

# IS TOTAL HUMERUS PROSTHETIC RECONSTRUCTION SAFE IN A PATIENT WITH PATHOLOGICAL FRACTURE FROM DEDIFFERENTIATED CHONDROSARCOMA ?

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## INTRODUCTION

Patients with dedifferentiated chondrosarcoma (ddCHS) have a dismal prognosis. Surgery is considered as treatment of choice because no chemotherapy so far was able to show response rates. There is continued debate whether the limb with a pathological fracture on the base of a malignant bone tumor should be amputated because of oncological control, or saved. There is general agreement regarding patients with osteosarcoma and pathological fracture to keep the limb, whereas for patients with ddCHS it is not clear.

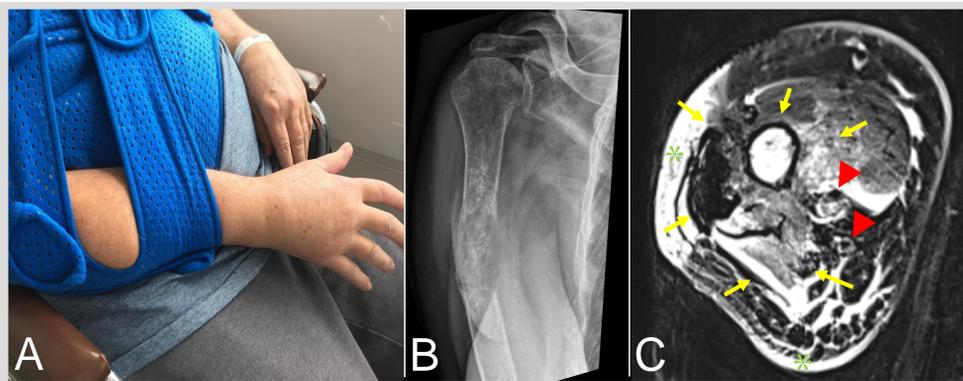


Figure 1: (A) The patient presented in our outpatient clinic with his right arm immobilized in a shoulder brace after diagnosis of (B) his pathological fracture of his upper arm in an secondary Swiss hospital. (C) Axial MRI T2-weighted turbo spin echo (TSE) slice at about the middle third of the right upper arm shows the tumor (arrows) and the surrounding edematous soft tissue (\*). The neuro-vascular structures (arrow heads) are in close proximity of the tumor but not embedded in it.

## PATIENT & METHODS

A 69 year old man noticed some discomfort in his right hand dominant upper arm for some months. 3 weeks prior to diagnosis, he developed night pain and subsequently he felt a crack. Staging evidenced localized disease. The CT-guided biopsy revealed a ddCHS, and the discussion with the patient then involved the Pro's and Con's of amputation versus limb-saving surgery. Imaging showed that proximally and distally, the tumor was confined to the intramedullary bone, and diaphyseally, the neurovascular bundle as well as specifically the radial nerve were separated by a fine line of fat tissues from the tumor.

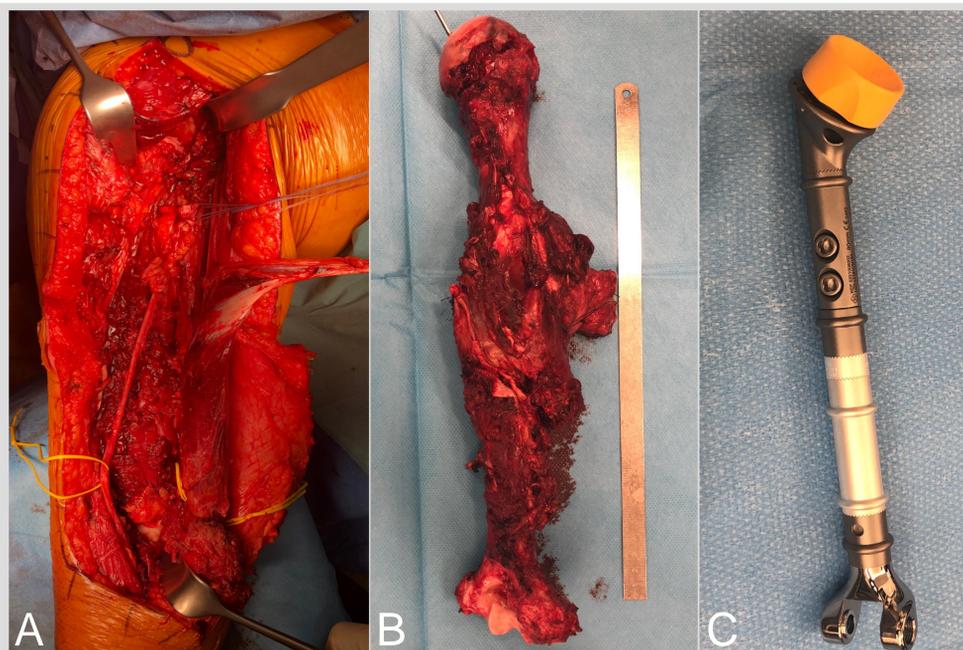


Figure 2: (A) Intra-operative situs of the right upper arm, view from anterior. The radial nerve is labeled with a vessel loop. (B) Completely excised right humerus and tumor mass viewed from posterior. (C) The total humerus prosthesis for the right humerus from anterior.

