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INTERTROCHANTERIC HIP FRACTURE IN A 6-YEAR-OLD GIRL TREATED WITH PEDIATRIC SLIDING HIP SCREW: CASE REPORT

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Hip fractures are very common in adults, but are rare entities in children, comprising less than 1% of all pediatric fractures. The authors present a clinical case of a 6-year-old girl with an intertrochanteric hip fracture — displaced Delbet's type IV — treated with a pediatric sliding hip screw. The osteosynthesis material was removed 10 months later.

The Delbet type IV hip fractures corresponds to 12% of all pediatric hip fractures. This type of fractures in children older than 3 years old should be treated with internal fixation with a sliding hip screw or a proximal femur locking plate. Preferably the reduction of the fracture should be done within 24 hours. Despite the delay of the surgical procedure, the patient got an excellent recovery without any of the complications described in the literature with a follow-up of 26 months upon the implant-removal surgery.

Keywords: traumatology; child; hip fractures; fracture fixation, internal.

СЛУЧАЙ ИСПОЛЬЗОВАНИЯ ДИНАМИЧЕСКОЙ КОНСТРУКЦИИ ПРИ ЛЕЧЕНИИ МЕЖВЕРТЕЛЬНОГО ПЕРЕЛОМА БЕДРА У ШЕСТИЛЕТНЕЙ ДЕВОЧКИ

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Переломы бедра — весьма распространенное явление среди взрослых, однако достаточно редкое у детей (составляют менее 1 % от всех переломов у детей). В статье представлен клинический случай межвертельного перелома бедра IV типа (по Delbet) со смещением у 6-летней девочки, лечение которого проводилось путем установки скользящего бедренного винта. Металлофиксаторы были удалены через 10 мес. после операции.

Переломы бедра IV типа (по Delbet) составляют около 12 % от всех переломов бедра у детей. У детей старше 3 лет подобные переломы требуют выполнения остеосинтеза скользящим бедренным винтом или проксимальной бедренной блокируемой пластиной. Репозицию желательно проводить в течение 24 часов после перелома.

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Несмотря на то что в нашем случае операция была выполнена не сразу, восстановление пациентки проходило хорошо, без каких-либо описанных в литературе осложнений в течение периода наблюдения, который продлился 26 мес. после удаления импланта.

Ключевые слова: травматология; ребенок; переломы бедра; остеосинтез.

Introduction

Pediatric hip fractures (PHF) are very common in adults, but are rare entities in children, comprising less than 1% of all pediatric fractures [1]. PHF typically result from high-energy mechanisms that can result in other extremity, visceral, or head injuries in 30% of patients, unlike low-energy adult hip fractures common in elderly patients [1]. Occasionally, pediatric hip fractures result from minor trauma superimposed upon bone that is weakened by tumor (e.g., unicameral bone cyst, fibrous dysplasia) or metabolic bone disease [1, 2].

A very rare cause is a stress fracture of the neck of the femur. Hormone based Slipped Upper Femoral Epiphysis (SUFE) has also been described incidentally as a cause of hip fractures. PHF can be part of a "battered child syndrome" [3].

Colonna adapted a classification system described by Delbet, which identifies four types of PHF, based on the location of the line of the fracture. This classification is widely accepted and is used to determine the treatment and prognosis. Type I fractures are transepiphyseal separations (with or without dislocation of the femoral head from the acetabulum), type II are transcervical, type III basicervical and type IV intertrochanteric fractures [4].

Although less common than others pediatric fractures, PHF deserve focused study because of the high rate of complications and the important lifetime morbidity that may result from complications. Potential complications from the fracture and its treatment include chondrolysis, avascular necrosis, varus malunion, nonunion, delayed physiolysis, premature physeal closure and other growth abnormalities leading to length discrepancy or angular deformities [1].

The elements that can potentially influence the development of complications include the degree of initial displacement, time between the injury and fracture reduction, quality and stability of the reduction and fixation, decompression of the hip joint, and weightbearing status [2].

The **objective** of this paper is to report a good outcome of the treatment of a rare pediatric fracture.

Case report

A 6-year-old girl, with unremarkable medical history, presented in the emergency department (2013/04/26), with pain on her left hip and left shoulder, sustained as a result of a fall from a height on a playground.

