International Journal of Research in Orthopaedics
Mankar P et al. Int J Res Orthop. 2023 Sep;9(5):1068-1070
http://www.ijoro.org

DOI: https://dx.doi.org/10.18203/issn.2455-4510.IntJResOrthop20232625

Case Report

Proximal humeral interlocking system plate for pediatric subtrochanteric femur fracture: a case report

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Received: 23 May 2023
Revised: 17 June 2023
Accepted: 05 July 2023

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ABSTRACT

Hip fractures are rare in the pediatric age group and they contribute about 1% of all fractures in children. Subtrochanteric femur fractures are the rarest form of hip fractures in children. The treatment for children between the ages 6-12 years is controversial. The treatment options for pediatric subtrochanteric femur fracture include traction followed by hip spica cast, immediate spica casting, cast bracing, internal fixation and external fixation. We report a case of a subtrochanteric femur fracture in a 7-year-old girl following a fall of heavy object over her leg. The fracture was fixed with an adult 3.5 mm proximal humeral interlocking system (PHILOS) plate. The purpose of this report is to provide an alternative mode of management for paediatric subtrochanteric femur fracture.

Keywords: Pediatric subtrochanteric fracture, PHILOS plate

INTRODUCTION

Femoral shaft fractures, including Subtrochanteric fractures, represents approximately 1.6% of all bony injuries in children.[1] Proximal or subtrochanteric femoral fractures in pediatric age group are relatively rare, occurring in only 4% to 17% of all pediatric femoral fractures with a male predominance.[2] Pediatric subtrochanteric femur fractures have received limited attention in the literature and its treatment is controversial. Treatment options are chosen on basis of the age of the patient, size and whether the femoral fracture is isolated injury or part of polytrauma. It ranges from skin traction, 90/90 skeletal traction with immediate spica casting, cast bracing, internal fixation and external fixation. Methods of internal fixation include intramedullary nails and compression plating.

CASE REPORT

A 7-year-old girl with no known medical history presented to our emergency medicine department with an alleged history of fall of heavy object (television set) over her left lower limb, following the incident patient complained of pain, swelling in left hip region and inability to bear weight on the left lower limb. There was no history of associated head injury, loss of consciousness, event amnesia, convulsions, ENT bleed or vomiting. Examination of the hip revealed tenderness around greater trochanter region with restricted and painful range of motion.

Radiograph of pelvis showed a subtrochanteric femur fracture of the left hip (Figure 1). Patient was given splintage in the emergency medicine department and blood investigations were sent for the routine labs. Patient was started on intravenous analgesics.

Operative procedure

The patient was positioned supine on the operating table. Using the lateral approach to the hip, open reduction and internal fixation with PHILOS Plate was done. A 3.5 mm 4-hole PHILOS plate was used for the fixation of the

fracture (Figure 2). Multiple 3.5 mm screws were inserted through the PHILOS.

Figure 1: Pre-op X-ray.

Figure 2: PHILOS plate.

Figure 3: Post-op 6 weeks.

Figure 4: Post-op 6 weeks.

Figure 5: 3-months follow-up.

Post operatively patient was encouraged to ambulate with support from the first post op day and she was discharged the day after, with advised for non-weight bearing for 6 weeks. On post op day 15 suture removal was done. Patient was encouraged to perform hip range of motions along with static quadricep exercises, static hamstring exercises and knee range of motions. 6 weeks post operatively patient was made to ambulate full weight bearing and allowed to squat. She was able to participate in all previous activities without pain or limitations.

DISCUSSION

Pediatric subtrochanteric femur fracture presents a special unstable type which receives no special attention in the literature.[3,4] Subtrochanteric femoral fractures in children are notably rare events, accounting for less than 10% of all femoral fractures and have a high rate of successful healing.[5] Patient's age may be the single most important variable related to pediatric femoral fracture treatment. The treatment for children between the ages 6-12 years is controversial. The treatment options for pediatric Subtrochanteric femur fracture include traction followed by hip spica cast, immediate spica casting, cast bracing, internal fixation and external fixation.[6]

In general, surgical fixation has become the preferred modality of treatment in older children and adolescents with Subtrochanteric fractures as conservative management tend to result in unsatisfactory alignment and limb length discrepancy.[7] Available surgical methods of pediatric subtrochanteric fractures include flexible intramedullary nailing, external fixators, rigid intramedullary nail and compression plating. Although, traction followed by hip spica cast is the method preferred by many surgeons for the treatment of children aged 6-10 years.[8] The conservative methods however require long hospitalization and accurate control of fracture alignment with frequent radiographic assessment.

Flexible intramedullary nailing is the preferred method of closed reduction for shaft femur fracture patient. However, it is not a method of choice for older children as it is associated with malunion and plaster complications. The major drawback of flexible intramedullary nailing in treating Subtrochanteric fracture is that it provides less

stability due to the lack of rotational control. Furthermore, it is unable to achieve compression and satisfactory reduction in subtrochanteric femur fracture in pediatric age group. Nail toggling is another potential complication due to the wider medullary canal in proximal femur.

Many authors discussed the use of traditional plate fixation as an alternative option for such injury. The disadvantage of open reduction and plating is more extensive soft tissue dissection, greater blood loss and potential damage to the periosteal blood flow, traditional plates also require contouring for accommodation of the pediatric femur. PHILOS plates are pre contoured to proximal humerus in adults and this pre contoured design is found to adequately fit to the anatomy of the pediatric proximal femur therefore seems to have advantage over traditional plates.[9] Besides that, the proximal holes of PHILOS Plate allow locking screws at angle of 130 degrees, which is on par with the femoral neck/shaft angle.

CONCLUSION

Internal fixation with a PHILOS reconstruction plate appears as a good treatment option for subtrochanteric femoral fractures in children.

Recommendations

Being a rare fracture in pediatric age group the subtrochanteric femur fracture has received less attention and the treatment for the same in the age group 6-12 is controversial we here provide an alternative mode of fixation.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Mankar P, Pundkare G. Proximal humeral interlocking system plate for pediatric subtrochanteric femur fracture: a case report. Int J Res Orthop 2023;9:1068-70.