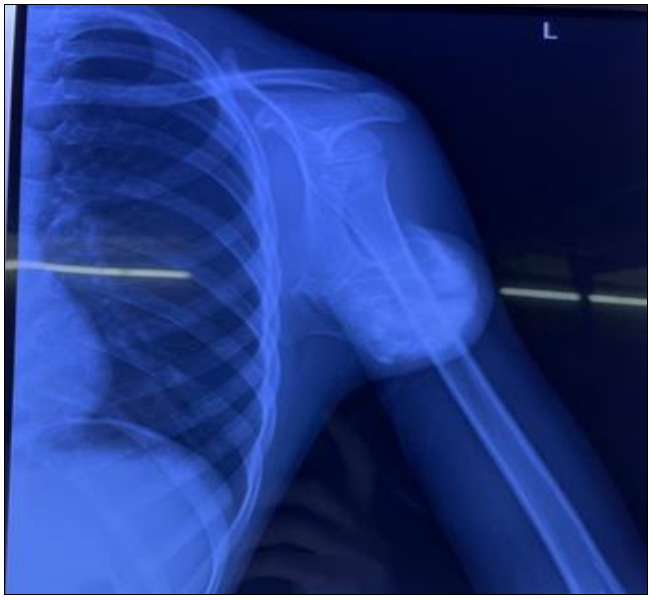


Fig 2: Pre-operative radiograph left shoulder AP view

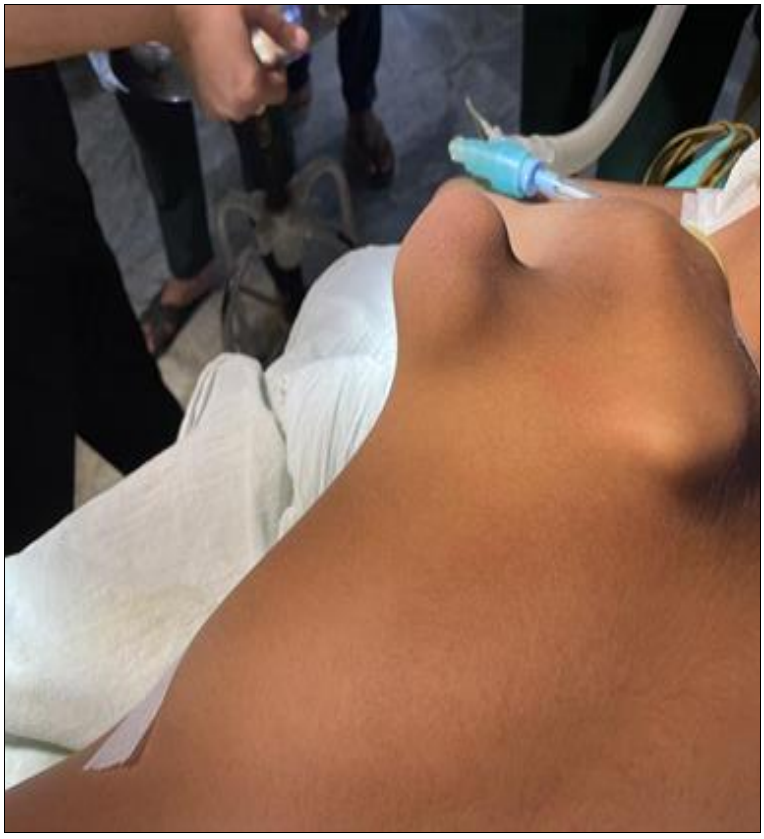


