Journal of Clinical Orthopaedics and Trauma 10 (2019) 1054–1058

Contents lists available at ScienceDirect

Journal of Clinical Orthopaedics and Trauma

journal homepage: www.elsevier.com/locate/jcot

Saving the ankle in distal fibular giant cell tumour – A case report

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ARTICLE INFO

Article history:
Received 23 April 2018
Received in revised form
22 July 2018
Accepted 14 March 2019
Available online 19 March 2019

Keywords:
GCT
Giant cell tumour
Distal fibula
Fibula slide
Ankle salvage

ABSTRACT

Distal Fibula Giant cell tumour (GCT) is a rare condition. The described methods of treatment for distal fibula GCT include excision of tumour and ankle arthrodesis, replacement of distal fibula with ipsilateral proximal fibula and autograft or allograft reconstruction. This case report describes treatment of distal fibula grade 3 GCT with involvement of syndesmosis with tumour excision, proximal fibular slide and reconstruction of ankle joint. With this technique the ankle joint movements are preserved and stability is maintained.

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Introduction

Giant cell tumour (GCT) of bone is a benign aggressive tumour.[1,2] The most frequent locations, in decreasing order are the distal femur, the proximal tibia, the distal radius, and the proximal humerus.[3] Involvement of the bones of the hand and foot are rare with incidences ranging from (2–4%) in the hand and (1.2–1.8%) in the foot. The incidence of GCT of the distal fibula is reported to be less than 1%.[4,5]

The described modalities for a distal fibular GCT range from complete excision of the distal fibula to extended curettage with adjuvants and stabilisation of the ankle joint.[6] The methods described to stabilise the ankle joint are intertibio-fibular or tibiotalar arthrodesis, rotation of the proximal fibula to 180°, cortical or strut grafting of the remnant fibula, fibular allografting, repair of the remnant lateral ankle ligaments and reconstruction using the distal peroneal tendons.[6,7]

We present two years of follow up of a case of grade 3 GCT of the distal fibula treated with excision, extended curettage, phenol cauterization and reconstruction of the distal fibula by proximal fibula slide to preserve ankle function.

Case report

A 20 year old male patient presented with pain in the right ankle region and difficulty in walking for a period of six months. On examination, a globular swelling was present on the lateral aspect of the ankle with restriction of ankle and subtalar joint movement. Radiograph of the right ankle showed an expansile lytic lesion, 6.5 cms in size, of the metaphyseo-diaphyseal part of the distal fibula involving the syndesmosis. The distal one cm of fibula was spared [Fig. 1a and 1b]. MRI of the ankle showed an expansile lytic lesion of the distal one third fibula with anterior soft tissue extension.(Enneking grade 3) Jamshidi needle (Jamshidi® Needles – CareFusion) biopsy confirmed giant cell tumour [Fig. 2a and 2b].

Operative steps

The options were discussed with the patient. At his request, surgery was planned to preserve the ankle movement. The tumour was approached through a direct posterolateral incision over the distal half of fibula. The cutaneous branch of superficial peroneal nerve was identified and preserved. The fibula proximal and distal to the tumour was osteotomized. The distal fibula was small (1cm in size). The tumour had breached the syndesmosis and had eroded the lateral surface of tibia. The syndesmotic ligament anteriorly was removed and extended curettage was done with a high speed burr (2296–10 50K Footswitch Stryker®) and chemical cautery with 80% phenol. To preserve the ankle joint, the 6 cms of intact fibula

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https://doi.org/10.1016/j.jcot.2019.03.010
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Fig. 1. a)Plain AP radiograph of the ankle showing expansile eccentric lytic lesion of the distal fibula. b)T2 weighted coronal MRI images of the ankle shows the tumour eroding the syndesmosis.

