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Case Report

Pubic Chondrosarcoma in a Young Male: A Rare Case Presentation and Challenge Management

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Abstract

Pelvic chondrosarcoma is the second most common primary bone sarcoma. Surgical resection remains the cornerstone of treatment due to its resistance to chemotherapy and radiotherapy. We present a case of a 22-year-old male with a large, fixed mass adherent to the right pubic bone. This report highlights the unique Enneking type III location of the chondrosarcoma and details the surgical management using a specialized approach.

Keywords: Chondrosarcoma, pelvis, Enneking type III.

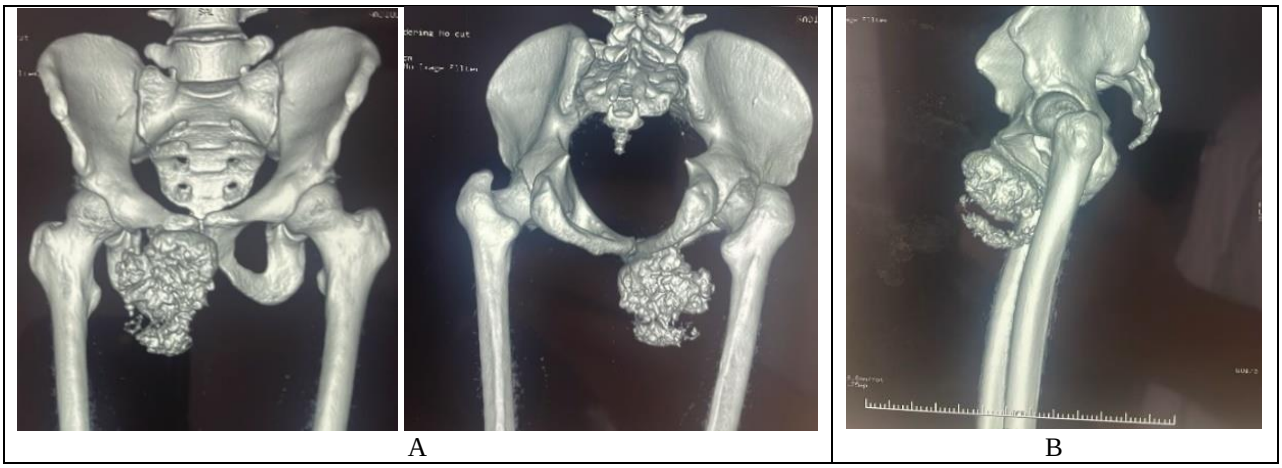
INTRODUCTION

Chondrosarcoma is a malignant cartilaginous neoplasm and the second most common primary bone sarcoma in adults, with a typical onset after the fourth decade of life. Pelvic location presents distinct therapeutic challenges due to its complex regional anatomy, proximity to critical neurovascular structures, and difficulty in achieving adequate surgical margins. Unlike other malignancies, chondrosarcoma demonstrates poor response to conventional chemotherapy and radiotherapy, making surgical resection with wide margins the cornerstone of treatment. The surgical management of pelvic chondrosarcomas demands meticulous preoperative planning and poses significant technical challenges, as the pursuit of adequate margins must be balanced against preserving critical anatomical structures and maintaining functional outcomes. Despite advances in imaging techniques and surgical navigation, the management of pelvic chondrosarcomas continues to present substantial challenges with regard to local recurrence rates and post-surgical complications.

CASE PRESENTATION

Our patient is a 22-year-old male without any personal or familial medical history, consults for pain in the right hip. was worried by swelling around his right pubic region progressing during two-year, clinical exam noted a painful fixed mass adhering to the pubic bone measuring about 5 cm long and 4 cm wide without any inflammatory signs. Pelvic x-ray (Fig. 1) and 3D CT-scan (Fig. 2) displayed an osteolytic and aggressive lesion of right superior pubic rami with posterior cortical destruction.

Figure 1: Anterior-posterior X-ray of the pelvis showing an osteolytic lesion of right superior pubic rami



A B

Figure 2: 3D computed tomography scan. AP view (A) and lateral view (B)

MRI images showed the lytic lesion of right pecten pubis with a low intensity in T1, and heterogeneous characteristics in T2-weighted sequences, exerting a mass effect on the bladder which was by elsewhere homogeneous and with thin wall. On the other hand, adjacent acetabular bone and hip joint were not affected (Fig. 3).

