Aneurysmal Bone Cyst of Pelvic Bones – patient wrestler

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Abstract

Background: Aneurysmal Bone Cyst (ABC), given its etiology and pathogenesis, remains one of the most controversial topics in orthopedics. Complications associated with ABC are not rare and can significantly impact professional or physical activities.
Aim: We present a case of ABC-like changes (2020) with polyostotic variants in an 18-year-old male patient who is a professional wrestler.
Methods: Preoperative MRI imaging, histopathological examination, and special immunohistochemical reactions (CD68, p63, Ki67) conducted on operative materials confirmed a transformation of Giant Cell Tumor of Bone into an ABC
Results: The pelvic area exhibited ABC-like changes affecting two bones – the right pubic ramus and sacrum, characterized by multiple fluid-fluid or blood-fluid cysts and tumor complications including osteolysis and necrosis. The expression of the P63 transcription protein is crucial as it suggests a lower potential for malignancy in the affected area.
Conclusions: Extensive curettage of the lesion and grafting with 'ZimmerBionet Gentamicin Bone Cement' were performed without fixation of the hemipelvis. Long-term outcomes and the patient's return to athletic activities support a benign prognosis. **(TCM-GMJ May 2026; 11 (1): P62-P64)**

Keywords: Pelvic area disorders; Aneurysmal bone cyst; Giant cell bone tumor.

Introduction

Aneurysmal Bone Cyst (ABC) is described as a locally aggressive, tumor-like destructive lesion in the literature [1, 2]. It can affect any bone but exhibits a predilection for the craniofacial, spinal, and pelvic regions, including the vertebrae. Pre-existing conditions such as Giant Cell Tumor, Fibrous Dysplasia, or chordomyxoid fibroma may predispose individuals to develop ABC [3-5].

Relapse frequencies are influenced by mitotic activity of cells, surgical intervention, and various risk factors such as cyst size, location, and disease phase [6, 7].

Here, we present a case of an 18-year-old male professional wrestler with a Giant Cell Tumor complicated by ABC in the pelvic region, affecting two bones: the pubic bone and sacrum.

Methods

An 18-year-old male patient presented with progressive abdominal pain radiating rapidly to the sacropubic area. There was no family history of similar conditions. The patient underwent magnetic resonance imaging (MRI) and X-ray investigations. The MRI (Figure 1) revealed processes localized centrally in the sacrum with a well-defined destructive pattern, multiple fluid-fluid cysts, and deep involvement of the sacral region. Additionally, on the MRI of the right pubic ramus, two small oval spaces separated by a narrow septum were observed (Figure 1).

The lesion presented as a tumor-like destructive area characterized by osteolysis, necrosis, and demarcations. Routine hematological investigations including complete blood count (CBC), C-reactive protein (CRP), and kidney function tests were within normal limits.

Based on clinical and radiological findings, ABC involving the right pubic bone and sacrum was diagnosed. Prognosis and treatment options were discussed with the patient and his parents. The treatment involved extensive curettage of the lesion followed by grafting using "Zimmer Bionet Gentamicin Bone Cement."

Histological examination with hematoxylin and eosin (H&E) staining and special immunohistochemical reactions were performed using transcriptional proteins P63 (Leica Novocastra, clone 7JUL), Ki67 (Leica Novocastra, clone MM1) to assess mitotic activity, and CD68 (Leica Novocastra, clone 514H12) to identify Giant cell localization and activities.

Histopathological evaluation revealed honeycombed dilated vascular spaces with solid areas, new bone formation, multinucleated Giant Cell reactions, and septae

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separated by immature cellular bone. Woven bone with hemosiderin deposition supported the diagnosis of Aneurysmal Bone Cyst (Figure 2a).

Immunohistochemical analysis demonstrated amorphous substances, CD68-positive macrophages, and p63-positive immature bone structures in the secondary cystic wall, confirming development from a Giant Cell Bone Tumor (Figures 2b, 2c). Moderate Ki67 activity was noted in regenerating foci of the solid bone cyst wall. Inflammatory areas with granulation tissue showed positive staining for Ki67 and strong positivity for p63 and CD68. Notably, the activity of Giant cells corresponded to the tumor stroma based on differential diagnostic markers.

The expression of p63 transcriptional protein is particularly significant as it suggests a lower potential for malignancy in the affected area [8, 9].

