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ANEURYSMAL BONE CYST OF LUMBAR VERTEBRA IN A 16-YEAR-OLD FEMALE: A CASE REPORT

Orthopaedics

Dr. Gopikrishnan V Junior Resident, Sri Siddhartha Medical College And Hospital.

Dr. Nagesh B Kotyal Junior Resident, Sri Siddhartha Medical College And Hospital.

Dr. Ravikumar A S Professor, Sri Siddhartha Medical College And Hospital.

ABSTRACT

Background: Aneurysmal bone cysts (ABCs) are rare, benign, expansile vascular lesions of bone. Spinal involvement is uncommon but carries a significant risk of neurological compromise due to proximity to neural structures. **Methods:** We report a case of a 16-year-old female presenting with low back pain and left-sided swelling. MRI revealed an expansile, multiloculated lesion in the left lateral aspect of the L5 vertebra, consistent with an aneurysmal bone cyst. The patient underwent posterior decompression, lesion excision, and fusion with instrumentation. **Results:** Postoperatively, the patient experienced immediate relief of pain and returned to normal activities within six weeks. Follow-up imaging at six months showed stable fixation and no recurrence. Histopathology confirmed the diagnosis of aneurysmal bone cyst. **Conclusion:** Early diagnosis and prompt surgical intervention with decompression and stabilization yield excellent functional outcomes in spinal ABCs and prevent neurological deficits.

KEYWORDS

Aneurysmal bone cyst, Case report, Decompression, Lumbar vertebra, Spinal fusion.

INTRODUCTION

Aneurysmal bone cysts (ABCs) are benign, expansile osteolytic lesions consisting of blood-filled spaces separated by connective tissue septa containing osteoid and giant cells. They account for approximately 1–2% of all primary bone tumors, predominantly affecting individuals under 20 years of age.

Although ABCs most frequently occur in long bones, 3–30% may involve the vertebral column. When located in the spine, these lesions may lead to bone destruction, spinal instability, deformity, or neurological compromise due to compression of adjacent neural elements. The etiology remains uncertain, with proposed mechanisms including vascular malformations, trauma, or secondary development from other lesions such as osteoblastoma or giant-cell tumor.

Given the potential for significant morbidity, early identification and management are essential. This report describes a rare case of an L5 vertebral ABC in an adolescent female managed with surgical excision and stabilization.

MATERIALS AND METHODS

A 16-year-old female presented with progressive low back pain for three months, accompanied by a swelling on the left side of her lower back. Pain worsened with bending and coughing but was not associated with radicular symptoms, weakness, or sensory loss.

Radiographic Evaluation:

Plain X-rays demonstrated a lytic lesion at the L5 vertebral body. MRI, as shown in figure 3 revealed an expansile, multiloculated lesion involving the left lateral aspect of the L5 body, pedicle, and lamina, showing multiple fluid–fluid levels and cortical thinning, consistent with an aneurysmal bone cyst.

Surgical Procedure:

After anesthetic clearance, the patient underwent posterior decompression, lesion excision, and fusion with pedicle screw instrumentation under C-arm guidance as shown in figure 4. The lesion was completely excised, decompressing the spinal canal and restoring stability.

Histopathological Examination:

Excised tissue revealed blood-filled spaces separated by fibrous septa containing osteoid, fibroblasts, and multinucleated giant cells, confirming the diagnosis of an aneurysmal bone cyst as shown in figure 5.

Follow-Up

The postoperative course was uneventful. Pain relief was observed within the first week, and the patient was mobilized with a lumbosacral brace on day 5. Follow-up visits at 1, 3, and 6 months showed stable fixation, absence of recurrence, and normal neurological status.

RESULTS

Radiological Findings:

MRI confirmed a multiloculated expansile cystic lesion in the L5 vertebra with typical fluid–fluid levels as shown in figure 3.

Surgical Outcome:

Lesion excision and decompression were successful. No intraoperative complications were encountered. Histopathology confirmed ABC.

Functional Outcome:

Pain intensity (VAS score) decreased from 8 preoperatively to 1 at 6 months postoperatively. The patient resumed daily activities without residual symptoms.

