Research Article

Arthroscopic single tunnel pullout suture in tibial eminence fracture

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Introduction

Tibial Eminence fracture is an intra-articular avulsion fracture of anterior cruciate ligament. It was first described by Poncet in 1875.(1) These injuries occur most commonly in skeletally immature patients between the ages of 8 and 14 years.

They account for 2% to 5% of knee injuries in the pediatric population and 14% of ACL injuries and have an incidence of 3 per 100,000 children per year. The first publication of eminence fractures in childhood was by Pringle et al. in 1907.(2)

A widely used system for the classification of these types of fractures was published by Meyers and McKeever in 1959.(3) Additionally, Meyers and McKeever were the first authors to report on a large number of cases in 1970; they analyzed and presented 45 cases including 35 cases of children.(4)

In children, most often the tibial eminence is not completely ossified and the collagen fibers of the ACL are continuous with the perichondrium of growth cartilage. This is why fewer ligament lesions and more avulsion fractures are found in children, with a high incidence between 8 and 17 years of age.

It is now known that they occur with much greater frequency in adult populations than previously thought. In children a lesion of the anterior cruciate ligament often occurs in combination with avulsion fracture of the anterior part of the inter-condylar eminence of the tibia or an avulsion fracture tibial eminence as an isolated lesion. By contrast, in adult this lesion may be combined with lesions of menisci, capsule or collateral ligament.(5)

Aim of the work

Describe a new arthroscopic technique in Treating Tibial eminence avulsion fracture using a single tunnel Pullout Suture and evaluate the results.

Patients and Methods

Between November 2015 and October 2017, 20 patients with an avulsion fracture tibial eminence were arthroscopically managed in the orthopedic surgery department at El-Minia university hospital. All patients included in this study were managed by arthroscopic single tunnel pullout suture technique.

There were 14 males and 6 females were involved in this study. All patients enrolled in this prospective study were interviewed and the details of the proposed arthroscopy were discussed with them. A full informed consent was obtained from each patient including approval of the arthroscopy, all possible complications and liability of further surgeries.

Inclusion criteria:

1. Age group : (10 – 40 years old)
2. Type II**,** III, and IV according to modified Meyers and McKeever classification .

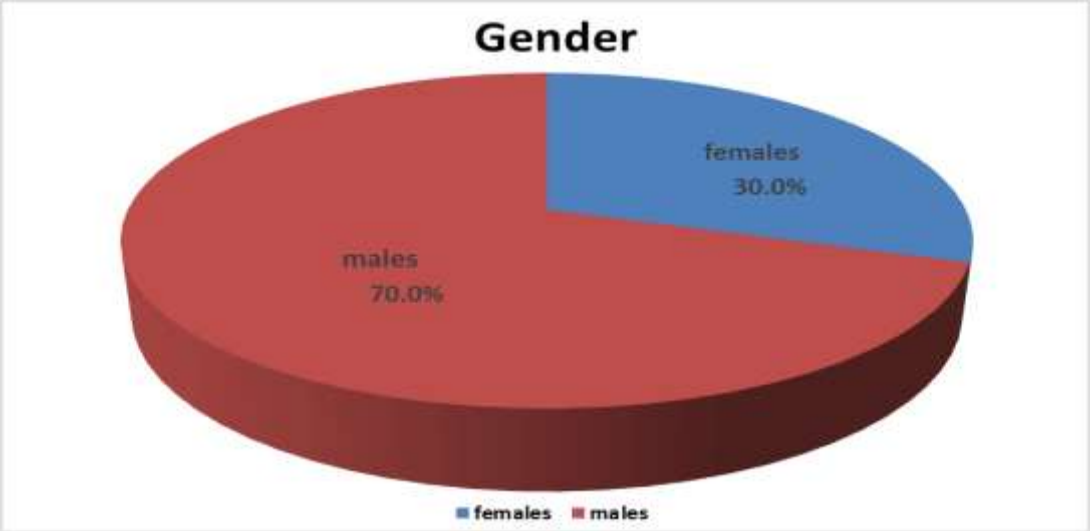
Exclusion criteria:

1. Previous injury and/or surgery.
2. Knee multi-ligamentous injury.
3. Associated lower limb injury and fractures.

Results

Table

Gender • **Male** • **Female**	 14(70%) 6(30%)
Side • **Right** • **Left**	 8(40%) 12(60%)



Discussion

Although tibial eminence fractures are rare (3/100,000/year), they account for 2%-5% of knee injuries in the pediatric population. (62,63) Despite the recently reported increased incidence in adults (42, 64), these injuries remain most common in skeletally immature subjects between 8 and 14 years of age (65), with most injuries were sustained as a result of sporting injuries. (66, 67)

Tibial eminence fractures were classified after Meyers and McKeever (3) and the classify-cation system was modified by Zaricznyj. (34) An important question raises itself about the radiological investigations required for diagnosis and subsequently planning the line of management. The initial diagnosis of these injuries is essentially based on plain radiography.

CT allows for detailed fracture and displacement analysis, while MRI allows assessment for concurrent meniscal, ligament-tous injuries and ACL condition. (44, 68, 69) Wilfinger et al., (2009) reported 1/16 case required operative management because of delayed union secondary to soft tissue interposition. (67)

This may further highlights the importance of CT imaging, especially in type II fractures, particularly if conservative treatment is decided. Others reported that upon CT evaluation some cases diagnosed by plain x-ray to be type II injuries, proven to be type III (70)

Other authors advocated its use to differentiate the degree of displacement and involvement of the tibial plateau, while, others suggest the use of MRI over CT (44, 69)

Summary and Conclusion

Tibial inter-condylar eminence fracture is serious injury that can affect knee stability and sports and daily function of the patient. Traditionally falling of a bicycle was the mode of Injury but more recently motor bike accident, motor car accident, sport injuries and direct knee trauma are seen in tibial eminence injuries.

There are many techniques of treatment such as screws, sutures, tension band, stables and anchors. Sutures and screws (Herbert or cannulated) are excellent modes of treatment which guarantee stability and early range of motion and good post-operative function. The need to remove the screw, residual laxity and the number of fixation points are the main drawbacks of screw fixation.

Suture technique is developing to face the drawbacks as no need for hardware removal post-operative, good ACL tensioning intra-operative and two or more number of fixation points which guarantee more stability early range of motion. Double tunnel suture technique was traditionally used.

We use single tunnel pullout technique with two sutures passed through the base of ACL being minimal invasive especially for the growth plate in skeletally immature patients and guarantee ACL tensioning.

In our study, we aimed to evaluate results and follow up of arthroscopic single tunnel pullout suture technique in treating tibial eminence displaced fractures. Twenty patients are included in our study and their follow up show excellent results in healing, knee stability and good return to daily and sport activities.

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