The patient was followed up for 12 months and remained symptom-free. A pelvic radiograph at the 12-month post-operative mark demonstrated satisfactory bone graft integration (Figure 3). The patient resumed physical activities and returned to professional wrestling.

Results and discussion

ABC in the pelvic area, particularly affecting the pubic and sacral bones, is rare. According to Dawod and Alisi's review [10], only 8 cases have been published in PubMed sources. Our case aligns with the typical age of ABC presentation, as approximately 80% of cases occur during adolescence [5, 10-12].

Radiographs and MRI scans play a crucial role in differential diagnosis, revealing characteristic fluid-fluid or blood-fluid cystic areas in the affected bones. Additionally, osteolytic foci, as previously described by Martinez and Sissons [13], Park et al. [1], and Restrepo et al. [2], are commonly observed in various ABC-affected bones.

Recent publications indicate that ABC is associated with pelvic bone tumors in 9% of cases [2, 12, 14, 15]. Our search identified 8 cases involving ABC of the distal end of the radius, detailing both presentation and modified treatment methods. Initial histomorphological examination is essential, as it may reveal features such as teleangiectasic osteosarcoma, Giant Cell bone tumor, or eosinophilic granuloma [16], necessitating urgent surgical or conservative interventions. Khan et al. [17] and Nayak et al. [18] described curettage and reconstruction of iliac crest defects. Rao et al. [11] reported curettage without grafting, although removal of the transplant was required two years later. Doriana Di Costa et al. [14] prioritized diagnostic procedures and localized damage in cases where ABC was complicated by bone fractures.

The limited number of ABC cases involving the pubis precludes detailed comparisons. Our approach emphasizes surgical intervention for stabilizing the distal end of the pubic ramus, supported by histopathological and immunohistochemical data confirming the absence of malignancy in the affected area.

In our case, typical MRI findings and histological biopsy examination were crucial for diagnosing ABC, with the immunohistochemistry panel (Figure 2b, c) confirming its benign nature despite concurrent changes (in this case, associated with a Giant Cell tumor).

Interestingly, the anatomical location of ABC in our wrestler patient is crucial for his athletic activities (Figure 1). We tailored our surgical technique by opting not to fix the hemipelvis. In contrast to the approaches of Khan et al. (2010) [17] and Downey et al. (2020) [19], who advocated for "wide excision, curettage, and reconstruction of defects using cancellous bone grafts from the iliac crest" [10].

Conclusion

MRI revealed characteristic ABC-like changes in the right pubic ramus and sacrum, showing multiple fluid-fluid or blood-fluid cysts, as well as osteolytic lesions and necrosis. Biopsy and immunohistochemical analysis (CD68, p63, Ki67) confirmed the diagnosis of ABC, arising from a transformed Giant Cell Tumor of Bone. The patient underwent extensive curettage of the lesion followed by grafting using 'ZimmerBionet Gentamicin Bone Cement'. No fixation of the hemipelvis was required. Long-term follow-up demonstrated successful symptom resolution, enabling the patient to return to wrestling activities, indicating a favorable prognosis. This case underscores the management challenges and effective treatment of ABC in a young athlete, underscoring the importance of tailored approaches in orthopedic care.

