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Aneurysmal bone cyst treated with freeze-dried allograft: A rare case presentation

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Abstract
Aneurysmal bone cysts are classified as benign, tumor-like bone lesions and are among the most common manifestations in childhood and adolescence. Surgical approaches may include curettage and filling with cancellous bone or cement, insertion of an ESIN, or the use of chemical adjuvants such as phenol. The patient was admitted based on X-ray and CT findings and taken up for surgery. The anterior approach to the proximal humerus was used. The cephalic vein was identified and preserved. The subscapularis muscle was left intact. Subperiosteal dissection was performed while keeping the muscle cuff intact. Humerus osteotomy was performed. Curettage from the bony canal was performed, and a freeze-dried allograft was removed from the bone bank, cut into slivers, and packed into the canal. Closure was performed. Patients were followed up on days 2, 14, 30, 60 and 120. The patient recovered 90% of her preoperative ROM and was advised to continue physiotherapy. The patient had no postoperative complaints, and the X-ray showed signs of bone healing. The effect of various treatment modalities on ABC management has been repeatedly examined in the literature, but the natural history of ABC and the optimal treatment remain unclear. In our opinion, surgical curettage and cyst excision with bone grafts are the optimal choices for treating ABCs and are significantly better than injections and fixation procedures. Treatment of ABCs with allografts may decrease reoperation rates. The initial radiographic appearance after allograft treatment revealed solid structural support, followed by new bone formation. This appearance may lead to more of these patients being treated with this approach.

Keywords: Aneurysmal bone cyst, allograft, extended curettage

Introduction
Aneurysmal bone cyst (ABC) is a rare benign osteolytic bone tumor that contains blood-filled cavernous spaces separated by septae containing osteoid tissue and osteoclast giant cells. ABC has been treated with several methods, including curettage, extended curettage, cementation, grafts, injections, intravenous radiology, cryo- and radiotherapy, as well as en bloc resection. This study was conducted to evaluate the results of extended curettage with allografts for aneurysm bone cysts of the humerus in a pediatric patient.

Case Report
A 14-year-old male patient presented to the Orthopedic OPD with complaints of intermittent and vague pain in his right shoulder and arm for 3 months. He had a history of slab application by another doctor for a fracture one month prior. The patient had a history of trivial falls approximately one month prior. No other relevant history was given by the patient. On examination, the right mid-arm circumference measured 22.5 cm, and the left mid-arm circumference measured 17.5 cm. There was no tenderness or local increase in temperature on palpation, no deformity was noted, and the range of motion was normal. X-ray and CT scans were performed, which suggested a cystic lesion, and the patient was advised to undergo surgery. (Fig 11)
After PAC, all routine investigations, and informed written consent, the patient was taken up for surgery. Freeze-dried allografts in the form of femoral heads were removed from our bone bank and thawed. The anterior approach to the proximal humerus was used. An incision was made from the tip of the coracoid process through the deltopectoral groove to the mid-shaft of the humerus.

The cephalic vein was identified and preserved. The deep fascia was incised in line with the skin incision. An interval developed between the biceps brachii and brachialis. The pectoralis major muscle was left intact. Subperiosteal dissection was performed by lifting the periosteum and keeping the muscle cuff intact. Humerus osteotomy was performed proximally and distally, leaving the cortex intact in the middle and acting as a bridge. Extensive curettage from the bony canal was performed, the sample was sent for histopathology, and phenol was used to kill all the tumor cells. The freeze-dried allograft was decorticated, shaped into cylinders, and packed into the canal. Cortical windows were placed back, the periosteum was sutured, and closure was performed in layers with a drain in situ and with a U-Slab. The patient was discharged on day 2 after dressing and drain removal. The sutures were removed on day 13, the slab was removed on day 21, and physiotherapy was started with gradual weight lifting. The postoperative period was uneventful. (Figs. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10).

Results

The entire lesion was curetted and confirmed by imaging postoperatively. Histopathology reported on Day 14: Gross: Multiple Gray Brown Soft Tissue Masses measuring collectively 2x2 cm. Microscopy: The microscopic findings were consistent with the diagnosis of an aneurysm bone cyst. The patient recovered uneventfully and achieved 90% of his ROM in 2 months. No recurrence of lesions or complications was observed. (Figs. 12, 13, 14, 15, 16, 17).

Discussion

In conclusion, postoperatively, the patient presented favorable short- and medium-term evolution, and the disappearance of pain and the resumption of function of the affected segment correlated with radiologically observed bone graft integration and the absence of local recurrence, demonstrating that although techniques for treating aneurysmal bone cysts include either injecting fibrosing alcoholic agents or performing reconstruction using vascular bone grafts, the freeze-dried allograft technique leads to successful results, especially for the humerus. Treatment of ABCs with allografts may decrease reoperation rates.

