



ORIGINAL RESEARCH PAPER

Radio-Diagnosis

“BRACHIAL ARTERY PSEUDOANEURYSM SECONDARY TO OSTEOCHONDROMA OF PROXIMAL HUMERUS:A RARE CASE REPORT ”

KEY WORDS:

Osteochondroma,pseudoaneurysm,vascular complications.

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ABSTRACT vascular complications of humeral osteochondromas are extremely rare .We describe a rare case of 16 year old boy who presented to orthopedic OPD with complaints of swelling,which on radiological workup revealed sessile osteochondroma with pseudoaneurysm of brachial artery .The diagnosis was based on systematic analyses of plain radiograph of arm,ultrasound,computed tomography and magnetic resonance imaging,as well as local clinical status in form of a pulsating soft tissue mass.This case demonstrates that for all cases of large osteochondromas ,neurovascular complications are to be looked for,even in unusual locations.

INTRODUCTION

Osteochondroma is the most common benign tumor or tumorlike lesion of bone.The radiographic appearance of this tumor is often diagnostic and reflects its pathologic characteristics, that is, a lesion composed of cortical and medullary bone with an overlying hyaline cartilage cap. However, it is the continuity of this lesion with the underlying native bone cortex and medullary canal that is pathognomonic of osteochondroma(1). Osteochondromas are developmental lesions rather than true neoplasms and are often referred to as an osteocartilaginous exostosis (or simply exostosis).

These lesions result from the separation of a fragment of epiphyseal growth plate cartilage, which subsequently herniates through the periosteal bone cuff that normally surrounds the growth plate(2). The majority are asymptomatic lesions(3) and discovered incidentally, and if they appear with symptoms, the most common of them is the development of a slow-growing mass. Malignant transformation has been reported as a very rare complication, accounting for <1% and occurring after puberty more frequently in the limb girdles (4). In cases of hereditary multiple osteochondromas, the risk of sarcomatous change is higher.

For locating and analysing complications such malignant transformation, bone fracture, vascular compromise, neurologic sequelae, and overlying bursa formation, computed tomography (CT) and magnetic resonance (MR) imaging is helpful. In young patients, the cartilage cap normally measures 1-3 cm thick, whereas in adults, it frequently measures only a few millimetres thick or is completely absent (5) .

After reaching skeletal maturity, a continuously expanding lesion and a hyaline cartilage cap that is at least 1.5 cm thick indicate malignant change. The cortical bone lacks mobile protons and has low signal intensity. The best radiologic method for assessing the hyaline cartilage cap and detecting the effect of the lesion on neighbouring structures is magnetic resonance imaging (MR). On T1-weighted MR images, the high water content of the cartilage cap has an intermediate to low signal intensity, but on T2-weighted images, it has a very high signal intensity. On MR images, these characteristics often enable reliable measurement of the cartilage cap thickness and distinction from underlying muscle.(6)

Surgical excision is limited to symptomatic osteochondromas. Patients may undergo surgical treatment

because of pain, disturbance of growth, decreased range of movement,cosmesis,symptoms secondary to compression of peripheral nerves, tendons , vessels and the spinal cord, intestinal or urinary obstruction, dysphagia, pleural irritation or the formation of a bursa. (7)

However, when a child presents with a large osteochondroma adjacent to a neurovascular bundle, surgery is often indicated to avoid further enlargement, which would make surgery more difficult with a higher risk of neurovascular complications. Pseudoaneurysm represents an extremely rare complication of osteochondroma that mainly involves the popliteal and femoral arteries.(8)

We describe a rare case report of Brachial artery pseudoaneurysm secondary to Osteochondroma,which is presenting as a soft tissue mass.

Aims & Objectives of the Study

To review a rare case of brachial artery pseudoaneurysm secondary to repetitive trauma by underlying large sessile osteochondroma.

Case Report:

A 16 year old boy presented to orthopedics OPD with complaints of painful swelling at medial aspect of right arm.

The swelling started as a small sized lesion at 6yrs of age and gradually enlarged to present size measuring around 7x5cm.The swelling was painless at its time of appearance, but now the patient developed dull pain at the site of swelling. On palpation the swelling is bony hard and increased pulsations are noted overlying the area.[Fig 1]



Fig 1:preoperative clinical image.

An X-ray was performed and showed a large sessile,broad based osteochondroma in the median side of the proximal humerus involving metaphyses and diaphyses.[Fig 2]



Fig 2: Plain radiograph demonstrating frontal view of right arm.