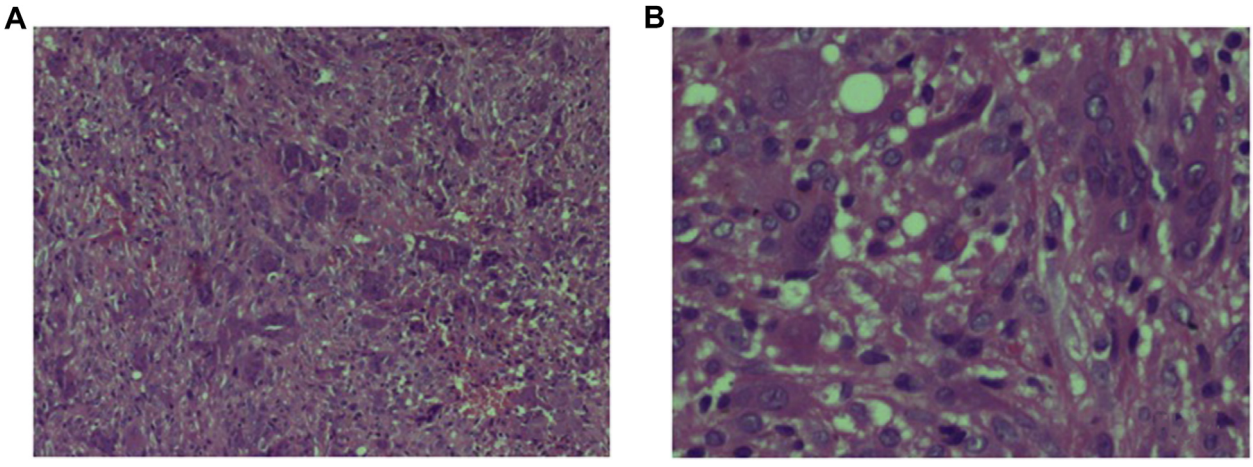

Fig. 2. a)Giant cell tumour with evenly distributed osteoclast-type multinucleate giant cells within a homogeneous proliferation of mononuclear plump stromal cells without cytological atypia. (H&E stain 100x magnification). b)Giant cell tumour at higher magnification shows resemblance of the nuclear morphology of the mononuclear stromal cells with that of the osteoclast-type multinucleate giant cells. (H&E stain 400x magnification).

proximal to the resection was dissected with the periosteum, osteotomised and slid down. This fibula was approximated with the remanent distal fibula and its fibular collateral ligaments, and fixed with a lateral precontoured distal humerus plate (Johnson and Johnson). Three screws were inserted in the distal fragment and proximally three transsyndesmotic locking screws were inserted [Fig. 3a and b].

The ankle was immobilised in a below knee back slab till suture removal. At suture removal, an Aircast was given and patient was allowed intermittent ankle ROM as tolerated and touch weight bearing with bilateral axillary crutches for 6 weeks progressing to full weight bearing on Aircast for another 6 weeks. Till 6 months, he was on protected weight bearing with aircast. Clinical and radiological follow up was done regularly. At two years follow up, clinical assement was done with American Orthopaedic Foot and Ankle Society score and radiological assessment with a plain radiograph and CT scans [Fig. 4a and b, 5a-b]. At follow up at two years, there was no ankle instability. The AOFAS score was excellent (97/100). His dorsi flexion was 20° and plantar fexion was 60°. Informed consent was obtained from patient for publication of results.

Discussion

We report a case of distal fibula GCT which was successfully managed without sacrifizing the ankle function in a young adult. Giant cell tumours are benign but locally aggressive lesions that present in younger age group and are prone to recurrence.[1,2] GCT of the small bones have high rates of multicentricity (7–8%) compared