Fig 1: Draping of the patient

Fig 2: Freeze-dried allograft in the form of a donor femoral head

Fig 3: Lifting of the periosteal sleeve

Fig 4: Drilling of the cortex to make cortical windows

Fig 5: Curettage of the tumor tissue and fluid

Fig 6: Extended curettage performed through the two bony windows created

Fig 7: Preparation of the graft

Fig 8: Decorticated graft fashioned into cuboids

Fig 9: Packing of the graft into the medullary canal

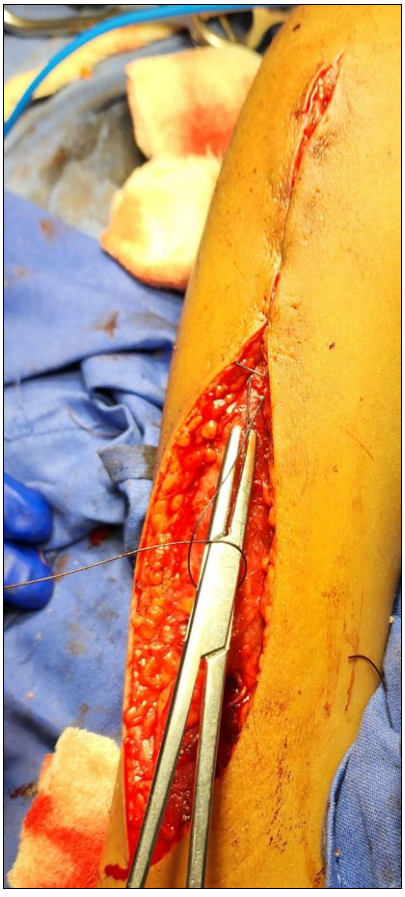

Fig 10: Closure Done In Layers

Fig 11: Preoperative X-ray of the Right Shoulder AP View

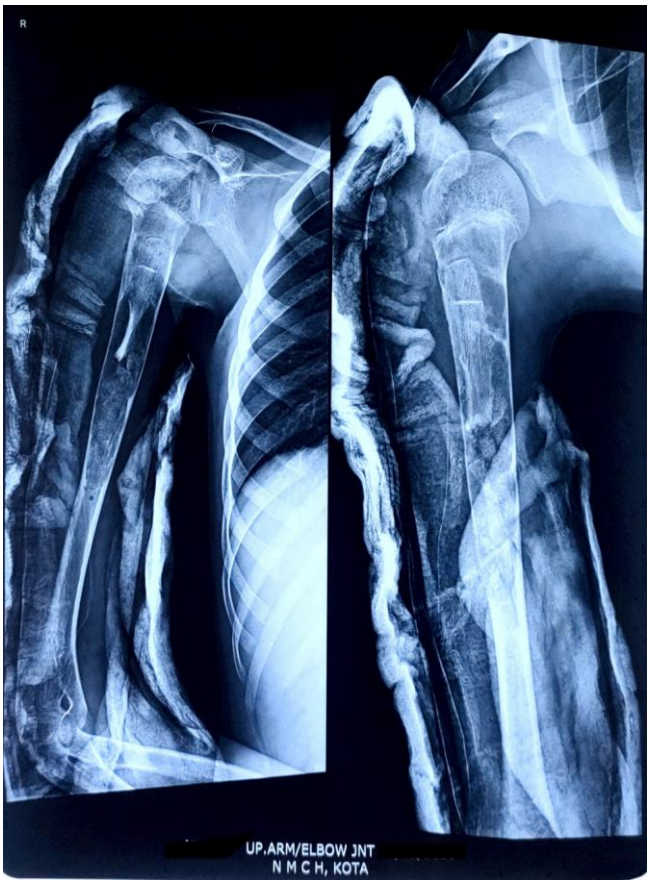

Fig 12: Postoperative Day 2 X-ray of the Right Shoulder AP and Lateral View

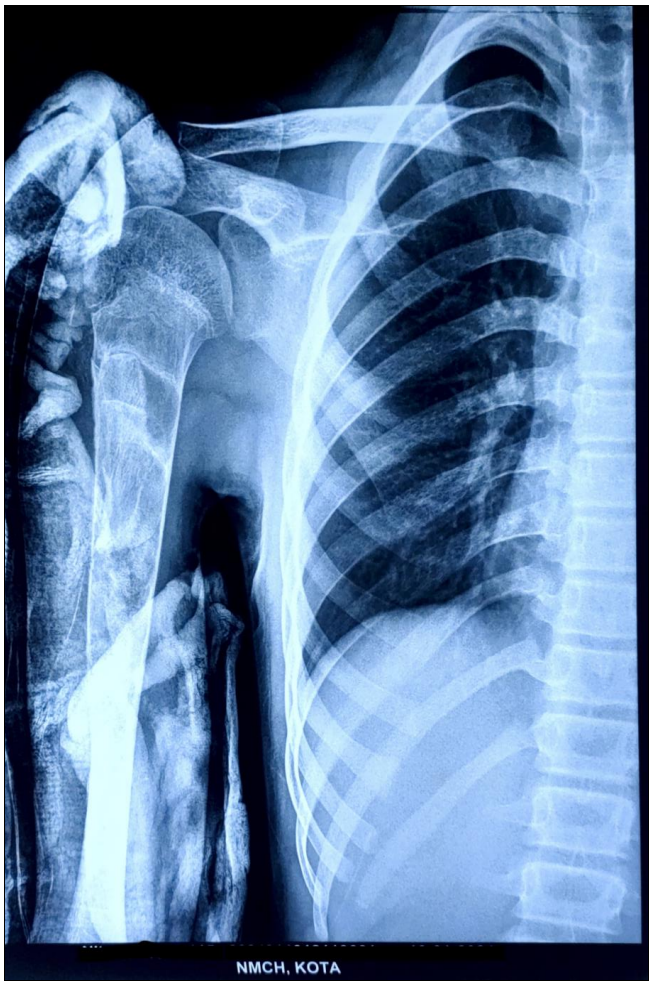

Fig 13: Postoperative Day 21 X-ray of the Right Shoulder AP View