Admission radiographs showed a left proximal femur fracture and a left displaced proximal humeral fracture. The PHF was classified as a Delbet type 4 — extracapsular intertrochanteric fracture (Fig. 1, *a*).

She was put under cutaneous traction and analgesics.

On 2013/04/30 was submitted to open reduction and internal fixation with a pediatric sliding hip screw (SHS). The tip of the SHS did not invaded the physis, being positioned distally to it (Fig. 1, *b*).

The postoperative period was uneventful. She began the rehabilitation program with increased and progressive weightbearing exercises, after a 4-week-period of non-weightbearing (Fig. 1, *c*).

The osteosynthesis plate was removed 10 months after surgery (Fig. 1, *d*, *e*).

26 Months after the first surgery, radiographs revealed complete bone remodeling and no limb length discrepancy (Fig. 1, *f*, *g*). The range of motion (ROM) is painless and full.

On her last follow-up appointment, her clinical status was considered good, using the Ratliff criteria (based on hip pain, ROM, daily activities and radiological findings) [5].

Discussion

Delbet type IV intertrochanteric fractures account for only 12% of PHF [1, 6].

They are generally associated with fewer complications than seen in the other types of PHF,

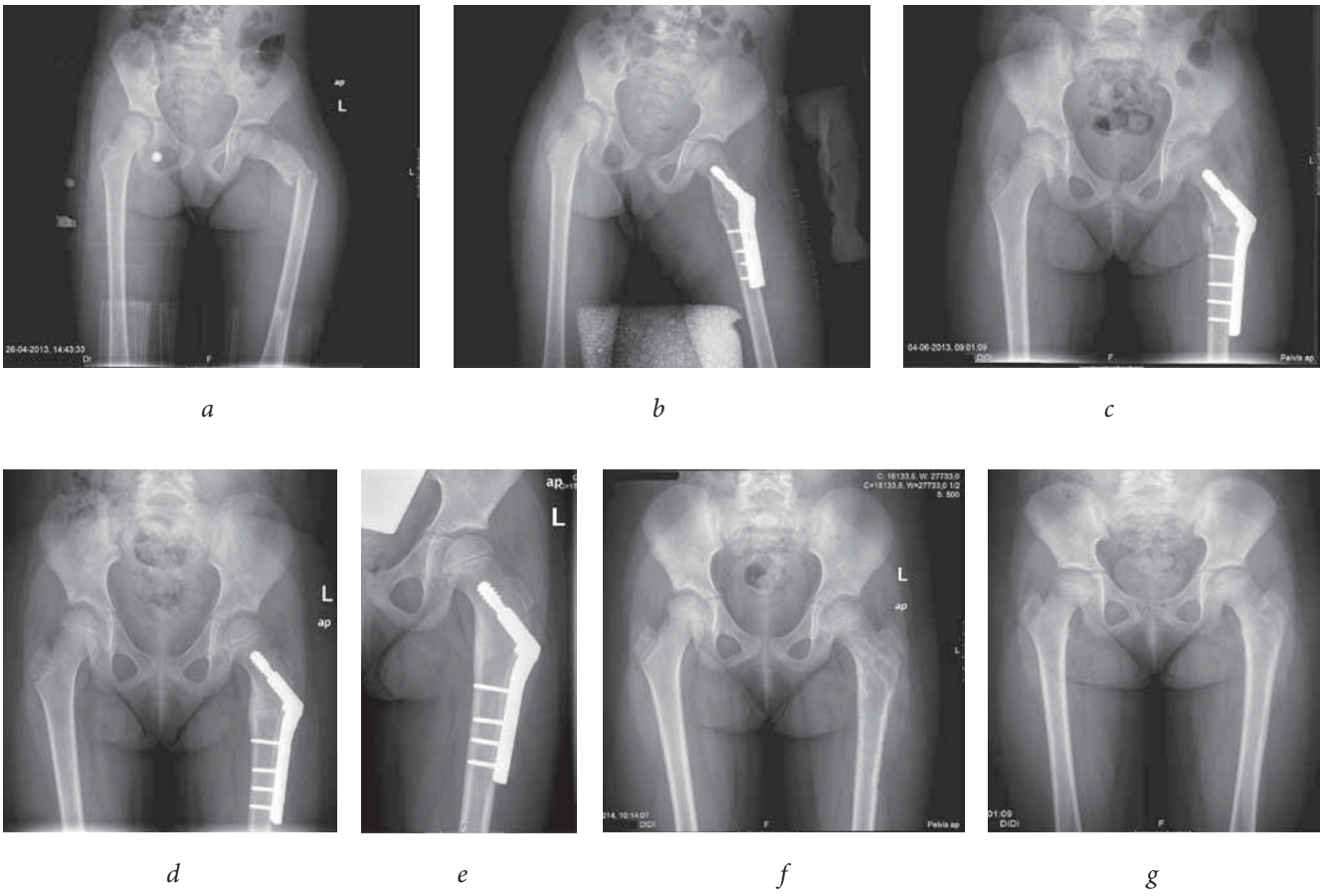

Рис. 1. Delbet type IV extracapsular displaced intertrochanteric fracture. Radiograph: *a* — before operation; *b* — first day after operation; *c* — one month after operation; *d* — three months after operation; *e* — six months after operation; *f* — one month after the operation of removing the osteosynthesis material; *g* — fifteen months after the operation of removing the osteosynthesis material

although non-union and coxa vara are still quite common [6].

The prevalence of coxa vara has been reported to be approximately 20% to 30%,the incidence have been decreased with the use of internal fixation in displaced fractures. Coxa vara may be caused by malunion, avascular necrosis of the femoral neck, premature physeal closure, or a combination of these problems. Severe coxa vara raises the greater trochanter in relation to the femoral head, causing shortening of the extremity and leading to inefficiency of the abductors. Remodeling of an established malunion may occur if the child is less than 8 years of age, or with a neck-shaft angle greater than 110 degrees. Older patients with progressive deformity may not remodel and subtrochanteric valgus osteotomy may be considered to heal nonunion, restore limb length, and the abductor moment arm [1].