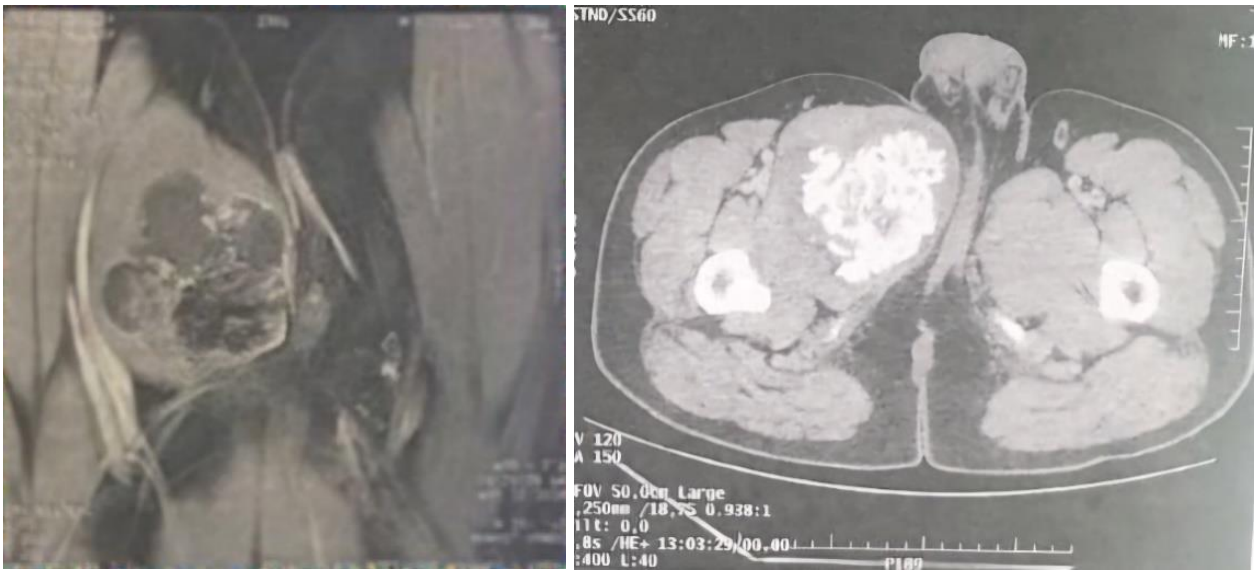


Figure 3: MRI showing a lytic lesion of right pecten pubis with a low intensity in T1, and heterogeneous characteristics in T2-weighted sequences

Surgical biopsy was performed through direct anterior approach under fluoroscopic control, macroscopic view of the tumor revealed a white cartilaginous constituent and histopathologic study was in favor of chondrosarcoma grade I.

On the way to analyze tumor extension, we realized thoracoabdominal CT-scan and a whole-body scintigraphy without any pathological findings. Therefore, an en bloc resection of pubic rami and ischiatic branch was completed through a specific approach.

Positioning: The patient is placed in the lithotomy position, with the hip elevated and positioned at the edge of the surgical table (Fig. 4).

Figure 4: Image showing the position

Incision: Using a skin marker, the position of the ischial tuberosity, the lower border of the pubic symphysis, and the inferior ramus of the pubis are marked. The incision begins 1 cm distal to the midpoint of the inguinal ligament and runs medially parallel to it. At the base of the penis or the labia majora, the incision curves distally toward the scrotum and continues along the lower border of the ischiopubic ramus to the ischial tuberosity (Fig. 5).

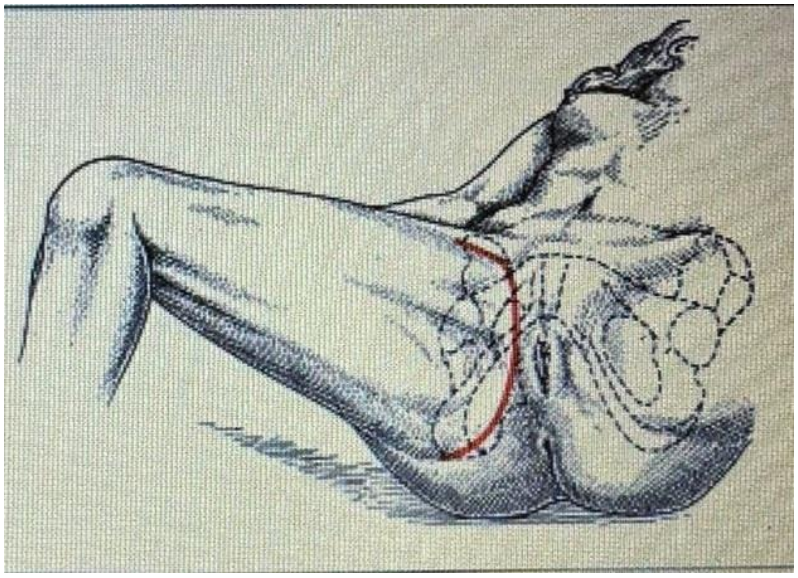


Figure 5: Surgical technique for ischial dissection according to Fabbri (extracted from Surgical Techniques in Orthopaedics and Traumatology, SS 470 - D, 2001)

Exposure: The pectineus, adductor longus, and external obturator muscles are incised subperiosteally, exposing part of the pubic body, the lateral portion of the ischiopubic ramus, and the ischial tuberosity (Fig. 6) with careful soft tissue dissection, hemostasis and pulling laterally of femoral neurovascular bundle. Bone resection was started at the level of the contralateral pubic symphysis, followed by right pecten pubis osteotomy in a propre periacetabular zone cheeked with fluoroscopy, then homolateral ischial tuberosity that was the last osteotomy allowing total tumor removal. Finally surgical mesh was implanted to avoid herniation (Fig. 7).

