

Original Research Article

ANEURYSMAL BONE CYST OF THE LATERAL MALLEOLUS IN AN EIGHTEEN YEARS OLD GIRL TREATED WITH RFA FOLLOWED BY EXTENDED CURETTAGE AND FIBULAR STRUT GRAFTING

Protik Mukherjee¹, Nitish Kumar², Malay³, Ashish Rustagi⁴, Arindam Das⁵

¹Senior Resident, Department of Orthopedics Vmmc and Safdarjung, New Delhi, India.

²Senior Resident, Department of Orthopedics Vmmc and Safdarjung, New Delhi, India.

³Seniors Resident, Department of Orthopedics Vmmc and Safdarjung, New Delhi, India.

⁴Associate Professor, Department of Orthopedics Vmmc and Safdarjung, New Delhi, India.

⁵Post Graduate Resident, Department of Orthopedics Vmmc and Safdarjung, New Delhi, India.

Received : 05/01/2024
Received in revised form : 19/02/2024
Accepted : 06/03/2024

Corresponding Author:

Dr. Protik Mukherjee

Senior Resident, Department of Orthopedics Vmmc and Safdarjung, New Delhi, India.

Email: protiknrs@gmail.com

DOI: 10.5530/ijmedph.2024.1.75

Source of Support: Nil,

Conflict of Interest: None declared

Int J Med Pub Health

2024; 14 (1); 411-414

ABSTRACT

An aneurysmal bone cyst is considered to be a locally aggressive tumour arising in the metaphysis of bone and an expansive lytic lesion with hemorrhagic contents and seen on MRI as fluid-fluid levels. Although the benign lesions are considered rare (incidence <1 in 1lac persons per year), several approach to treat these tumours have been presented. We report the case of a 18year old girl diagnosed with aneurysmal bone cyst of the lateral malleolus. The patient was managed initially with Radiofrequency ablation(RFA) of the lesion followed by extended curettage and fibular strut grafting enabled the treatment of the lesion without causing recurrence and instability of the ankle joint.

INTRODUCTION

Aneurysmal bone cyst(ABC) is an expansile lytic lesion characterised by several sponge like blood/serum filled non-endothelialized spaces of various diameters. It was first described by Jaffe and Lichtenstein. It usually arises in the metaphysis of long bones examples: Proximal humerus, Distal Femur, Proximal Tibia and Spine. The ABC can be primary or secondary depending on its origin de-novo or in a pre-existing bony lesion with hemorrhagic cystic changes.

ABC is generally considered rare. It accounts for less than 6% of all. Bone tumours and is found to be four times rarer than osteosarcoma. It is more common during the second decade of life and is a rare entity above 30years of age.

The ABC is caused to be due to venous congestion leading to expansile lytic lesion filled with blood/serum like material with septations. It is an intermediate grade tumour which is locally aggressive.

Treatment modalities are varied for aneurysmal bone cysts which include non-invasive and invasive

procedures. The non-invasive procedures are as follows: -1.) Radiofrequency Ablation

1. Angioembolisation
2. Radionuclide
3. Radiotherapy

The invasive procedures are as follows: -1)

Curopsy- curettage and biopsy

1. Sclerotherapy
2. Curettage +/- bone graft
3. En-bloc resection and reconstruction
4. Amputations(rare)

Here, we report a case of ABC involving the lateral malleolus treated initially with RFA followed by extended curettage with fibular strut graft. The patient was initially given a trial of non-invasive radiofrequency ablation following which the resolution of the tumour did not occur. This was followed by curettage and filling the defect with bone cement. However, the symptoms persisted and there was recurrence of the tumour. Finally, an extended curettage with high speed burr was done and the defect was filled with a fibular strut graft and fixed with 08 holed anatomical lateral malleolus locking plate. This was performed at a tertiary care centre in India. After an extensive literature research we

account this case as the first to be documented in this region and possibly in India.

CASE REPORT

This is case of 18year old female who sought consult for pain in the right ankle lateral aspect that started 2months prior. The pain was insidious in onset, gradually progressive in nature, dull aching type, aggravated on weight bearing and was associated with a slowly enlarging mass on the lateral aspect of her right ankle. The mass was gradually increasing in size and was associated with local tenderness. No other symptoms nor any history of trauma noted. Though the history of may be short for a benign tumour, tendency for late consult is inherent in. Our setting and must be considered.

