

CLINICAL CASE

**THE SURGICAL TREATMENT OF CHONDROBLASTIC
OSTEOSARCOMA - A CASE REPORT****Z. Panti^{1,2}, R. Ene^{1,2}, M. Nica^{1,2}, B. Șerban^{1,2}, M. Popa^{1,2}, C. Cîrstoiu^{1,2}**¹Orthopaedics and Traumatology Department, Emergency University Hospital of Bucharest²The University of Medicine and Pharmacy “Carol Davila”, Bucharest

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Abstract

Osteosarcoma is the most common primary malignant bone tumor, with a higher prevalence among children and young adults. Its most frequent localization is in the distal femur, followed by the proximal humerus and the proximal femur. In this article we will describe the case of a 25-year-old male patient who presented to our medical facility, accusing spontaneous pain and swelling, both originating from the left knee. The X-ray of the distal femur showed a heterogeneous mass around the left femoral metaphysis with massive periosteal reaction. The computerized tomography (CT) analysis revealed cortical destruction, with extra-compartmental localization. The patient has later undergone to an incisional biopsy. The histopathology report showed the presence of a chondroblastic osteosarcoma. According to the multidisciplinary diagnosis, the tumor was finally classified as type IIB on the Enneking classification. In such cases, the elective surgical procedure is reconstructive surgery, consisting of wide resection of the distal femur, followed by modular reconstruction. After the surgery, the patient's condition improved significantly and the functional outcome of the reconstructed joint was also satisfying.

Keywords: *chondroblastic osteosarcoma, limb salvage, prosthesis***Introduction**

The term osteosarcoma refers to a various group of malignant bone tumors. Their common histopathological pattern consists of mesenchymal tissue with evidence of osteogenic differentiation [1]. In terms of anatomopathology, there can be many types of osteosarcomas, such as osteoblastic, chondroblastic, fibroblastic, telangiectatic and mixed forms. However, the chondroblastic osteosarcoma can be found in only 25% of the reported cases [1].

Its exact cause cannot be determined, yet there have been found some risk factors

associated with osteosarcoma like: Retinoblastoma, fibrous dysplasia, Paget's disease, Li Fraumeni syndrome, osteogenesis imperfecta and previous exposure to radiation [2].

Case presentation

In this article we present the case of a 25-year-old male patient who was admitted in our medical facility complaining of spontaneous pain of the left knee, with exacerbations during the night. The patient also presented swelling around the affected area and difficulty in

walking. The onset of the symptoms was sudden and severe. The clinical examination showed the presence of a nodular formation of solid consistency in the distal part of the left femur.

Under this circumstances, an X-ray was performed and it revealed a heterogeneous mass around the left femoral metaphysis with massive periosteal reaction and multiple centers of calcification (Figure 1).

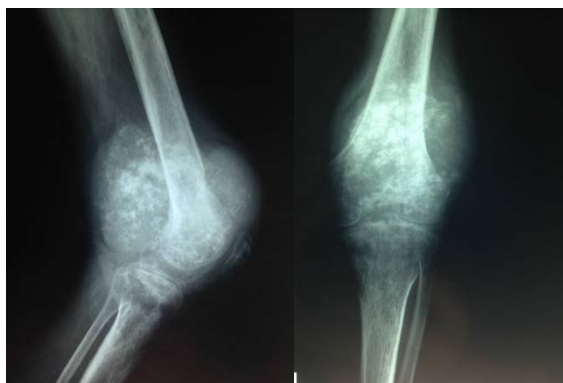


Figure 1-X-ray of the distal femur showing a heterogenous mass with multiple calcifications-lateral and frontal view

Afterwards, a CT scan clarified the overall view of the affected region. This procedure pointed out an important osseous destruction localized in the distal femoral metaphysis having mass effect on the surrounding soft tissue (Figure 2). Structural modifications could also be seen in the metaphyseal-epiphyseal region of the left femur and in epiphyseal region of the tibia and fibula. The tumoral mass had an irregular aspect, with hypodense necrotic areas interposed with numerous hyperdense areas (Figure 3). In order to determine whether the patient presented metastases or other osseous complications a whole body scintigraphy was performed using the ^{99m}Tc -MDP specific bone radiotracer. The result showed intense focal activity in the distal part of the left femur with no abnormal radiotracer uptake in the rest of the skeletal system (Figure 4).

For a correct histopathological diagnosis, the patient was subjected to an incisional biopsy. The histopathological report confirmed the presence of a chondroblastic osteosarcoma with numerous atypical cells and a high grade of cellular pleomorphism (Figure 5). The tumor was staged as a type II B on the Enneking surgical classification system.

