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Research Paper

A Rare Tumor GCT of Proximal Fibula and Knee Stability After Resection of Proximal Fibula - Case Report

Medical Science

KEYWORDS : GCT, LCL, Excisional Biopsy

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ABSTRACT

A patient who reported with a slowly growing pain and swelling over the lateral aspect of the left knee, was investigated and diagnosed to have a giant cell tumour of upper end fibula, which was confirmed on biopsy. The tumour was managed with excision biopsy and reconstruction of lateral collateral ligament of knee (LCL). The case is being reported for its rare site of occurrence and our technique of reconstructing the LCL attachment after resection of the proximal fibula.

Introduction- The proximal fibula is a rare location for primary bone tumors[1]. Treatment of proximal fibular GCT requires removing a fibular segment including the fibular head while taking care of anterior & posterior tibial artery because of their anatomical relation with tumor. These resections result in an unavoidable loss of knee stability because of resecting the lateral collateral ligament (LCL) insertion site on the fibular head. We are describing our technique of reconstructing the LCL attachment after resection of the proximal fibula and reporting postoperative lateral knee stability and functional outcomes.

Case Report - A 45years old male patient presented with dull aching pain on lateral side of left knee for 6 months, which used to aggravate by walking or strenuous activities, relieved by taking rest or painkillers. Pain was progressive in nature and in severity. He was not able to walk and sleep properly for past two weeks due to pain which was present all the time and not relieved by rest. Swelling also appeared on lateral aspect of knee over fibula fifteen days ago; this was progressive in nature and associated with feeling of tightness in knee. Swelling was firm to hard in consistency. Over lined skin was normal without any local rise of temperature. Movements of knee were painful. There was no significant lymphadenopathy and distal neurovascular deficit. There was no history of associated trauma, fever, evening rise of temperature, night sweats or loss of weight. Radiograph showed ill defined, expansile, geographic, lytic lesion in proximal fibula (Figure1). MRI showed lobulated heterogeneously enhancing lesion in proximal end of fibula with hemorrhagic components suggesting possibility of Giant cell tumor(Figure2). Excisional Biopsy was planned and performed (Figure3) under tourniquet control without using esmarch, resection of proximal fibula was done with a thin muscle cuff in all dimensions, and the LCL attachment site (Figure4). The peroneal nerve and its motor branches were preserved and the tibiofibular joint was excised intraarticularly . 6x5x11 cm size of tumor was removed (Figure4), LCL was reattached to lateral tibial metaphysis by non absorbable sutures in 20^{o} of knee flexion. During excision of tumor bleeding from anterior tibial artery occurred which was managed and repaired by a vascular surgeon. Wound was sutured in standard manner and specimen was sent for histopathological examination which confirmed the diagnosis of GCT(Figure5). Postoperatively, the extremity was immobilized in a cast for 3 weeks in 20° flexion to allow soft tissue healing. After cast removal, full weight bearing and active range of motion (ROM) around the knee were allowed. At 12 months follow-up, the wound healed by primary intention and there was no evidence of local recurrence. The patient was pain-free and satisfied with a left knee range of motion 0 to 126^{o}. The patient was walking, full weight - bearing and performing all his daily activities unhindered. Patient was evaluated by plain radiography and a physical examination including lateral knee stability which was assesed by measuring the degree of lateral joint space opening using a varus stress with the knee in 30^{o} flexion and in neutral tibial rotation every three months for a year.

DISCUSSION-

Giant cell tumor is the most common bone tumor in the young adults aged 25 to 40. Giant cell tumor are found more commonly in women than men, and occur most often during the third decade [2].GCT accounts for 5 to 9 percent of all primary bony tumors. Giant cell tumors are usually found in the long bones, most often the distal femur, proximal tibia, and distal radius[2]. The proximal fibula is a rare location for GCT[1]. Giant cell tumors occur only after the closure of epiphyseal plates. Giant cell tumor of bone is a benign lesion that is a usually solitary and locally aggressive. In the very rare instances this lesion has the potential for metastasis to the lungs and in these cases the lung lesions may behave in an unpredictable manner and even require no treatment[3]. There are no definite biological or histological parameters to determine the prognosis or aggressiveness of this lesion[4].

Most patients present with slowly progressive pain, with or without a mass. Symptoms arise when the lesion begins to destroy the cortex and irritate the periosteum or when the weakening of the bone caused by the tumor causes pain due to imminent pathologic fracture. Some giant cell tumors present with a pathologic fracture.

