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Floating knee injury in a child with polyostotic non-ossifying fibroma: A case report

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Abstract
Bone defects arising from non-ossifying fibroma may render the affected bone mechanically weak especially when associated with larger defect size in a growing skeleton of an active child. Most of these defects are asymptomatic and are incidental findings with very few presenting with pathological fractures. They can however be satisfactorily managed by conservative or operative means as per the case and personality of fracture. These lesions affecting a larger segment of bone at multiple skeletal sites is a rare occurrence. Simultaneous fractures of both bones of leg and femur or floating knee injury pattern, in association with polyostotic non-ossifying fibroma, has not been reported the best knowledge of the authors.

Keywords: pathological fractures, non-ossifying fibroma, pediatric, floating knee, injury, polyostotic, fibrous cortical defect

Introduction
Non ossifying fibroma (NOF) is larger variants of fibrous cortical defects (FCD) and is among the most common bone tumor or tumor like conditions affecting a growing skeleton. The lesion consists of fibrous tissue, multinucleate giant cells and foam cells and often is asymptomatic [1]. Pathological fracture, however, is an uncommon but potential complication of these lesions in an active child with sports participation [2]. Most common site of these lesion is metaphyseal with multiple, diaphyseal and poly-ostotic lesions reported rarely in isolation or concomitantly. Present case is a rare occurrence of widespread spread of these lesions including diaphysis of multiple skeletal sites. The simultaneous fracture of multiple long bones of ipsilateral lower extremity is a rare presentation in its own right and rarer if it is related to pathological fractures.

Case Report
A twelve years old healthy male child presented to us in the emergency department with history of fall during playing soccer, leading to pain, deformity and difficulty in weight bearing over left lower limb. On clinical examination, there was tenderness and abnormal mobility over the mid-thigh and middle of the leg suggesting fractures in the corresponding region. There was history of no other significant related or remote injury or related systemic disorder. Radiographs confirmed the diagnosis of fracture middle third of left femur and that of both bones of ipsilateral leg thus consisting a floating knee injury. Additional findings in the radiographs were incidental in the form of multiple bony lytic lesions with reactive marginal sclerotic zone in the femur and leg bones of fractured extremity (Fig.1). The radiological features of the lesions were similar to non-ossifying fibroma. Additional radiographs were ordered after informed consent of the parents in view of detecting similar lesions in other skeletal sites. Contralateral thigh, leg also showed similar lesions along with bilateral humerus and forearms bones (Fig.2). The lesions were mainly presented in the diaphyseal or meta-diaphyseal region and were large involving more than 50% of the cortical diameter at certain places. There was no history of any pain associated with these lesions in the past. On further detailed evaluation of radiographs, the current fractures also seemed to have resulted through one of those lesions in respective sites. A provisional diagnosis of pathological fracture in a child in the settings of multiple non ossifying fibroma was made.

Initial splint was provided with high groin plaster slab in the left lower limb. The case was planned for closed reduction and fixation with titanium elastic nailing system (TENS) as definitive treatment. The surgery was performed after informed consent of the parents in view of the minor case. Under aseptic conditions two adequate sized flexible titanium nails were introduced and secured with standard techniques. Multiple bone injury and difficulty to manage the case conservatively with splints were the key factors for the decision. Furthermore, minimal invasive procedure with TENS also ensured early range of motion and avoidance of side effects of prolonged plaster treatment while providing adequate stability till union. Pre-bending of the nails as required was undertaken before the insertion. The reduction was checked for restoration of length, alignment and rotation in the image intensifier. The whole procedure was undertaken in fluoroscopic guidance to ensure satisfactory management. The procedure did not require any other incision than the nail entry points thus ensuring quick wound healing and less chances of infection. Closure of wounds was followed by compression bandages and support of the limb over a pillow.

The post-operative period was uneventful with normal healing of wounds and early start of quadriceps strengthening exercises.

There was gradual union on successive radiographs over a period of eight weeks. Patient has improvement in all clinical parameters when reviewed at 3, 6 and 12 post-operative weeks and then at 6 and 12 months (Fig.3). There was uneventful removal of nails from both sites after one year. The child was pain free and performing all activities of daily living when reviewed at one year. The lesions remained non-ossified till the last follow up even after the fractures were united. The child has been asked for periodic visits for monitoring and appropriate interventions as per the requirement at that time.

