

Complete Traumatic Separation of Proximal Femoral Epiphysis in A 2 Year Old Child

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What to Learn from this Article?

Traumatic separation of proximal femoral epiphysis - presentation and management.

Abstract

Introduction: Hip fractures are very common in adults, but are rare in children, comprising less than 1% of all pediatric fractures. Separation of the proximal femoral epiphysis can occur in a child with a traumatic hip dislocation and an open epiphysis. Regardless of the mechanism of proximal femoral epiphyseal separation, the prognosis is poor secondary to the development of osteonecrosis.

Case Report: Here we are reporting a case of complete separation of the proximal epiphysis of the femur in a 2 year old female child. She was treated by open reduction and internal fixation by a single k-wire of proximal femoral epiphysis. Regular follow up showed fusion of proximal femoral epiphysis at about 3 months of post operative period. After 8 months of follow up she can stand and walk without support. Long term outcome is awaited.

Conclusion: Traumatic separation of the proximal femoral epiphysis is a rare but devastating injury because osteonecrosis occurs in most cases. In our study we found fusion of the proximal femoral epiphysis to the neck after 3 months of postoperative period. But to comment upon the final outcome a long follow up is awaited.

Keywords: Epiphysis separation, Osteonecrosis, Growth arrest.

Introduction

Hip fractures are very common in adults, but are rare in children, comprising less than 1% of all pediatric fractures [1, 2]. The proximal femur in children, except for the proximal femoral epiphysis, is extremely strong and high-energy forces, such as from motor vehicle accidents and high falls, are necessary to cause fracture [1]. Pediatric hip fractures generally are classified by the method of Delbet because its simplicity and uniformity allow accurate description and reporting of results of each fracture by type [3]. Type I is a

transepiphyseal separation, with [type IA] or without [type IB] dislocation of the femoral head from the acetabulum [3].

Type II is a transcervical fracture. Type III is a cervicotrochanteric fracture. Type IV is an intertrochanteric fracture [3].

Type I transepiphyseal fractures occur through the proximal femoral epiphysis. Such fractures are rare, constituting 8% of femoral neck fractures in children [3, 4]. True transepiphyseal fractures are different from unstable slipped capital femoral epiphysis of the preadolescent, which probably occurs as a

Author's Photo Gallery



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Figure 1: Preoperative Skiagram Of The Patient – Plain radiograph of left hip and thigh region showing completely displaced femoral head epiphysis, lying in the groin region.

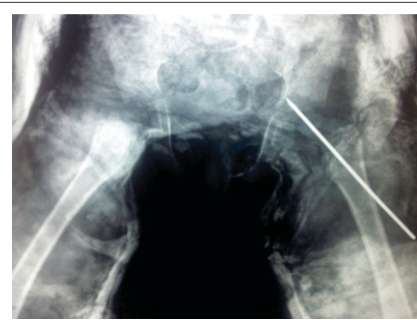


Figure 2: Postoperative Skiagram Of The Patient – Immediate postoperative plain radiograph of left hip and thigh region showing K-Wire fixation of the displaced femoral epiphysis.



Figure 3: 3 Months Postoperative Skiagram Of The Patient – 3 months postoperative plain radiograph of left hip and thigh region showing union of the displaced femoral epiphysis with the shaft.

result of a subtle endocrinopathy [5]. Approximately half of type I fractures are associated with a dislocation of the capital femoral epiphysis. In such cases, the outcome is dismal because of ON and premature epiphyseal closure in virtually 100% of patients [6, 7].

The current management is directed at early, anatomic reduction of these fractures with stable internal fixation and supplemental external stabilization [casting], with the goal of minimizing devastating late complications [4,8]. Regardless of the mechanism of proximal femoral epiphyseal separation, the prognosis is poor secondary to the development of osteonecrosis [8].