On Ultrasound, irregular bony outgrowth was noted arising from proximal humerus, with overlying thin hypoechoic rim suggestive of cartilage. [Fig 3]

A 3.8x3.5cm outpouching noted arising from Brachial artery through a narrow neck measuring 3.1mm. On doppler study turbulent flow noted with classic ying yang sign suggestive of saccular aneurysm. Echogenic content noted partially filling the lumen of aneurysm suggestive of thrombus. [Fig 4,5] Soft tissue edema noted adjacent to the bony lesion.



Fig 3: Thin hypoechoic rim overlying irregular bony surface

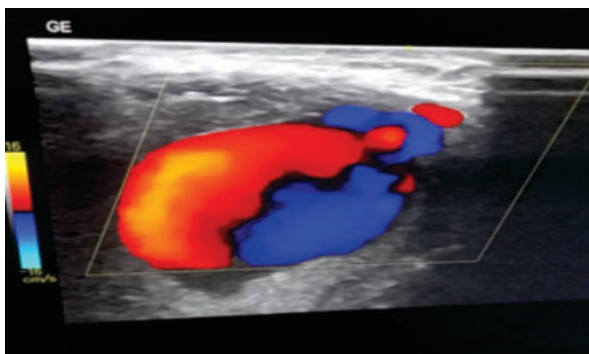


Fig 4: Classical ying yang sign of pseudoaneurysm

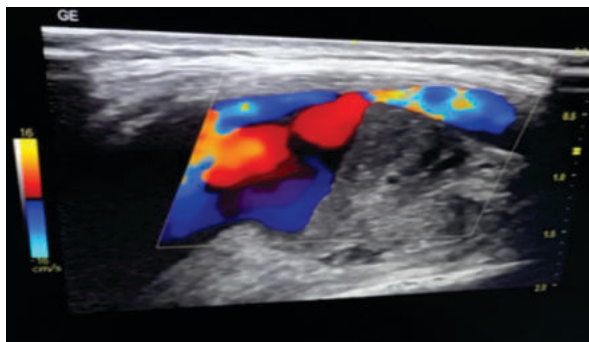


Fig 5: pseudoaneurysm originating through a narrow neck from brachial artery.

On CT scan the same findings of Xray are confirmed but is better able to demonstrate medullary continuity. (Fig 6)

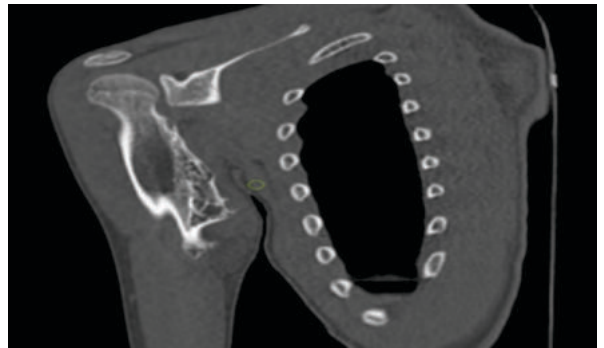


Fig 6: A broad based cortical tumor communicating with medullary cavity noted arising from proximal metaphyseal-diaphyseal region of right humerus.

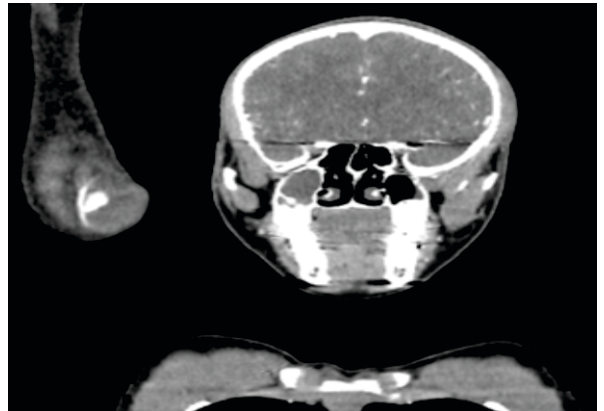


Fig 7: Saccular outpouching with contrast filling noted arising from brachial artery adjacent to osteochondroma.

On MRI a large, complex mass noted close to the osteochondroma and the brachial artery showing nonhomogeneous lamellar structure and inhomogenous intensity on T1 & T2-weighted sequence, and the regularly capsulated aspect of the contours were suggestive of hematoma-thrombosis (Fig 9,10)

The MR angiography facilitated the diagnosis, as it showed a pseudoaneurysm arising from the compressed brachial artery with extravasation of contrast medium into the mass. Angiography confirmed the diagnosis of pseudoaneurysm measuring 1.36x0.8 cm of patent lumen. (Fig 7, 12).