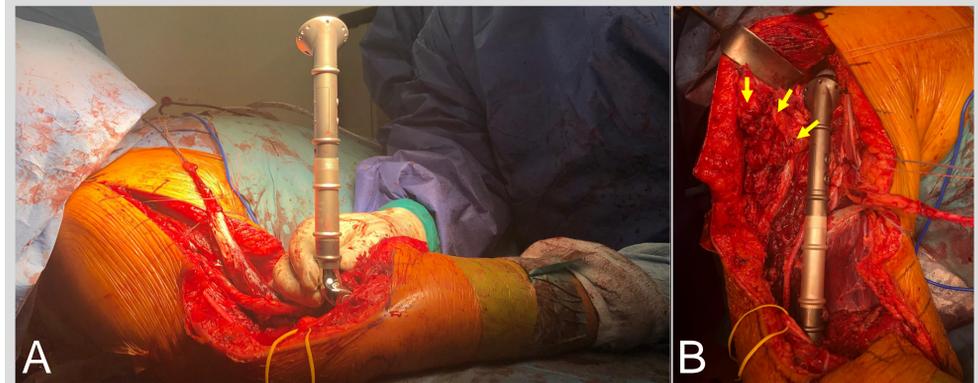


Figure 3: (A) Right upper arm from lateral. The humeral component of the prosthesis is coupled with the uncemented ulnar component. (B) Right upper arm from anterior. The total humerus prosthesis is in situ. The deltoid is not yet reattached (arrows).

## RESULTS

A utilitarian incision was used from delto-pectoral interval to distal, and from there over the crease of the elbow medially to the forearm. Whereas the brachial muscle was sacrificed, the biceps muscle with the motor branch of the musculo-cutaneous nerve could be preserved to retain flexion. The deltoid diaphyseal insertion was completely involved by the tumor and therefore resected. Both shoulder and elbow joints were resected trans-articularly. Reconstruction was performed using a total humerus prosthesis, with uncemented ulnar stem fixation and using the reverse design for the shoulder part. Three months postoperatively, the patient showed overt metastases.

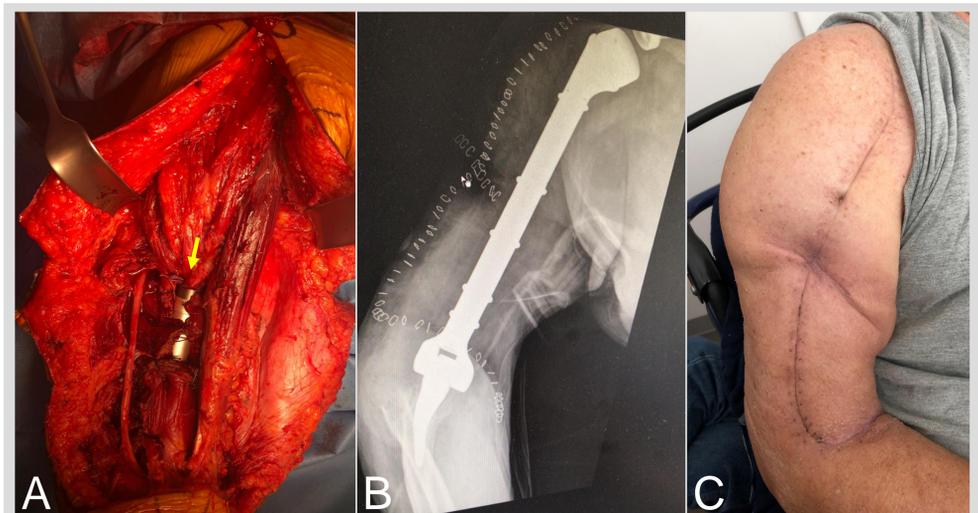


Figure 4: (A) Right upper arm from anterior. The total humerus prosthesis is distally covered by remnant brachialis muscle. The deltoid muscle is directly reattached (arrow) on the prosthesis. (B) Antero-posterior radiograph showing the total humerus prosthesis. (C) Clinical picture of the right upper arm after stitch removal three weeks after surgery. The transverse incision in the middle of the scar is due to elliptical excision of the biopsy paths.

## CONCLUSION

Pathological fractures in patients with ddCHS imply a challenging situation from the oncological perspective. While current chemotherapy may not affect survival, surgery is necessary for local control, but may neither affect overall outcome. So if amputation may likely not render a survival advantage, and if the local situation allows to save neurovascular structures, it may be one option to discuss the situation openly with the patient, thereby avoiding mutilating surgery.

## HIGHLIGHTS:

There is a challenging decision making process between limb-salvage and amputation, particularly considering the potential spread