During examination, a mass was noted on the right lateral malleolar region approximately 4x3cm in size. The mass was hard, tender, fixed, non-fluctuant, the overlying skin was mobile and there were no skin changes overlying the mass. Range of motion of the ankle was normal except for pain on eversion of the right foot. Radiographic evaluation of the right ankle demonstrated an expansile osteolytic lesion with well-defined margins in the metaphyseal region of the right distal fibula with sclerotic margins and were compatible with a benign osteolytic tumour.



Figure 1: plain AP and Lat radiograph of the right ankle joint demonstration a well-defined osteolytic lesion in the metaphyseal region of the right distal fibula (lateral malleolus)

MRI of the lesion was done which demonstrated an expansile lytic lesion in the right lateral malleolus with multiple fluid-fluid levels and some areas of hyper intensity shown below.

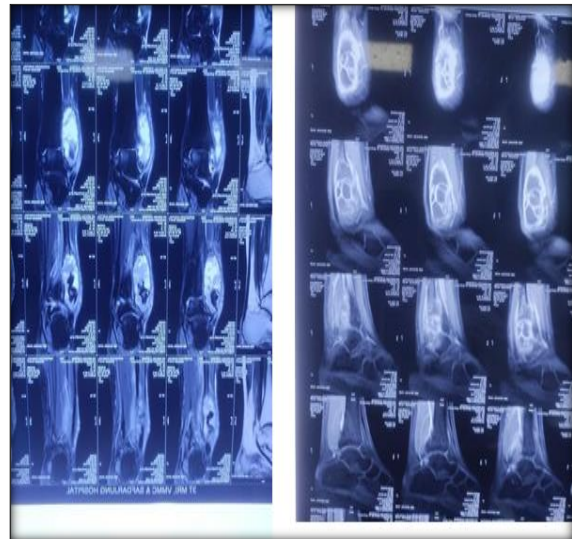


Figure 2: MRI of the right ankle demonstrating fluid-fluid levels suggestive of ABC

On the basis of radiographic and MRI findings a diagnosis of Aneurysmal Bone Cyst of Lateral malleolus was made and the patient was counselled regarding the treatment of the tumour. The patient initially opted for non-invasive modalities of therapy for which Radiofrequency Ablation of the tumour mass was done in 2020. However this was not effective in the resolution of the tumour mass. Hence, the patient was counselled regarding invasive modalities of treatment. After proper consent and pre-operative work-up patient was taken up for extended curettage and filling the defect with cement. The lateral malleolus was approached laterally, the tumour mass was thoroughly curettage curopsy was done and after thorough curettage the defect was filled with bone cement on 3/10/2020. Following which the patient was followed up in OPD.



Figure 3: Radiograph of the right ankle joint demonstrating bone cement in-situ

The patient was finally taken up a second surgery on 29/10/2021. When the tumour was approached laterally and the cement was removed and extended

curettage was done with high speed burr and the defect was filled with a fibular strut graft harvested from the contra lateral leg and fixation was done with a,^[8] holed lateral malleolar anatomical locking plate. Intra-operatively the range of motion particularly plantarflexion and dorsiflexion was not limited. Post-operatively she was placed on a below knee slab and crutch ambulation to prevent the motion at the ankle joint. The post-operative period was uneventful and the suture line was dry and healthy and sutures were removed on post-op day.^[14] The patient was then serially followed up on OPD. On the 6th week the slab was removed and patient was placed on an ankle brace.

8 months post-operatively, evidence of consolidation was noted and we started full weight bearing. She was monitored regularly and no complaints were noted. No recurrence was noted till then.



Figure 4a: immediate post-op x-ray



Figure 4b: post-op xray 3months post-operatively



Figure 4c: post-op xray 4months post-operatively



Figure 4d: post-op xray 5months post-operatively



Figure 4f: post-op xray 8months post-operatively

DISCUSSION

The typical presentation of ABC is that of a gradually enlarging mass of a few months duration associated with pain occurring from six months to a year and involving almost all parts of the skeleton, with the humerus and femur as the most commonly affected. The fibula is a dispensable bone; hence, wide surgical margins are theoretically more easily achievable than in other skeletal sites. However, ample resections of distal fibular lesions may be hampered by difficulties with soft tissue coverage and the possible impact on foot and ankle biomechanics