In this case, the difficulty of recognizing the cartilage cap on T2 sequences is because of the overlying pseudoaneurysm and adjacent soft tissue edema. (Fig 8-11)

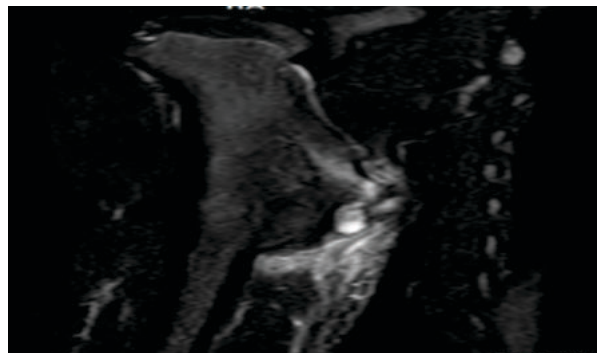


Fig 8: Sagittal T1W fat sat image showing broad-based tumor with medullary continuity and adjacent soft tissue edema.

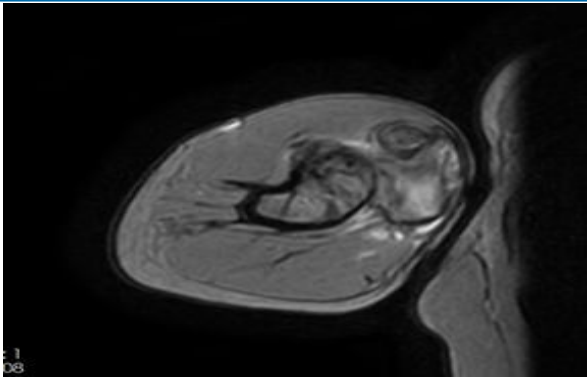


Fig 9: Axial T1W fat sat image showing hematoma as an inhomogeneous lesion adjacent to osteochondroma and brachial artery.

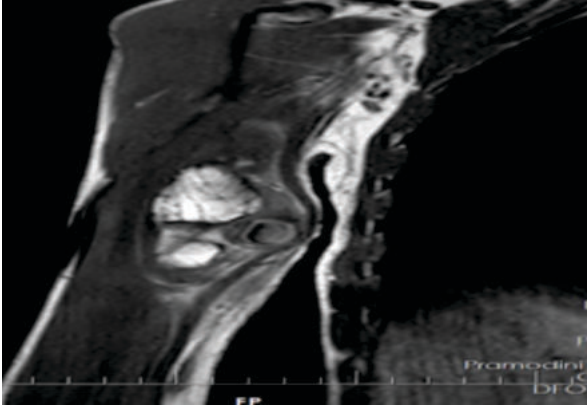


Fig 10: Sagittal T1W image showing pseudoaneurysm arising from the brachial artery with surrounding thrombus.

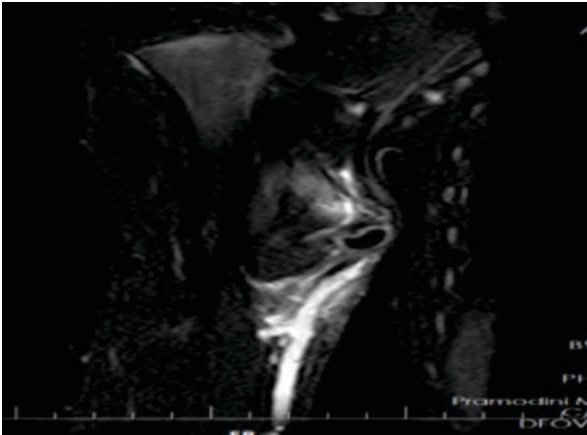


Fig 11: Sagittal STIR image.

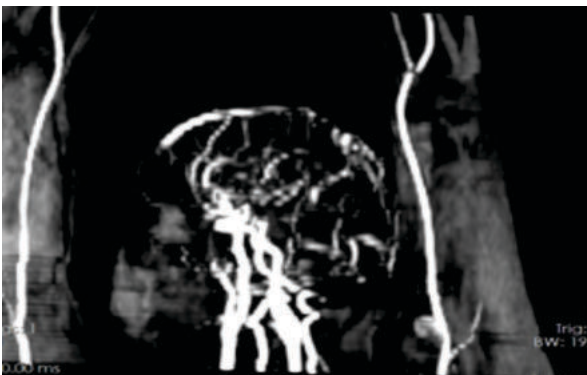


Fig 12: MR Angiography confirming diagnosis of brachial artery pseudoaneurysm.

During the operation, a longitudinal incision was given and the nerve and artery were preserved. Wide local excision of the bony lesion was done.

Aneurysm was not operated due to the risk of intraoperative embolisation and, the patient was kept on conservative management for treatment of thrombus.