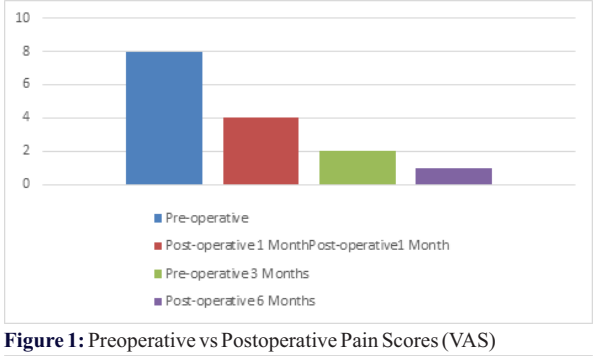

Figure 1: Preoperative vs Postoperative Pain Scores (VAS)

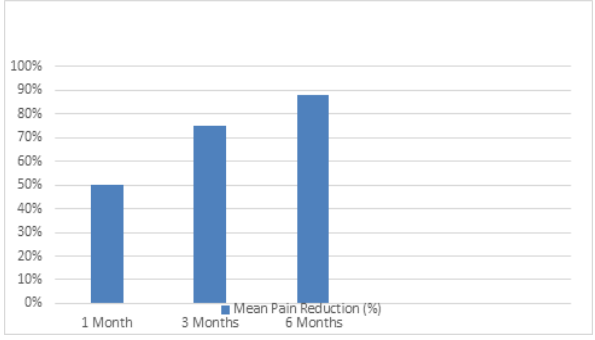

Figure 2: Pain Improvement Timeline

Figure 3: Pre-Operative Clinical picture and MRI Lumbar spine

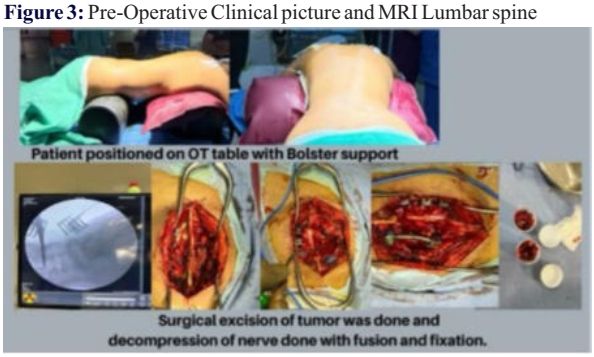

Figure 4: Intra-Operative pictures

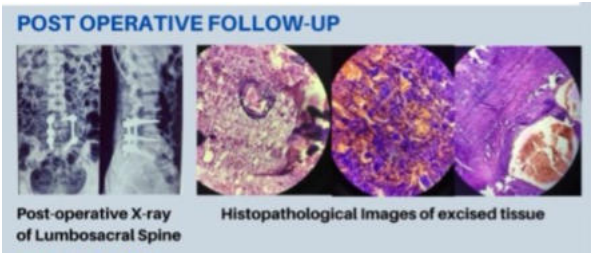

Figure 5: Post-Operative X-ray Lumbar spine and HPE images

DISCUSSION

Aneurysmal bone cysts of the spine, though rare, represent a diagnostic and therapeutic challenge due to their proximity to neural elements. MRI remains the imaging modality of choice, offering detailed delineation of the lesion and its relation to the spinal canal.

Various theories propose that ABCs may result from local vascular malformations or hemodynamic disturbances leading to increased venous pressure and bone resorption. The differential diagnoses include telangiectatic osteosarcoma, giant cell tumor, and hemangioma.

Treatment Approaches:

While nonsurgical options such as embolization or sclerotherapy have been described, surgical excision remains the gold standard for symptomatic or unstable lesions. Decompression and stabilization are crucial when neural structures are threatened.

Several studies support this approach:

- Park et al. (2022) and Choi et al. (2023) reported excellent functional outcomes and minimal recurrence with complete surgical excision and spinal fixation.
- Rossi et al. (2020) emphasized early surgical intervention to prevent deformity and neurological deficits.

Our patient showed complete resolution of pain and no recurrence on imaging at six months, corroborating these findings.

CONCLUSION

Aneurysmal bone cysts of the spine are rare but clinically significant lesions that can lead to instability and neurological impairment if untreated. MRI and histopathology are essential for diagnosis. Early surgical excision with decompression and fusion provides optimal outcomes, minimizing recurrence and restoring function.

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