Figure 6: Operative view showing exposure of the tumor

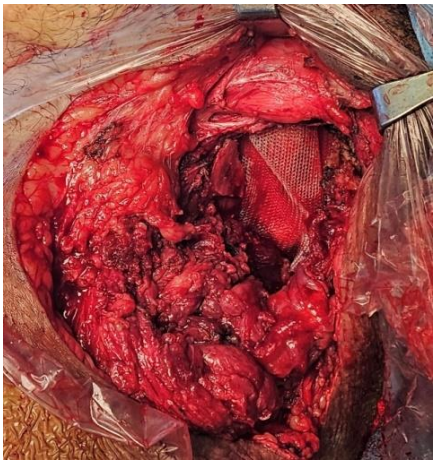


Figure 7: Operative view showing the surgical mesh

Post-operative radiographs showed complete resection of pubic tumor (Fig. 8) and histopathological study of resected specimen confirmed the diagnosis and chondrosarcoma grading with secure and proper margins (Fig 9).

Total weight bearing was started after three months, and patient was regularly checked clinically and by imaging based on multiple X-rays at 3, 6 months and every year associated with annual pelvic CT-scan. All these exams were normal without detection of any recurrence after three-year follow-up.

Figure 8: Post-operative radiograph showing complete resection of pubic tumor

Figure 9: The excision piece measuring 143mm at the major axis

DISCUSSION

Pelvic chondrosarcoma remains a significant challenge in orthopedic oncology due to its location, the proximity of critical structures, and the considerable size tumors can attain before presentation (Hillmann A, *et al*., 2003; Wilson R. J, *et al*., 2018; Bus M. P. A, *et al*., 2018). The pelvis houses essential neurovascular structures, including the iliac vessels, sciatic nerve, and major pelvic organs such as the bladder, rectum, and reproductive organs. This intricate anatomy makes surgical resection of pelvic chondrosarcomas particularly hazardous, as achieving adequate surgical margins is often hindered by the proximity of these critical structures. While the management of these tumors remains one of the most challenging aspects of sarcoma surgery, significant advances in imaging, diagnostics, and understanding tumor behavior relative to its surrounding environment have contributed to a reduction in the incidence of incomplete resections and subsequent increases in local recurrence (Kawai A, *et al.*, 1998; Donati D., *et al*., 2005; Hillmann A, *et al*., 2003).

As observed, chondrosarcomas (CSs) are slightly male-predominant tumors, typically affecting mature adults with a peak frequency in the fourth decade (Donati D, *et al*., 2005). High-grade CS appears to be more common in men over 50 years (Evans H. L, *et al*., 1977); however, our patient was 22 years old.

The only curative treatment for chondrosarcoma, regardless of its location, is surgical resection with wide margins. The survival rate for patients with chondrosarcoma of the pelvic girdle ranges between 51% and 88% at five years, which is lower than that of patients with peripheral chondrosarcoma (57% to 83%) (Donati D, *et al*., 2005; Hillmann A, *et al*., 2003). En bloc resection with clear surgical margins is associated with the lowest recurrence rates and improved survival. However, the rate of achieving clear margins varies widely in the literature, ranging from 25% to 82% (Bus M. P. A, *et al*., 2018; Hillmann A, *et al.*, 2003; Sheth D. S, *et al*., 1996).

Tumor location is also a significant prognostic factor (Mochizuki K, *et al*., 2000) and (Sheth D. S, *et al*., 1996) have highlighted that zone 3 chondrosarcomas are associated with poorer survival outcomes and a higher risk of local recurrence. (Hillmann A, *et al*., 2003) also noted that zone 3 tumors carry a greater risk of local recurrence, although the difference was not statistically significant. This is likely due to the surgical difficulty in obtaining clear margins in these locations, unlike zone 1 tumors, which are more accessible. These findings emphasize that the quality of resection margins is a major prognostic factor for both local control of chondrosarcoma and overall survival, particularly in young patients.

Several surgical approaches for Enneking type III resection of the anterior pelvis exist, with the ilioinguinal approach being the most commonly used, as demonstrated in a similar case by Ene R, *et al*., (2018). Additionally, a posterior approach may be employed if the tumor involves the ischiopubic branch. Certain surgical precautions should be considered, such as preserving the inguinal cord, urethra, and obturator neurovascular bundle. However, en bloc resection has its disadvantages, including the sacrifice of adductor muscle origins, which can compromise the medial stabilization of the hip joint. Furthermore, limited reconstruction options for the pelvic ramus may lead to complications such as inguinal or scrotal herniation. Therefore, it is advisable to implant surgical mesh following extensive pubic bone resection (Von Rundstedt F. C, *et al*., 2009).

CONCLUSION

Chondrosarcoma of the pelvic girdle remains of worse prognosis than periph eral bones chondrosarcoma since the critical prognosis factor is the resection margins quality. This location, and especially the peri-acetabular zone, poses difficult specific technical prob lems when

conservative surgery is selected. Various imaging techniques should help better envision tumor resection extent. Inter-ilioabdominal amputation should only be resorted to in non-metastatic patients, when the tumor does not seem to be removable with sufficient healthy margins guarantee, or when local conditions make it impossible to hope for a good quality reconstruction.

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