Radiologic findings demonstrate the lesion is most often eccentrically placed to the long axis of the bone. The center is most radiolucent with increasing density towards the periphery. There is a well-defined in defect in the metaphysis and epiphysis, with destruction of the medullary cavity and adjacent cortex. The destruction may stop just short of the joint. Intact borders and a sharp inner margin may be associated with a better prognosis. These tumors often thin the cortex, and may expand into the soft tissues surrounding the bone,or they may expand the bone extensively, remaining within an eggshell-thin rim of periosteal new bone.

Histopathology findings-The gross appearance of the giant cell tumor is firm, and homogeneous, with foci of hemorrhage or necrosis. Microscopically, there are numerous multinucleated giant cells. The stromal cells are homogeneous mononuclear cells with around or ovoid shapes, large nuclei and indistinct nucleoli. The nuclei of the stromal cells are identical to the nuclei in the giant cells, a feature that distinguishes giant cell tumors from other lesions that also contained giant cells. Another feature of giant cell tumor is that the giant cells may contain very large numbers of nuclei, often several hundred. In some tumors, the giant cells can be seen to be engulfing more nuclei from the stroma. Dif-

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ferential Diagnosis includes other aggressive tumors in this age group and location includes Aneurysmal Bone Cyst, Sarcomas in bone & Desmoplastic Fibroma.

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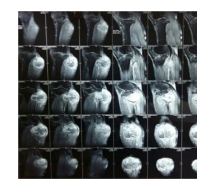
Treatment of proximal fibular GCT requires removing a fibular segment including the fibular head with a thin muscle cuff all around along with LCL attachment, while taking care of anterior & posterior tibial artery because of their anatomical relation with tumor. The types of proximal fibular resections were described by Malawer[5]. A Type I resection included the proximal fibula, a thin muscle cuff in all dimensions, and the LCL attachment site. The peroneal nerve and its motor branches were preserved and the tibiofibular joint was excised intraarticularly . A Type II resection included an en bloc removal of the proximal fibula and the tibiofibular joint, the anterior and lateral muscle compartments, the peroneal nerve, and the anterior tibial artery. Faezypour et al[6] and Jacob et al[7] described a similar technique of reconstructing the LCL. Jacob et al[7] reported that out of the 24 patients who had proximal fibula resections, 15 had a Type I resection and nine had a Type II resection. All nine patients who had Type II resections had an expected iatrogenic complete and permanent loss of peroneal nerve function. Three patients who had Type I resections had a transient peroneal nerve palsy that resolved spontaneously within 4 to 7 months. None of the patients had flap ischemia, wound dehiscence, or thromboembolic complications. Twenty patients (83%) had stable knee, three (13%) had Grade 1 instability, and one (4%) had Grade 2 instability (Table 2). Patients who had reconstruction after a Type I resection had a higher ($p < 0.025$) rate of knee stability compared with patients who had a Type II resection. All patients had full ROM of the ipsilateral knee. The three patients who had Grade 1 instability were asymptomatic and did not require knee support for ambulation. The one patient with Grade 2 instability required a knee brace, and occasionally, a cane for ambulation. Data regarding functional outcome were available for 12 patients who had Type I resections and for seven patients who had Type II resections; the former group had better ($p < 0.02$) functional outcome.

In our case we achieved satisfactorily functional outcome without any recurrence of tumor. At one year follow up the patient was walking, pain free full weight bearing with knee ROM 0 to 126^{o} and performing all his daily activities unhindered.

Reattachment of LCL to the tibial metaphysic by non absorbable suture is a safe and reliable technique to reconstruct knee stability after resection of the proximal fibula. It provides stability and good function in the patient. This technique is simple to perform and associated with minimal morbidity. As we are just reporting a case we recommend a larger series for better assessment and implication of this simple technique of LCL reattachment after proximal fibular resection for better knee stability.

Fig1- Pre op X-Ray



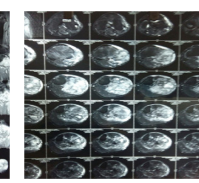


Fig2- Pre Op MRI Of Left Knee

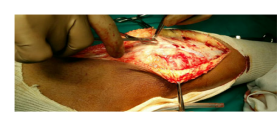


Fig3- Intra op

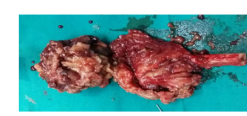


Fig4- Excisional Biopsy Proximal Fibula

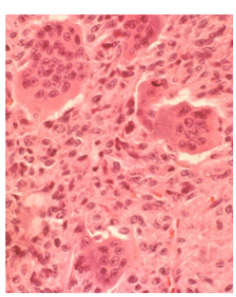


Fig5- Histopath Slide

Fig6- post Op X-Ray

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