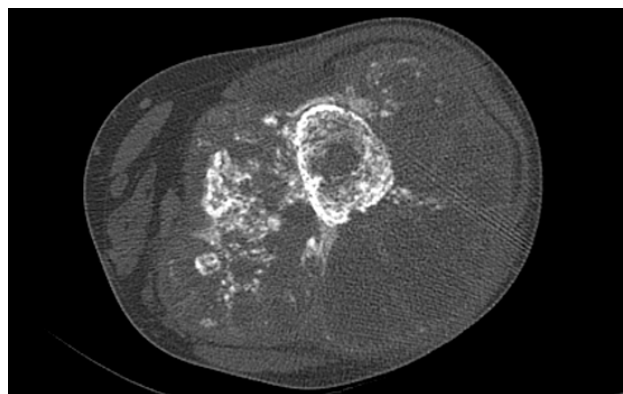


Figure 2- CT scan of the distal femur-transversal section



Figure 3 - CT scan of the distal femur- sagittal section



Figure 4 - Anterior (left) and posterior (right) whole body scan scintigrams showing an increased activity in the distal left femur with no metastatic foci

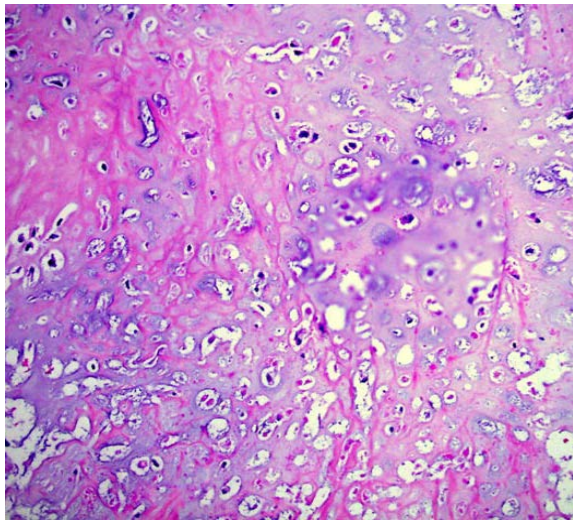


Figure 5 - Microscopic appearance-osteoid matrix with numerous atypical cells

The elective surgical treatment for patients with this pathology remains the endoprosthesis reconstruction. The dissection was made using the anterior and medial parapatellar approach, followed by wide resection of the distal femur (Figure 6). After this procedure, the specimen was sent for the extemporaneous examination of the resection site (Figure 7). The microscopic observation showed no atypical cells at the site of resection. Subsequently, the prosthesis was later cemented into the femur and distal tibia (Figure 8). The patient's recovery after the surgery was fast with regained flexibility and almost immediate weight bearing on the affected leg.



Figure 6 - Intraoperative aspect of distal femur



Figure 7 - Macroscopic aspect of the tumor



Figure 8 - Prosthesis cementation into the tibia



Figure 9 - X-ray of the left knee



Figure 10- X-ray of left femur showing the implantation of the prosthesis

At the post-operative check-up, the patient showed a fair medical state with an important improvement regarding the affected limb. With this occasion, another set of X-rays was performed, revealing the correct anatomical position of the prosthesis (Figure 9-10).

Discussions

Currently, the election surgical treatment for malignant bone tumors is local resection followed by reconstruction. Usually, for this type of procedure, more options are available: osteoarticular allograft reconstruction, allograft prosthesis with composite reconstruction, but the most commonly used remains the endoprosthetic reconstruction [3].

The advantages of endoprosthetic reconstruction are significant comparing to other surgical methods: structural stability, almost immediate weight bearing and regained flexibility. Moreover, this type of surgical procedure, leads to a 93% rate of limb salvage [4]. However other studies show that the endoprosthetic reconstruction can also lead to additional medical complications, such as structural failure, aseptic loosening, infection and tumor progression [5].

The chondroblastic osteosarcoma, depending on its location and aggressivity, can cause different clinical symptoms. For instance the diaphyseal osteosarcoma has higher risk to develop stress fractures compared to the metaphyseal osteosarcomas (28% vs 12%) [6]. These mechanical complications can lead not only to decrease life quality, but also to a lower 5 year-old surviving rate [7],[8]. However, the patients with diaphyseal osteosarcoma showed a better 5 year old event-free surviving rate (87%) compared to as those with metaphyseal osteosarcoma (59%) [9]. Also age plays an important role in the establishment of life expectancy. Patients younger than 26 years old have a higher 5 year event-free surviving rate than those with ages between 40 and 60 years old [10]. Yet the 5 year overall survival rate for the patients suffering from this conditions remains low (66.2%) [11]. Another factor that influences the prognostic factors of patients with osteosarcoma is the presences of soft tissue metastases. For instance, only 15-25% of patients with pulmonary metastases are cured after chemotherapy sessions and surgical resection of the metastases [12],[13].

Even though great progress was made in the surgical orthopedic field, the overall survival rate has remained constant in the last two decades [14].

Conclusion

Osteosarcoma, once one of the greatest challenges in modern orthopedics, now has an accessible solution: endoprosthetic reconstruction. In this article we presented the case of a patient with chondroblastic osteosarcoma, outlining the improvement of the prognostic factors for the patients suffering from that condition. Due to a multidisciplinary work, the patient's recovery was accelerated and the affected limb regained almost its all previous functions.

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