Fig 3: Clinical photograph of swelling

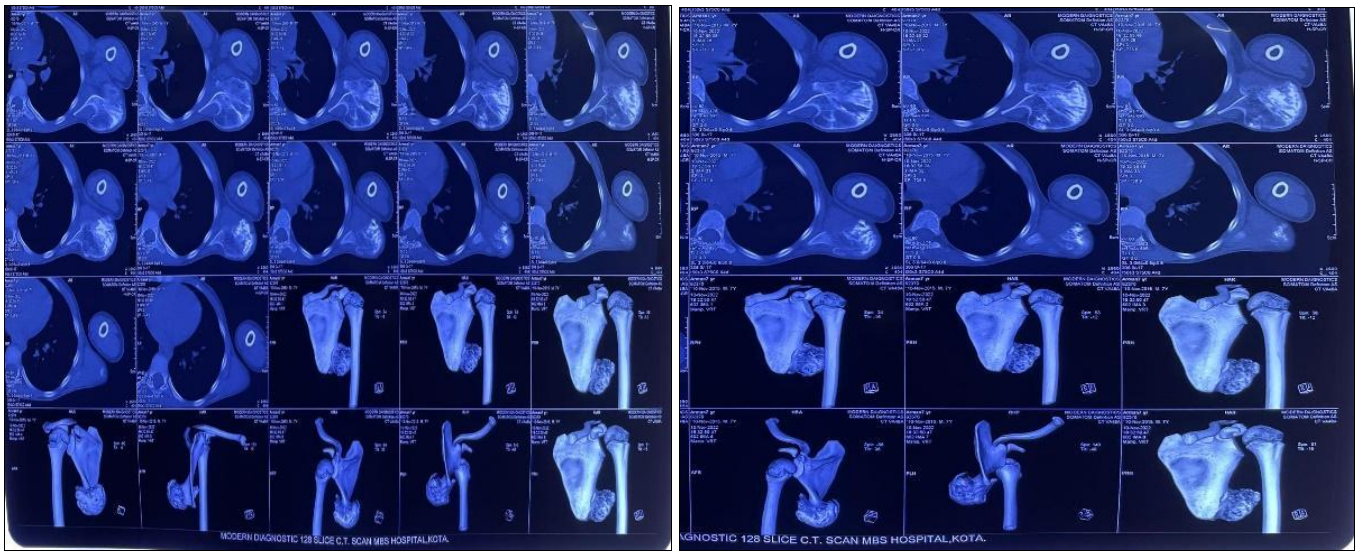
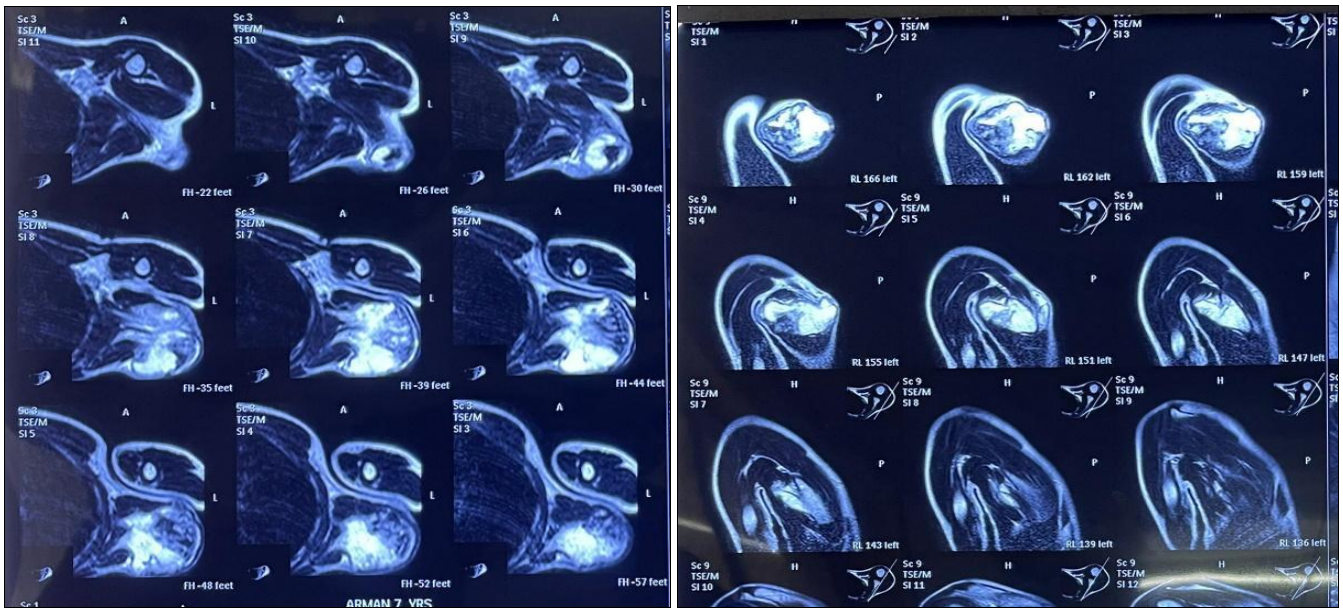