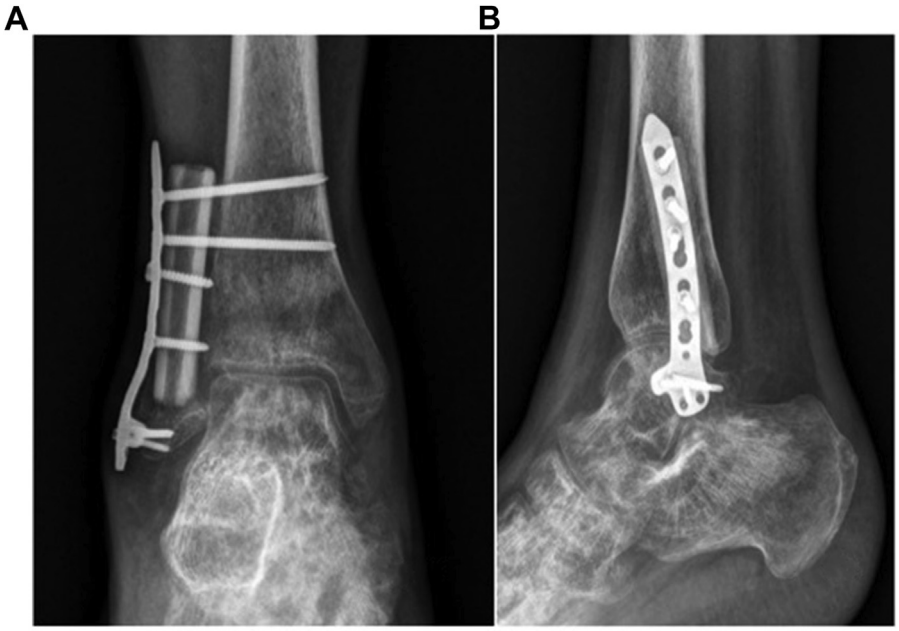

Fig. 3. Immediate postoperative AP (3a) and lateral view (3b) radiographs showing excision of tumour and slid down fibula fixed with a precontoured lateral humeral condyle plate.

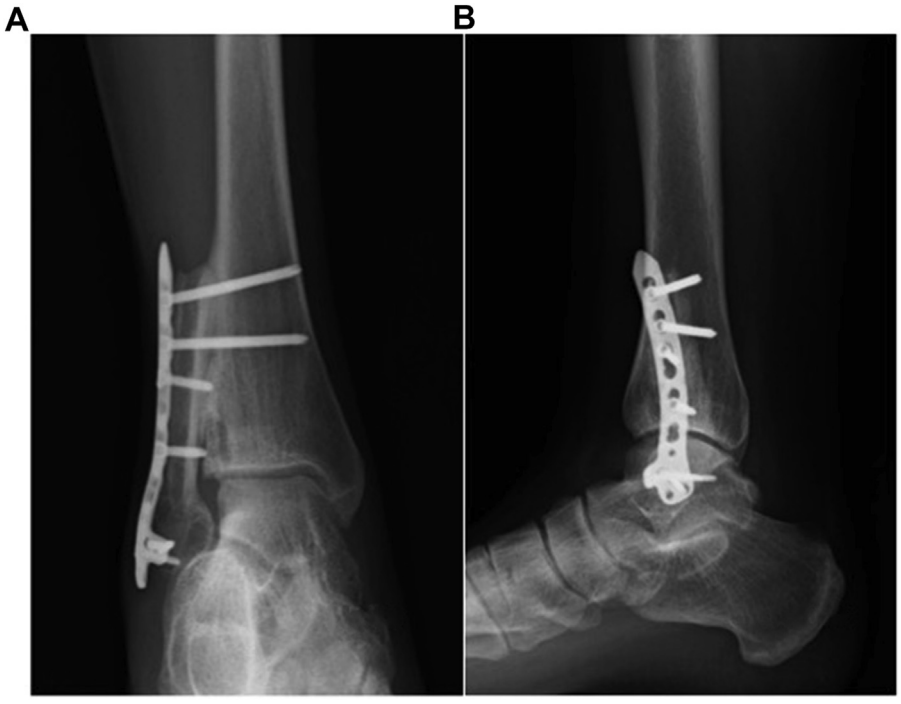

Fig. 4. Two years follow up AP (4a) and Lateral (4b) radiograph confirming syndesmotic union with a well preserved ankle joint without deformities.

to long bones (1%).[5] The reported rates of recurrence in literature are 27%–65% after curettage, 12%–34% after curettage with adjuvants and 0%–12% after resection for small bones. The causes of recurrence are incomplete resection of the tumour, inability to use adjuvants because of soft tissue, anatomical restrictions and lack of standardised procedure.[8]

Patients with GCT distal fibula present with pain and swelling of the ankle joint. The treatment of GCT distal fibula is ill defined. However, when salvage is planned, it is essential to maintain the integrity of the lateral malleolus. Studies have shown the importance of the integrity of the entire fibula and its ligamentous attachments for maintaining ankle stability. The fibula deepens the ankle mortise during weight bearing and bears 7.1% of the body weight when intact. When the distal fibula is excised completely without reconstructive procedure, it results in ankle valgus instability and subsequent arthritis.[7,9–11]

Capanna et al. have described six types of fibular resection and reconstruction based on the position of the lesion on the distal