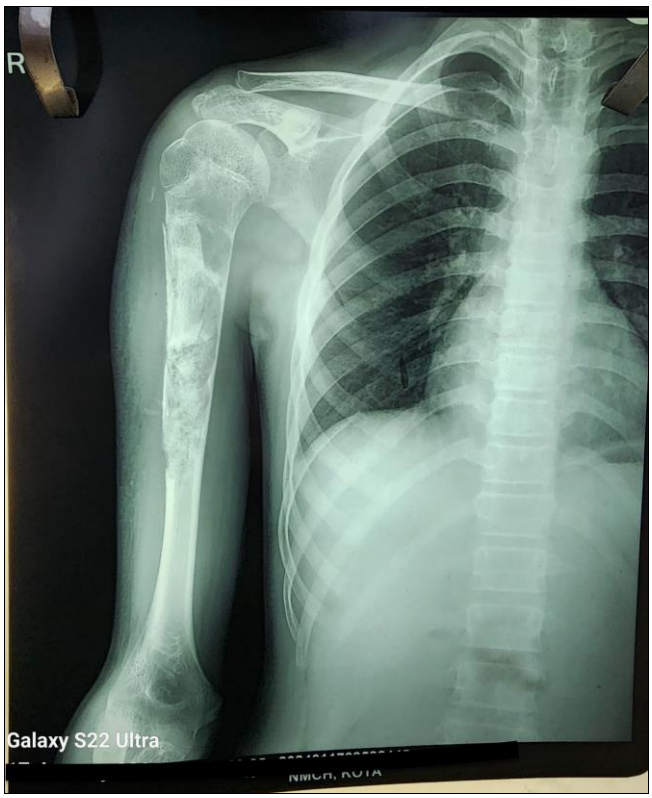

Fig 14: Postoperative 6-week X-ray of the Right Shoulder AP View

Fig 15: Postoperative 8-week X-ray of the right shoulder AP view

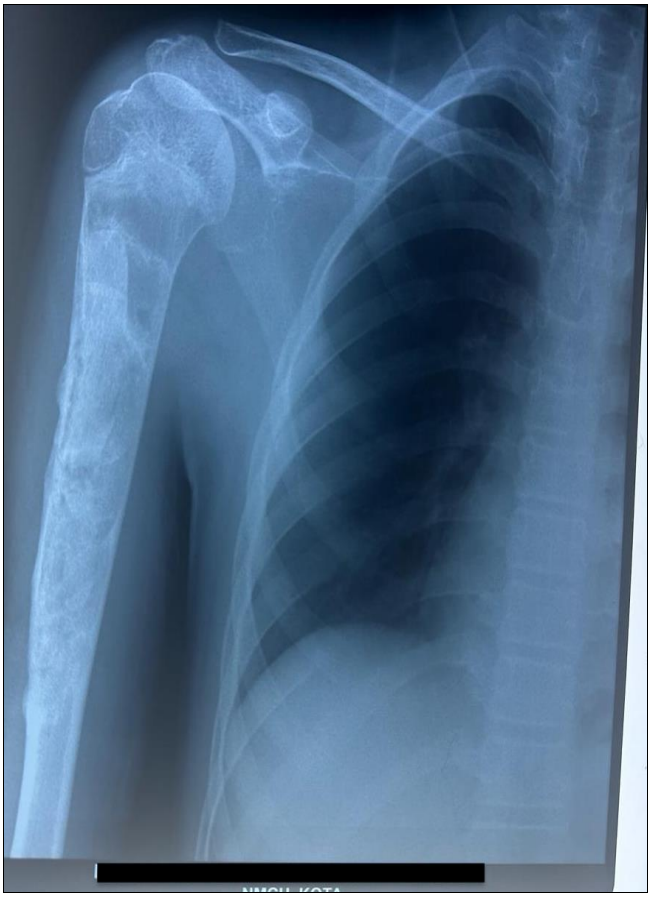

Fig 16: Postoperative 16-week X-ray of the Right Shoulder AP View

Fig 17: Clinical photograph of the range of motion

Conclusion

This study showed that the treatment of aneurysmal bone cysts in pediatric humerus patients with extended curettage with freeze-dried allografts is a viable option and leads to early mobility and strong structural support for such patients.

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Conflict of Interest

Not available

Financial Support

Not available

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