Fig 4: (a,b) Pre-operative NCCT left shoulder



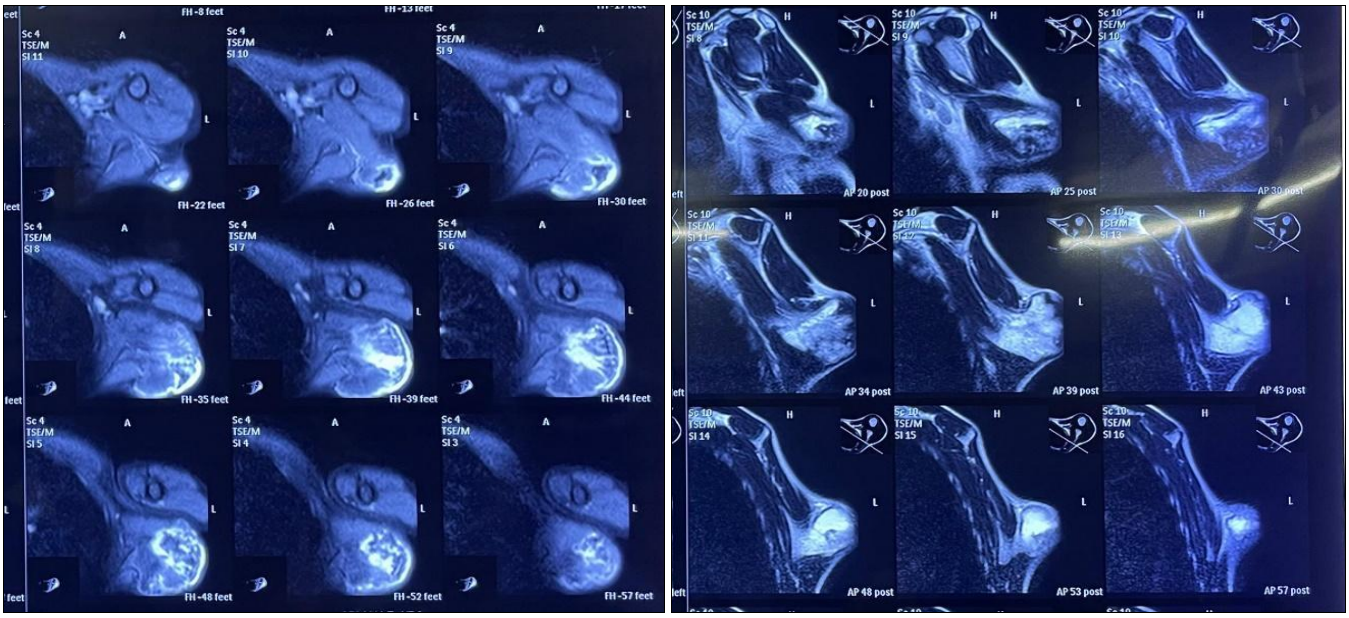


Fig 5: (a, b, c, d) Pre-operative MRI left shoulder

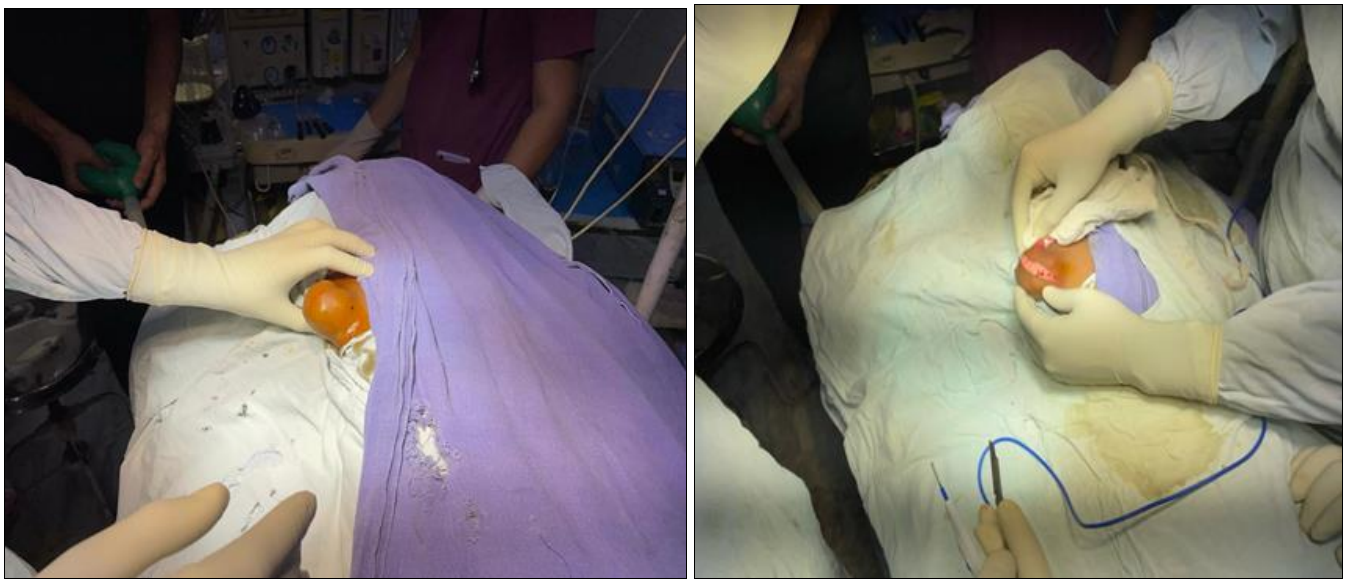


Fig 6: (a, b) Draping and incision

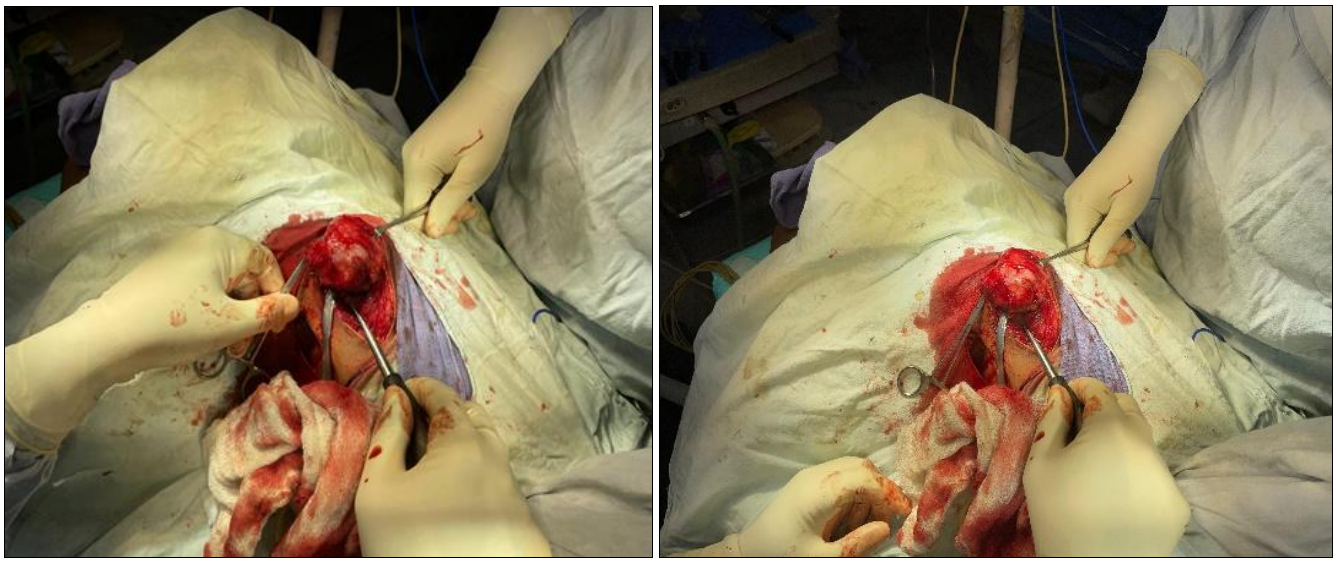


Fig 7: (a, b) Exposure of the tumor with stalk

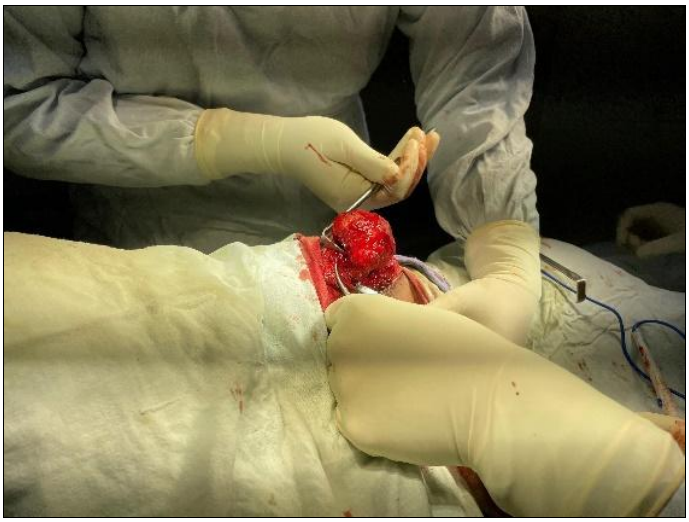


Fig 8: Resection of tumor with stalk

Fig 9: Sample sent for histopathological examination

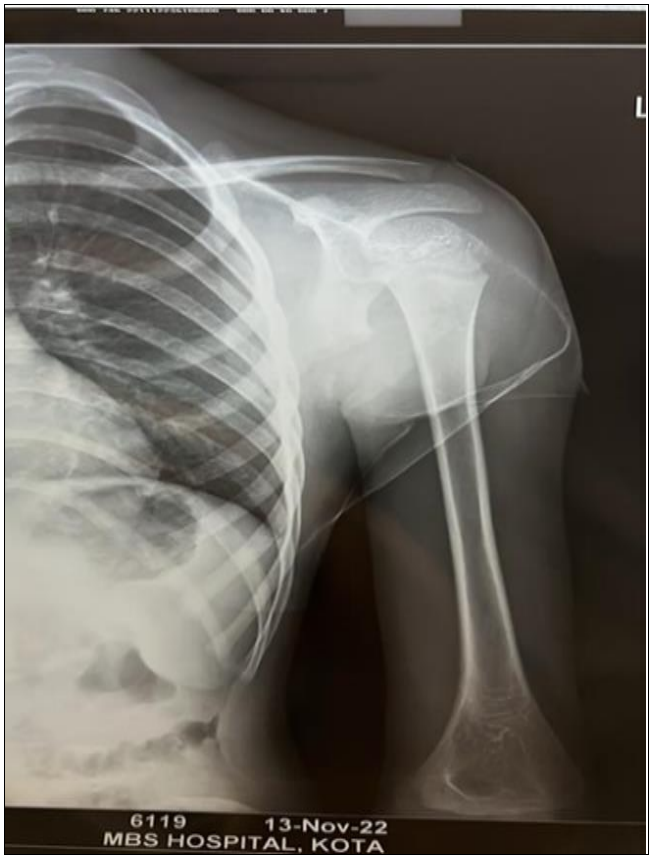


Fig 10: Post op X-ray

Conclusion

Osteochondromas of the scapula are very rare benign bone tumors, are at risk of being left unnoticed until malignant transformation occurs, like other central osteochondromas; therefore, we routinely advocate the removal of scapular osteochondromas at presentation. Signs most concerning for malignant transformation include rapid expansion, particularly after skeletal maturity, location on the scapula or pelvis, as well as a cartilage cap that is greater than 2 cm on MRI. However, it has been shown that in the skeletally immature, the cartilage cap can be quite large during periods of rapid growth, and does not reflect malignant change. Signs concerning for malignancy should be further evaluated and considered for surgical excision. Excision after diagnosis can be done in a well-planned manner to avoid iatrogenic injury to the growth plate and ensure complete excision at the base of the stalk.

Conflict of Interest
Not available

Financial Support
Not available

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