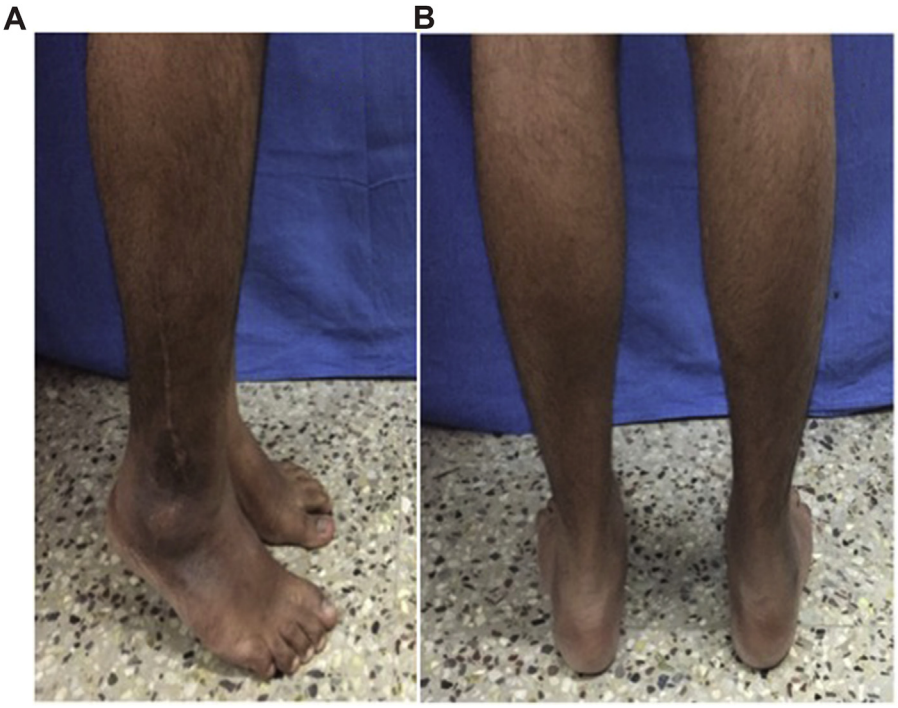

Fig. 5. a - Clinical picture of the patient standing on tiptoes. **b** - Clinical photograph of patients heel demonstrating normal ankle valgus.

fibula which range from 180° rotation of the proximal fibula, use of cortical graft and augmentation of the ankle with peroneal tendons.[12] Other reconstruction options include the use of tricortical iliac crest graft and fibular allograft fixed with dynamic compression plates (DCP) to maintain the integrity of the ankle joint.[13–17]

Each reconstructive procedure has its advantages and disadvantages. The proximal fibula is not anatomically congruent with the distal tibia and does not provide ligamentous stability when used to reconstruct the ankle mortise. Morever, there can be damage to the common peroneal nerve and lateral collateral ligament while removing the proximal fibula.[7,9,12–18] Leibner et al. had laid down seven principles for reconstruction of the distal fibula, stressing on the preservation of the native fibula as deemed safe.[18]

Our patient, had a Campanacci Grade 3 lesion and wanted his ankle function preserved. The advantage was the intact fibular tip with its ligamentous attachments. Hence, our treatment was aimed at complete excision of the tumour with extended currettage and preservation of ankle mortise. Fibular resection below 6–8cm from the distal tip results in damage to the syndesmotic ligaments and the interosseous membrane, increasing the inversion and rotational stresses around the ankle joint. This translates to deep muscular pain, weakness and difficulty in running in patients. Fixation and reconstruction of the syndesmosis is recommended in these injuries.[19,20]

In our patient, the challenge was the type of fixation to be chosen since the lateral malleolus was too small. We excised the proximal noninvolved fibula subperiosteally, brought it distally and fixed it with distal humerus lateral precontoured locking plate along with syndesmotic fixation. With this plate the distal fibula could take 3 screws and the proximal fibula could take 4 screws. The functional outcome calculated using the AOFAS score was excellent (97/100) at two years.[21] Our patient had a functional range of movement and was back to his occupation and full physical activity.

Conclusion

There is limited data in literature on the long term functional outcomes of the various modalities of treatment and its effect on ankle stability in GCT of the distal fibula. The described technique will be useful when future reconstruction are undertaken for this rare condition.

Acknowledgement

The authors acknowledge Dr. Sramana Mukhopadhyay, Department of Pathology, CMC Vellore, for the contribution of histopathological figures.

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