Giant periosteal chondroma of proximal humerus extending on both sides of axillary nerve managed by surgical excision through deltoid split approach via shoulder strap incision: A case report

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Abstract
Periosteal chondromas are relatively rare (<2%) amongst the benign bone tumours and giant periosteal chondromas (size in largest dimension >5 cm) are rarer still. It is often confused radiologically with more aggressive malignant tumours of bone. This case report is about a giant periosteal chondroma of the left proximal humerus in a 22 year old male wherein axillary nerve was passing through almost the mid of the lesion. Deltoid split approach via Edinburgh Shoulder strap incision was used to access the tumour which was then removed by marginal excision and intralesional curetage. Axillary nerve was preserved. Histopathologically, there was no signs of malignancy and the diagnosis of periosteal chondroma was confirmed. At 9 months of follow-up, clinico radiologically there are no signs of recurrence, patient is asymptomatic and performing his normal routine activities.

Keywords: Giant periosteal chondroma, Shoulder strap incision, Axillary nerve

Introduction
Chondromas are benign cartilaginous tumours. Most of them are enchondromas, which develop within the bone marrow [1]. Periosteal chondroma, on the other hand, is relatively rare (<2% of all benign bone tumours) [2] less common, slow-growing benign cartilaginous tumor which arises within or under the periosteum. It induces cortical erosion and periosteal reaction under constant pressure [3]. This gives it a characteristic radiologic appearance of a single cartilaginous mass in the metaphyseal region with well-defined depression or "saucerization" of the adjacent cortex. Radiologically it is often confused with soft-tissue tumors compressing bone (like sub-periosteal haemangioma and sub-periosteal ganglion), fibrous cortical defect, aneurysmal bone cyst, chondromyxoid fibroma and periosteal chondrosarcoma or osteosarcoma [2,4,5]. At times, especially when it is large, it may even mimic osteochondroma [6]. Histologically, it shows hypercellularity, plump nuclei, and binucleation, which makes it difficult to differentiate from chondrosarcoma. Evidence of invasion is the major parameter to differentiate between the two [7]. The management remains surgical excision which can range from intralesional/marginal resection to en-bloc excision. Recurrence rate has been reported to be 3.6% [3]. This case report highlights the difficulties encountered in surgical excision of a giant periosteal chondroma (size in greatest dimension >5 cm) of proximal humerus especially with regards to preservation of axillary nerve and the newer surgical approach through shoulder strap incision [8], which to the best of our knowledge has never been reported in a case of periosteal chondroma excision.

Case report
We are reporting a case of 22 year old male, student by occupation who presented to us with a slow growing (>2 years duration), mildly painful swelling over the lateral aspect of left proximal humerus. It was not quite obvious on inspection but there was presence of local tenderness, bony hard mass with irregular surface of size around 6cm X 4cm on palpation. There were no clinical features suggestive of involvement of axillary nerve. We got the X-ray and MRI done. Considering the age of the patient and insidious onset of symptoms, based on X-ray, we were suspecting some benign tumour. The differential diagnosis included sessile osteochondroma, periosteal chondroma, fibrous cortical defect, chondromyxoid fibroma, etc. MRI was done and that revealed a lobulated lesion, arising from the lateral cortex of left proximal humerus with suspected areas of cortical breach medially. Neurovascular bundles were found to be free and no definite extra osseous soft tissue component was seen. The lesion showed heterogenous post-contrast enhancement. The size of the lesion was 30mm (AP) X 26mm (Transverse) X 52mm (cranio-caudal). The radiological features were consistent with a diagnosis of Periosteal Chondroma.
Informed consent for operative intervention after explaining all the risks especially with regards to chances of axillary nerve palsy, recurrence, pathological fracture and possibility of the lesion coming out to be malignant was taken. Consent was also taken for publication in a scientific journal without revealing the identity of the patient. We went in with the operation through direct lateral approach to the proximal humerus via a shoulder strap incision [8]. We tried performing margin excision but we had no choice but to take out the tumour in two pieces due to the presence of axillary nerve straddling through the tumour mass. While trying to isolate the axillary nerve, when we were passing a haemostat under it, the capsule got breached despite our utmost gentleness. Once the major tumour mass was excised, we also curetted the area of the bone from where we had removed the tumour. Post operatively there was no evidence of axillary nerve palsy. The biopsy specimen was sent for histopathology where it was confirmed to be periosteal chondroma with no evidence of any malignancy. The limb had to be kept in bag arm pouch for around 3 months to prevent chances of any pathological fracture. Only when some sclerosis could be seen on the X-ray and patient was absolutely pain-free did we allow him for normal routine activities. Nine months down the line, the patient is still asymptomatic and is able to perform his normal routine activities. Latest X-rays showed no evidence of recurrence.

Discussion
Periosteal chondromas are one of the rare kinds of benign tumours that has been reported in numerous papers. But, giant periosteal chondroma, which are more than 5 cm in length have been very rarely reported [6,9]. Imura et al reported giant periosteal chondroma of the right distal femur in a 17 year old male, which was treated with intralesional resection and intensive curettage. They reported a novel application of a bioresorbable plate in the management of the large bone defect after resection of a benign bone tumor [9]. The difficulties encountered in excising such a mass because of the presence of axillary nerve has not been stressed upon in any of the papers. It becomes a question of weighing between two options (1) Radical Excision of the tumour along with the intervening axillary nerve and (2) Marginal excision/curettage and preserving the axillary nerve. We went with the latter considering the benign nature of the lesion and the recurrence rate being low at around 3.6 % [3]. As the axillary nerve was passing through the tumour, it was a bit difficult for us to delineate the nerve from the tumour. We isolated the nerve along with some fibres of deltoid. Shoulder strap incision was used because of the following reasons: (1) The incision is parallel to the Langer’s lines and thus heals cosmetically. (2) It gives better view of the surgical field. (3) Although not done in our case but we could have split deltoid at more than one place if required, which would not have been possible with direct lateral approach [8]. Unlike the case of Imura et al [9], we did not feel the need to apply any plate to protect the bone because of the fact that humerus is a non-weight bearing bone and that there was more than 3/5th of the circumference of humerus that was still intact. But, nevertheless application of a biodegradable or even conventional plate is an option if one suspects the chances of pathological fracture.

Conclusion
Giant periosteal chondroma, due to its large size is one of the differential diagnosis of benign tumours of bone which must be distinguished from radiologically similar malignant neoplasms like periosteal chondrosarcoma or osteosarcoma. Although the definitive diagnosis can be done only on histopathology, MRI is helpful to see whether it is well localised or infiltrating the surrounding tissues. As the chances of recurrence is very low, radical surgery should be avoided and attempt should be made to preserve the vital structures, if possible. Deltoid splitting approach by shoulder strap incision which is cosmetically better and provides wide exposure can be used in cases of periosteal chondroma or any other benign bony tumour excision.


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