Premature physeal closure has occurred after approximately 28% of PHF. The risk of premature physeal closure increases with penetration by fixation devices or when AVN is present. The capital femoral physis contributes only 13% of the growth of the entire extremity and normally closes earlier than most of the other physes in the lower extremity. As a result, shortening due to premature physeal closure is not significant except in very young children [1].

Undisplaced type IV fractures in children younger than 3 to 4 years are treated without internal fixation with immobilization in a spica cast for 12 weeks. Great care is needed to cast the limb in a position that best aligns the bone. Instability or failure to maintain adequate reduction and polytrauma are indications for internal fixation. Displaced type IV fractures in all children more than 3 years of age should be treated with internal fixation with a pediatric or juvenile compression hip screw placed into femoral neck short of the physis [1].

In recent literature it has been reported that the rate of complication can be reduced considerably with open or closed reduction and internal fixation within first 24 hours [5].

Despite the delay of the surgery, our patient had an excellent recovery without any of the complications described in the literature [7].

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References

1. McCarthy J, Noonan K. Fractures and traumatic dislocations of the hip in children. In: Beaty JH, Kasser JR, editors. *Rockwood and Wilkins' Fractures in Children*. 7th ed. Philadelphia: Lippincott Williams & Wilkins; 2010. P. 769-796.
2. Dhar SA, Ali MF, Dar TA, et al. Delayed fixation of the transcervical fracture of the neck of the femur in the pediatric population: results and complications. *J Child Orthop*. 2009;3(6):473-477. doi: 10.1007/s11832-009-0209-2.
3. Bimmel R, Bakker A, Bosma B, Michielsen J. Paediatric hip fractures: a systematic review of incidence, treatment options and complications. *Acta Orthop Belg*. 2010;76(1):7-13.
4. Flynn JM, Wong KL, Yeh GL, et al. Displaced fractures of the hip in children. *Journal Bone Joint Surg Br*. 2002;84(1):108-112. doi: 10.1302/0301-620x.84b1.11972.
5. Bombaci H, Centel T, Babay A, Türkmen IM. Evaluation of complications of femoral neck fractures in children operated on at least 24 hours after initial trauma. *Acta Orthop Traumatol Turc*. 2006;40(1):6-14.
6. Panzica M, Pape H-C, Garapati R, et al. Long-term outcome of a child with a proximal femur fracture after high-energy trauma. *Injury Extra*. 2004;35(4):35-39. doi: 10.1016/j.injury.2004.02.006.
7. Dhar D. Bilateral traumatic fracture of neck of femur in a child: a case report. *Malays Orthop J*. 2013;7(2):34-36. doi: 10.5704/MOJ.1307.001.

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