Several solutions for different pathologies have been enumerated.^[4] For decades, below-knee amputation has been the main treatment for malignant tumours involving the distal fibula and tibia. Advances in surgical techniques and chemotherapy have led to the introduction of alternative, less destructive approaches. For instance, distal fibular resection without reconstruction of the lateral side of the ankle is frequently performed. In such instances, ankle stability is obtained via either soft tissue and ligament reconstruction or tibiotalar arthrodesis. In other cases, fibular resection is followed by reconstruction with allograft, autografts, pedicled vascularised epiphyseal transfers using the ipsilateral proximal fibula or a long bone graft from the iliac crest, bone transplants, or prosthetic ankle joint replacement.

Subperiosteal excision has been reported,^[5] with none of the patients receiving instillation of bone marrow, autogenous bone graft, allograft, or any

synthetic bone substitutes but the periosteal covering was saved, resulting to bone regeneration within three to nine months with no joint instability or recurrence.

CONCLUSION

The incidence of ABC in distal fibula is very low, treatment options are also few. Regular treatment protocol for ABC is curettage and bone grafting. Lesion at distal end of fibula is definitely a rare entity and its treatment is a complex issue since maintaining ankle stability is difficult following excision.

REFERENCES

1. Kumar AV, Naidu MJ, Mandava B. Aneurysmal Bone Cyst of Distal Fibula Treated with En-Bloc Excision and Ligamentous Ankle Stabilisation: A Rare Case Report. *IOSR-JDMS*. 2015;14(4):39-41. doi: 10.9790/0853-14443941. [CrossRef] [Google Scholar]
2. Wang EHM, de Dios AV. Makati City: The Bookmark Inc; 2007. *A Bone Tumors in Filipinos, A collection of 876 Cases from the University of the Philippines, Philippine General Hospital*. p. 133. [Google Scholar]
3. Tsagozis P, Brosjo O. Current Strategies for the Treatment of Aneurysmal Bone Cysts. *Orthop Rev(Pavia)*. 2015;7(4):6182. doi: 10.4081/or.2015.6182. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
4. Perisano C, Marzetti E, Spinelli MS, Graci C, Fabbriani C, Maffulli N et al. Clinical management and surgical treatment of distal fibular tumours: a case series and review of the literature. *Int Orthop*. 2012;36(9):1907-13. doi: 10.1007/s00264-012-1536-3. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
5. Abuhassan FO, Shannak AO. Subperiosteal resection of aneurysmal bone cysts of the distal fibula. *J Bone Joint Surg Br*. 2009;91(9):1227-31. doi: 10.1302/0301-620X.91B9.22395. [PubMed] [CrossRef] [Google Scholar]
6. Gerard Vincent Yu, Lisa S. Roth, Craig S. Sellers. Aneurysmal bone cyst of the fibula. *J Foot Ankle Surg*. 1998;37(5):426-36. doi: 10.1016/S1067-2516(98)80053-7. (ScienceDirect)
7. Ramirez N, Perez C, Rivera YC. Distal third fibular aneurysmal bone cyst: en bloc resection and proximal third fibular reconstruction. *American Journal of Orthopedics (Belle Mead, N.J.)*. 2001 Mar;30(3):237-240. PMID: 11300134
8. Lampasi M, Magnani M, Donzelli O. Aneurysmal bone cysts of the distal fibula in children: longterm results of curettage and resection in nine patients. *J Bone Joint Surg. Br*. 2007;89(10):13561362. doi: 10.1302/0301-620x.89b10.19375.
9. Kalli E, Mortenson, Lawrence M. Fallat. Allogenic fibular bone graft reconstruction with complete regeneration of the lateral malleolus after En bloc resection of a distal fibular aneurysmal bone cyst: A case report. *J Foot Ankle Surg*. 2021;1(3). Doi: 10.1016/j.fastrc.2021.100055.
10. Rahman, Mohamed Abdel, Ayman Mohammad El Masry, Sherif Ishak Azmy. Review of 16 cases of aneurysmal bone cyst in the proximal femur treated by extended curettage and cryosurgery with reconstruction using autogenous nonvascularized fibula graft. *J Orthopaedic Surg*. 2018; 26(2): 2309499018783905. doi.org/10.1177/2309499018783905.