Case Report

A 2 year old female child presented to us with complaints of pain and swelling over left hip region along with inability to bear weight on her left lower limb following a fall from height one week back. Pain was acute in onset, continuous, severe in the beginning but later it was moderate and localized over the anterior aspect of left hip. It was aggravated by limb movement and relieved by rest. There was no radiation of pain. Pain was accompanied by diffuse swelling of the whole left hip region predominantly over the anterior aspect. On examination the swelling was diffuse, soft, localized to upper part of thigh, non-translucent, non-illuminant, non-fluctuant, non-pulsatile and not fixed to the bone. There was deep tenderness over the scarpa's triangle. Local temperature was slightly raised. Straight leg raising test was negative. Bitrochanteric compression test was positive, and there was supratrochanteric shortening of 1.5 cm on the left side. The limb was in flexion, abduction and external rotation. There was no deformity at the knee. There was painful restriction of all movements of the left hip joint.

Routine blood investigations were within normal limits. Plain radiographs of the left hip anteroposterior and lateral views were done. It showed complete separation of proximal femoral epiphysis of the head of the femur [Type I B fracture] and its gross displacement in the medial compartment of proximal thigh region. For further management Magnetic

Resonance Imaging [MRI] of the left hip was done. It showed complete traumatic separation of proximal femur epiphysis and its gross displacement in the medial compartment of the thigh. The epiphysis was still viable. The patient was planned for surgery. In supine position the hip joint was opened by anterolateral [Watson Jones] approach. The epiphysis was located with blunt dissection and fluoroscopy. It was replaced back in the acetabulum and transfixed with the help of a k wire. Hip spica was applied. Regular follow up was done every two weeks. It showed migration of the k-wire in the pelvis and premature gradual fusion of the epiphysis with the neck. The k-wire was removed after 10 weeks and full weight bearing was allowed. MRI was again done and it showed a viable epiphysis. After three months there was complete fusion of the epiphysis but there was painless full range of movement of the hip joint. The patient was able to bear weight completely but long term result is awaited.

Discussion

The prevalence of fractures of the hip in children is less than 1%. Therefore, most orthopaedic surgeons will treat only a few such fractures in a lifetime [1, 2]. Most importantly the epiphysis is a significant barrier to interosseous blood supply for the femoral head [1, 3]. Because of this, and the fact that there is little blood supply to the femoral head from the ligamentum teres, an increased risk of necrosis is present following fracture and injury to the retinacular vessels [9, 10]. A transepiphyseal separation can occur in children because of the weak proximal femoral epiphysis [9, 10]. Transcervical and cervicotrochanteric fractures have an extremely high risk for osteonecrosis and coxa vara compared with their adult counterparts [9]. Intertrochanteric fractures are mechanically similar in both groups, although in children involvement of the greater trochanteric apophysis can result in premature closure [8, 10]. The proximal femoral epiphysis is at risk in hip



Figure 4: Clinical photograph of the patient showing full weight bearing by the patient.



Figure 5: Clinical photograph of the patient showing the patient in squatting posture indicating full range of motion and painless weight gearing.

fracture and has obvious implications for fracture care and prognosis [9]. If the proximal epiphysis is damaged, coxa vara, coxa breva, osteonecrosis, premature epiphyseal closure, limb length discrepancy may develop with further growth regardless of fracture alignment [9].

Conclusion

Traumatic separation of the proximal femoral epiphysis is a rare but devastating injury because osteonecrosis occurs in most cases. In our study we found fusion of the proximal femoral epiphysis to the neck after 3 months of postoperative period. There was 5 mm of shortening present in the affected limb after 8 months of postoperative period. Child is doing well; she can stand and walk without any support. Proximal femoral epiphysis is responsible for only 30% of lower limb growth, so good results are predicted. But to comment upon the final outcome a long follow up is awaited.

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Clinical Message

Although this is a rare type of injury and in many cases the presentation may be late but the displaced epiphysis must be reduced back in the acetabulum and fixed. This type of injury is ought to produce complications. Premature epiphyseal closure occurs in almost all cases but if there is no osteonecrosis then the patient can get a painless mobile hip.

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