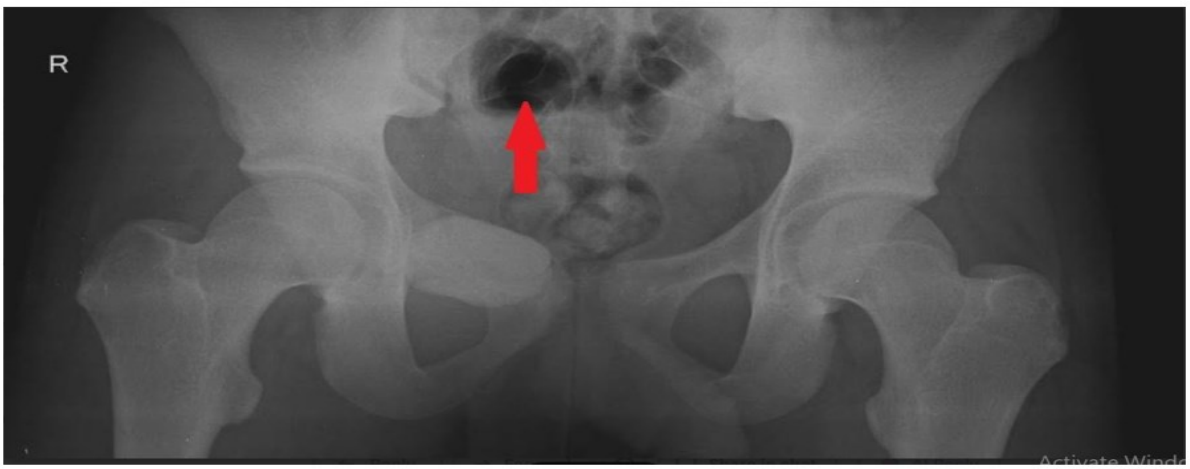

Figure 1: Preoperative MRI showing a well-defined destructive lesion with multiple fluid-fluid cysts in the right pubic ramus and sacrum (red arrow).

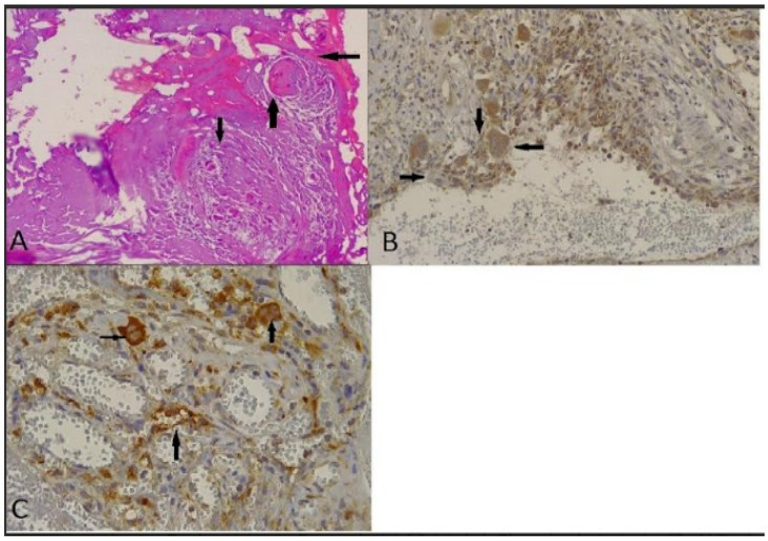

Figure 2: ABC microscopic features. a. H&E staining showing dilated vascular beds with solid areas in the sacrum (arrow). X200. b. Immunohistochemistry revealing marked positive expression of p63 in the cystic wall infiltrated by Giant cells. Pubic area (arrow). X200. c. CD68-positive macrophages (Giant cells) observed in the solid bone cyst wall (arrow). X400.

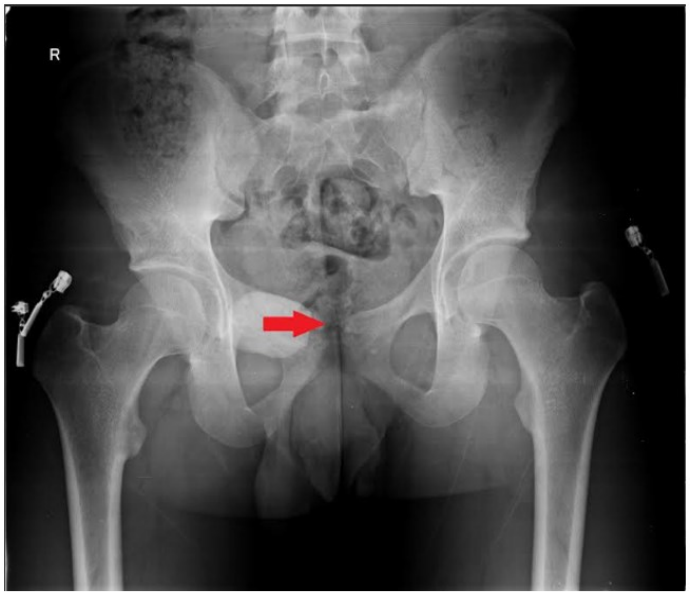

Figure 3: Pelvic zone radiograph taken 12 months post-operatively, demonstrating satisfactory maturation of the bone graft site (red arrow).

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