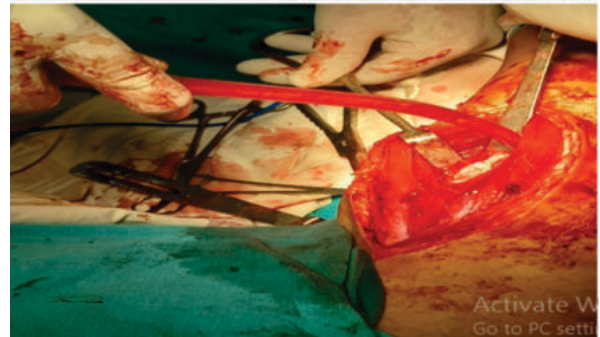
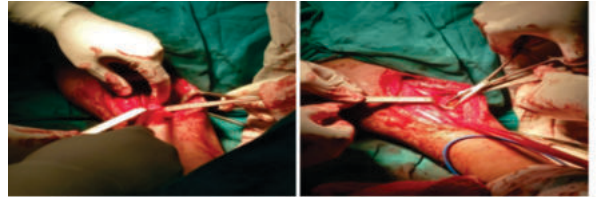


Fig 13: Intra operative images showing wide local excision of the bone tumor with preservation of neurovascular bundle.

The histopathology of surgical specimen revealed both bony and cartilagenous components. (Fig 14,15).



Fig 14: Gross surgical specimen cross section showing medullary communication of tumor with long bone and an overlying cartilagenous cap.

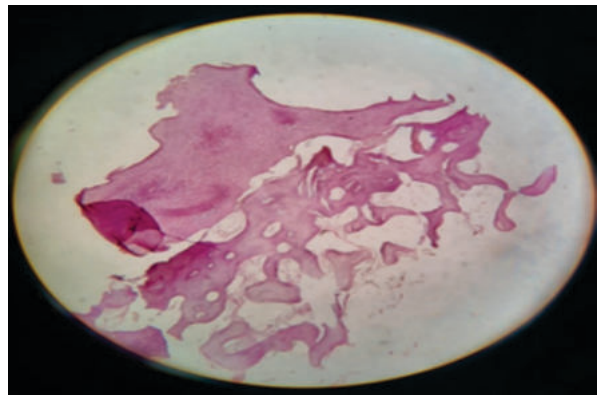


Fig 15: HPE of specimen showing bony trabeculae and cartilage cap.

DISCUSSION:

Pseudoaneurysms are a rare complication of

osteochondroma . Although described arterial locations include the superficial femoral, brachial, and posterior tibial arteries, the popliteal artery is most frequently involved. This complication affects young patients near the end of normal skeletal growth and occurs with solitary and multiple lesions with equal frequency. It has been hypothesized that during this time the cartilage cap matures, undergoing ossification and converting a relatively soft surface to a firm, often sharp area (9). Osteochondromas lying adjacent to an artery can chronically abrade and ultimately lacerate the arterial surface with normal movement or repetitive trauma(1). The predominance of popliteal artery involvement is related to the frequency of osteochondromas in this location as well as to the fixed position of this vessel proximally at the adductor canal and distally by its branches. In the past, these vascular complications were best evaluated with angiography (venous or arterial), which revealed displacement, stenosis, filling defects (thrombosis), or a mass communicating with the artery (pseudoaneurysm). Currently, US is often utilized to image these manifestations, although the osteochondroma is not well evaluated (10). A pseudoaneurysm appears as a complex mass closely related to the underlying artery. Flow within the pseudoaneurysm is usually seen with Doppler US, contrast material–enhanced CT or MR imaging.

Repair of the arterial injury is quite often not possible. When an end-to-end anastomosis cannot be performed, graft replacement with the autologous saphenous vein or with a synthetic graft is preferred.(9)

The case presented here is quite uncommon,because of the location of the lesion, but is typical:an adolescent male having large sessile osteochondroma compressing and abrading the adjacent vessels. Plain radiography and USG re the intial modalities to be used for directing towards diagnosis.

Whereas,CT angiography is confirmatory of pseudoaneurysm.MRI is mandatory for such such atypical masses to rule out other differentials such as Ewing's sarcoma or malignant transformation. Malignant transformation is extremely rare in adolescence(11).Ewing's sarcoma presents with typical history of fever,raised LDH and ESR levels,leukocytosis,anemia,which lack in our case.So,in order to reach the final diagnosis careful consideration of all clinical and radiological features are taken into account.It is extremely important to treat adequately such large lesions, because osteochondromas may recur after an inadequate resection and radiological follow up is necessary(11).

CONCLUSION:

In cases of suspected vascular complication secondary to a osteochondroma,all the imaging work up is to be carried out to reach the final diagnosis.A team effort by radiologists, orthopedic surgeons,vascular surgeons, pathologists is needed for proper diagnosis,pre operative treatment and follow up of such ambiguous cases.

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