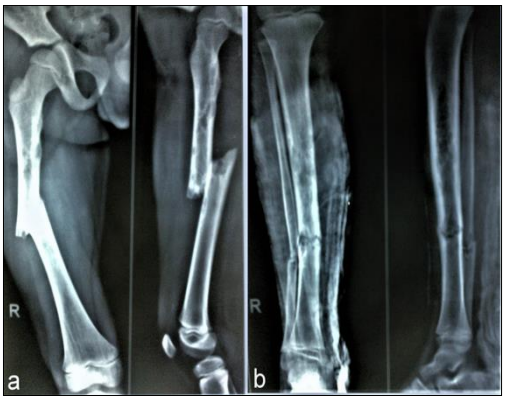

Fig 1: Fracture of femur (a) and tibia (b) along with multiple bony lesions present over the femur and leg bones corresponding to polyostotic non-ossifying fibroma.

Fig 2: Other sites of skeletal involvement in bilateral upper extremities (upper) and contralateral thigh and leg region showing similar asymptomatic polyostotic lesions (below).

Fig 3: Fracture of femur showing gradual union (a, b) along with united tibia (c) with implants in-situ.

Discussion

FCDs are common pediatric benign skeletal neoplasm affecting sites like distal femur, proximal tibia and fibula among others. They are believed to be seen radiographically in one fourth of pediatric patients [1, 2]. Their asymptomatic profile is barrier to estimate true incidence of these lesion. NOF are larger variant with similar pattern of involvement and multi-centricity [2, 3]. The lesions appear intramedullary with radiolucent, eccentric, geographic and cystic lesion usually more than 4 cm. in size [4]. Usually they present with pathological fractures of the involved bone and size may be a predictor and risk factor [1, 4]. Prophylactic curettage and bone grafting has been suggested in cases with large size of lesion or those causing pain or those likely result in pathological fractures [3,4]. The fractures, however, are reported to have excellent union rate in such cases. The lesion, on the other hand, may remain non ossified for long or even after the fracture union in some cases. Although they are believed to resolve on their own in many cases as the defects become sclerotic [2, 5]. The risk of recurrent fractures is thus present in the follow up and warrants careful monitoring and activity modifications [6]. There is lack of authentic treatment guidelines for fracture management, prophylactic management as well as the ideal mode of treatment. It was managed by flexible intramedullary nails as standard technique in such injury. Simultaneous fractures of femur and ipsilateral both bones of leg in the settings of polyostotic benign lesion is not reported as per the literature search done by authors. The treatment in most instances is individualized with several variables to be taken into consideration. The exclusion of neoplastic or non-neoplastic etiology for the pathological fractures should be based on similar injury patterns in a defined geographical region. A detailed studies are required to understand comprehensive clinical incidence and presentation of non neoplastic lesions in respective geographical location for better management [7]. The present case highlights an uncommon etiology in pediatric trauma and reiterates the fact that major bones fractures in children may sometimes result from underlying bone pathology. The case, however, was treated in standard manner with good outcome.

Conclusion

Injuries in sports resulting in fractures of long bones with atypical pattern may at times be related to underlying bony lesions. Multiple bone involvement may result from polyostotic nature of underlying lesions. Acknowledgement of common benign lesions presenting atypically is important for proper identification and better management.

References

1. Cunningham JB, Ackerman LV. Metaphyseal fibrous defects. J Bone Joint Surg Am. 1956; 38(4):97-808.
2. Campbell CJ, Harkess J. Fibrous metaphyseal defect of bone. Surg Gynecol Obstet. 1957; 104(3):329-336.
3. Drennan DB, Maylahn DJ, Fathey JJ. Fractures through large non ossifying fibromas. Clin Orthop Relat Res. 1974(103):82-88.
4. Arata MA, Peterson HA, Dahlin DC. Pathological fractures through non ossifying fibromas. Review of the Mayo Clinic experience. J Bone Joint Surg Am. 1891; 63(6):980-988.

5. Roberts JB. Bilateral hyperplastic callus formation in osteogenesis imperfect. J Bone Joint Surg Am. 1976; 58(8):1164-1166.
6. Easley ME, Kneisl JS. Pathologic fractures through nonossifying fibromas: is prophylactic treatment warranted? J Pediatr Orthop. 1997; 17(6):808-813.
7. Dharmshaktu GS, Shekhar C, Pangtey T, Singh P, Bhandar SS. Pathological fractures in non-neoplastic disorders: A study of etiology, clinical profile and management in a teaching hospital in Uttarakhand. International Journal of Orthopaedics Traumatology and Surgical Sciences. 2017; 3(1):447-452.