Chondroblastic osteosarcoma of proximal fibula

Yasir Salam Siddiqui,* Pathania VP,1 Manisha Mendiratta,2 Nusra Rahman3

1Dept. of Orthopaedic Surgery, SRMS - Institute of Medical Sciences, Bhojipura, Bareilly, UP, India
2Dept. of Pathology, SRMS - Institute of Medical Sciences, Bhojipura, Bareilly, UP, India and - 1Junior Resident, Dept. of Anatomy
3J.N. Medical College, AMU, Aligarh, UP, India

INTRODUCTION

Osteosarcoma is the most common form of primary malignant bone tumour that occurs during childhood and adolescence. The incidence of new diagnoses peaks in the second decade of life. The metaphysis of the long bones is the site of predilection, and, in declining order, it commonly involves distal femur, proximal tibia, and proximal humerus. The proximal fibula is a relatively rare site for osteosarcoma. We are reporting a case of osteosarcoma of proximal fibula in a 17-year-old male child and discuss the difficult aspects of diagnosis and management.

The management of osteosarcoma of the proximal fibula is demanding for the treating surgeon because of the proximity of the common peroneal nerve to the lesion. Resection of malignant tumours often requires wide surgical margins and to obtain such margin, at times resection of the common peroneal nerve is done. The purpose of this case report is to discuss the difficult aspects of diagnosis and management of osteosarcoma of proximal fibula. The case report is presented after obtaining informed consent from the patient.

CASE REPORT

A 17 year old male patient presented to our institution with 5 months history of gradually increasing pain and swelling in the region of his right proximal leg. He did not give any history of trauma, fever or any other systemic illness. Examination revealed firm and tender swelling involving the proximal fibula. Movements of the knee were within normal limits. Common peroneal nerve was intact. The patient’s laboratory results were normal except for low levels of haemoglobin, elevated levels of lactate dehydrogenase and alkaline phosphatase. Plain radiographs of the right knee showed the interrupted perioseal reaction involving the meta-diaphysis of proximal fibula. The lesion seems to have infiltrated...
the surrounding soft tissues, but proximal epiphysis of fibula seems to be free of the lesion (Figure 1). Interrupted periosteal reaction and extension of lesion in soft tissues indicated the aggressiveness of the lesion. Chest X-ray did not reveal any metastatic deposit. CT-scan of the chest was also normal. Magnetic resonance imaging (MRI) of the lesion also showed aggressive lesion involving the anterolateral aspect of proximal fibula. MRI also revealed irregular cortex and cortical breach with extension of the lesion in surrounding soft tissues (Figure 2 and 3). Common peroneal nerve was free of lesion as it lies posterior to fibular head. A clinicoradiological diagnosis of aggressive neoplastic lesion involving proximal fibula was made and the lesion was subjected to Fine Needle Aspiration Cytology (FNAC), to establish histological diagnosis. FNAC report was inconclusive. Considering the aggressive nature of lesion, excision of the lesion along with resection of the proximal fibula with safe margins was planned. During operation, it was found that the lesion had expanded the proximal end of fibula, and had infiltrated the surrounding soft tissues. The lesion along with the infiltrated soft tissues with safe margins was excised (Figure 4) and sent for histological examination. Common peroneal nerve was not resected as MRI and clinical examination excluded the involvement of nerve by tumorous lesion. No attempt was made to reconstruct the lateral soft tissue structures. Biopsy report showed areas of chondroid and osteoid differentiation, with predominance of neoplastic chondrocytes in the form of lobules. At the periphery of cartilage there are spindle cells with areas of new bone formation-osteoid matrix. The final biopsy report established diagnosis of chondroblastic osteosarcoma. Immediate post-operative period was uneventful with preservation of ankle dorsiflexion, but the patient developed toes drop. Patient was given 6 cycles of multi-agent chemotherapy, following confirmation of diagnosis of chondroblastic osteosarcoma. At the latest follow-up patient is not having any clinicoradiological (Figure 5) evidence...
of local recurrence or metastasis. Continuous follow-up for the possibility of local tumour recurrence and dissemination of the disease should be emphasized in these patients.

**DISCUSSION**

Osteosarcoma is the most common primary malignant bone tumour in children and adolescents. The proximal fibula is a rare site of osteosarcoma representing about 2% of all osteosarcomas. In previous reports on osteosarcoma arising from the proximal fibula, most of the patients were in their second decade, which was also seen in our patient. As resection of malignant tumours frequently necessitates wide surgical margins, in this view the treatment of sarcoma of the proximal fibula carries difficulties firstly, because of the frequent involvement of the peroneal nerve and resultant foot drop following resection of nerve to achieve clear margins. Secondly, stability of the knee joint is also at stake following resection of tumour. In our patient we intentionally preserved the common peroneal nerve as some authors have reported good results by preserving the common peroneal nerve through intentional marginal excision of these tumours. In our patient, even though no attempt was made to reconstruct the lateral soft tissue structures providing knee stability, postoperatively the knee was stable and with good function. This was in confirmation with authors who have reported good function after resection without ligament reconstruction.

The current World Health Organization (WHO) classification of osteosarcoma recognizes three major subtypes of conventional osteosarcoma: osteoblastic, chondroblastic, and fibroblastic, reflecting the predominant type of matrix in the tumour. Chondroblastic osteosarcoma and conventional osteosarcoma have similar clinical, radiological, and prognostic features. Chondroblastic osteosarcomas constitute 9–25% of conventional osteosarcomas. Morphologically, they are characterized with chondroid and osteoid differentiation. Chondroblastic osteosarcoma can be confused with chondrosarcoma in small biopsy specimens, and differentiating it from chondroblastic osteosarcoma is difficult. Osteoid formation within the tumour is the most important morphologic diagnostic feature. It is not always possible to obtain osteoid formation in small biopsy specimens. As a consequence, cases with chondroblastic osteosarcoma might be misdiagnosed as chondrosarcoma. False diagnosis rate has been reported to be as high as 44%. Hence, clinico-radiological findings must be used for differentiating chondroblastic osteosarcoma from chondrosarcoma. The most important clinical findings are patient’s age and location of the lesion. As in our case, the radiological differential diagnosis of an atypically located lesion in proximal fibula in a teenager was osteosarcoma and Ewing’s sarcoma. Chondrosarcoma was not kept in differential diagnosis on clinico-radiological ground. Unni emphasized that in an adolescent patient, if the tumour morphologically constitutes a neoplastic cartilage and osteoid formation
does not accompany, unless established to the contrary, it must be considered and treated as chondroblastic osteosarcoma.[8] In our case biopsy clearly showed association of neoplastic cartilage with malignant osteoid, establishing diagnosis of chondroblastic osteosarcoma and subsequent multi-agent chemotherapy resulted in good functional outcome.

A systematic approach to clinical history, radiographic evaluation and histopathology is necessary for accurate diagnosis of osteosarcoma. Our result showed that after resection of the proximal fibula the knee function remained stable, even though no attempt was made to reconstruct the lateral soft tissue structures. Peroneal nerve-preserving surgery is associated with a high risk of local recurrence and continuous follow-up for the possibility of local tumour recurrence and dissemination of the disease should be emphasized in these patients.

REFERENCES