Coexistence of Extraskeletal Mesenchymal Chondrosarcoma and Isolated Hemihiperplasia: A Case Report

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What to Learn from this Article?
The possibility of malignancy must be kept in mind in musculoskeletal masses of patients with hemihyperplasia.

Abstract

Introduction: Arthroscopic fixation of tibial spine fracture without damage to the growth plate is very important in patients with open physis. The present article describes a simple and effective technique being used for the first time to treat this condition.

Case report: A 16-year-old boy sustained avulsion fractures of tibial spine while playing. He was treated arthroscopically with excellent result.

Conclusion: Arthroscopic fixation of tibial spine fracture in patients with open physis with two cannulated screws perpendicular to each other is a very simple technique which provides strong construct, and allows early mobilization without risk of damage to the growth plate.

Keywords: Arthroscopic fixation, Tibial spine avulsion, Tibial spine fracture, Cannulated screws, Open physis, Open growth plate.

Introduction
Avulsion fractures of tibial spine leading to discontinuity of anterior cruciate ligament fibers are uncommon but well described in literature in both pediatric and adult population [1]. These fractures are also called as tibial eminence fractures or ACL avulsion fractures. They represent a variant of anterior cruciate ligament injury. These injuries are commonly seen in children aged between 8-14 years and are usually sports related injuries. In adults, these injuries are commonly related to high energy trauma usually road traffic accidents [1, 2] and have high incidence of associated injuries. The cause of increased incidence amongst children is hypothesized as being secondary to relative weakness of incompletely ossified tibial eminence compared to native ACL fibres. Meyers and McKeever classified these injuries in 1959 as non-displaced (type I), partially displaced or hinged (type II) and completely displaced (type III) fractures. Type III fractures were further subdivided into 'not rotated' and 'rotated' [1, 2, 3]. This classification was modified by Zaricznyj to include comminuted avulsion fractures (type IV) [4].

Case Report
A 16-year-old boy sustained injury to his left knee while playing. The patient had severe pain and swelling and was unable to bear weight in the affected knee. X-rays revealed displaced tibial spine fracture [Fig. 1, 2], and the young boy was treated with cast. However, the patient was uncomfortable with the cast and came to our institute. It was displaced fracture. We did MRI to rule out other injuries [Fig. 3].

Acknowledgments

Author's Photo Gallery

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Patient was treated arthroscopically under spinal anesthesia in supine position. Anterolateral and anteromedial portals used. Both the portals should be standard or slightly low as higher portal may put the scope above the fractured fragment and one may not be able to see the fracture clearly. Fractured fragment was clearly defined with the help of shaver. It also involved significant portion of medial tibial plateau [Fig. 4, 5]. Fracture was reduced with help of ACL zig and under C-Arm guidance provisionally fixed with guide wire from superolateral portal taking care not to cross physis, as it was a large fragment it was not sitting completely from medial side so another wire was used from superomedial portal to fix medial side of fragment perpendicular to lateral wire, again without crossing the physis. Two 3.5 mm partially threaded cannulated screws (zimmer) were directly used 45mm from lateral side and 35mm from medial side [Fig. 7]. Stability of the fragment was assessed with a probe and was found to be stable [Fig. 6]. Post-operatively, patient was kept in a knee brace [Fig. 10]. Post-op X-rays showed proper position of both the screws [Fig. 8, 9]. He was allowed to walk full weight bearing with the knee brace for support. Knee range of motion was allowed from 0-90 for 2 weeks than 0-120 for next 2 weeks. After one month, he was allowed to walk without knee brace. At 6 months, patients was allowed to run.

Discussion

Arthroscopic fixation of displaced tibial spine fracture is a standard procedure [8, 9]. Commonly, tibial spine is fixed either with cannulated screws or strong non absorbable sutures. In patients with open physis, injury to physis is a serious concern as it may lead to various growth disturbances [10, 11]. In patients with open physis, suture fixation is considered safer than cannulated screw fixation but even suture fixation requires drilling through the physis which may cause damage to the physis, incidence of growth disturbances have been reported even with transphyseal suture technique which lead to development of transepiphyseal suture technique. Both tranphyseal and transepiphyseal suture techniques are quite complex and require more time as compared to screw fixation technique. Prolonged Immobilisation of knee after any technique can lead to arthrofibrosis [12]. Thus, strong fixation and early mobilization are key to success. Biomechanical studies on strength of various fixation techniques have produced mixed results [5, 6, 7]. In porcine model, Egger & colleagues demonstrated that fiber wire (Arthrex) suture were superior to Ethibond suture (Ethicon) and 1 or 2 ante grade cannulated screws in single and cyclical loading protocol. In bovine model, Mahar and colleagues found no difference between Ethibond suture, bioabsorbable nails, single bioabsorbable screw or single metal screw in an ultimate failure test. In cyclical loading test, Tsucada and coworkers found a statistically significant difference in displacement favoring cannulated screw over Ethibond suture. In cases of comminuted fractures suture technique is preferred as screws are unlikely to provide adequate fixation [5, 6, 7].

In this case as this was large fragment, we used two cannulated
screws (Zimmer) perpendicular to each other holding only in epiphysis for fixation. Thus avoiding any risk of physeal damage. These self tapping screws are directly used after provisional fixation with guidewire as no drilling is required. Perpendicular configuration of two screws provides a strong construct which helps in early mobilization. We started full weight bearing mobilization in post knee brace from second post op day. For first two weeks knee ROM from 0-90 was allowed which was increased to 120 for next two weeks. Patient was allowed to walk without brace after 1 month.

Thus, arthroscopic fixation with two cannulated screws perpendicular to each other is a very simple technique providing a strong construct and thus allows early mobilization.

**Conclusion**

Arthroscopic fixation of tibial spine fracture in patients with open physis with two cannulated screws perpendicular to each other is a very simple technique that provides a strong construct and allows early mobilization without any risk of damage to growth plate.

**Clinical Message**

Arthroscopic fixation of tibial spine fracture in patients with open physis with two cannulated screws perpendicular to each other is a very strong construct, allowing early mobilization without risk of damage to growth plate.

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**How to Cite this Article**

Demirkiran ND, Akdeniz O, Hapa O, Havitçioğlu H. Coexistence of Extraskeletal Mesenchymal Chondrosarcoma and Isolated Hemihyperplasia: A Case Report. Journal of Orthopaedic Case Reports 2016 April-June;6(2):28-30.

**Conflict of Interest:** Nil

**Source of Support:** None