

Traumatic femoral neck fracture in a child after a motor vehicle accident: A case report

Jacobus Rademan*; Nabeela Adam

***Corresponding Author: Jacobus Rademan**

Orthopedics Department, Frere Hospital, East London, Eastern Cape, South Africa.

Email: Jacobusrademan@yahoo.com

Keywords

Fractures; Trauma; X-ray.

Introduction

Femoral neck fractures following trauma, make up less than 1% of injuries sustained by children [1]. Femoral neck fractures seen in children are usually unilateral and follow high energy trauma (eg. Fall from height or motor vehicle accident).

We present an 11 year old, previously well, female who sustained a right hip dislocation and femoral neck fracture after a motor vehicle accident. The patient was stabilized at a nearby peripheral hospital and a closed reduction of the hip was attempted under sedation. The post reduction x-ray showed a femoral neck fracture with the femoral head displaced posteriorly.

Case Presentation

An 11-year old female was referred to our orthopaedic unit after sustaining a femoral neck fracture. The patient was previously well and had no known hip disease prior to the accident. She was a passenger in a motor vehicle that was involved in a head-on collision with another motor. EMS services took her to a peripheral hospital where she was stabilized. Initial x-rays showed a right hip dislocation (posterior), but no appreciable neck of femur fracture. Closed reduction under conscious sedation was attempted. An x-ray taken after the reduction showed a neck of femur neck fracture, Delbert 2 and the femoral head was dislocated and displaced posteriorly. After consultation with the on-call.

Orthopaedic surgeon, the patient was placed in skin traction and referred to our hospital for further management.



Figure 1: Xray on arrival at hospital.

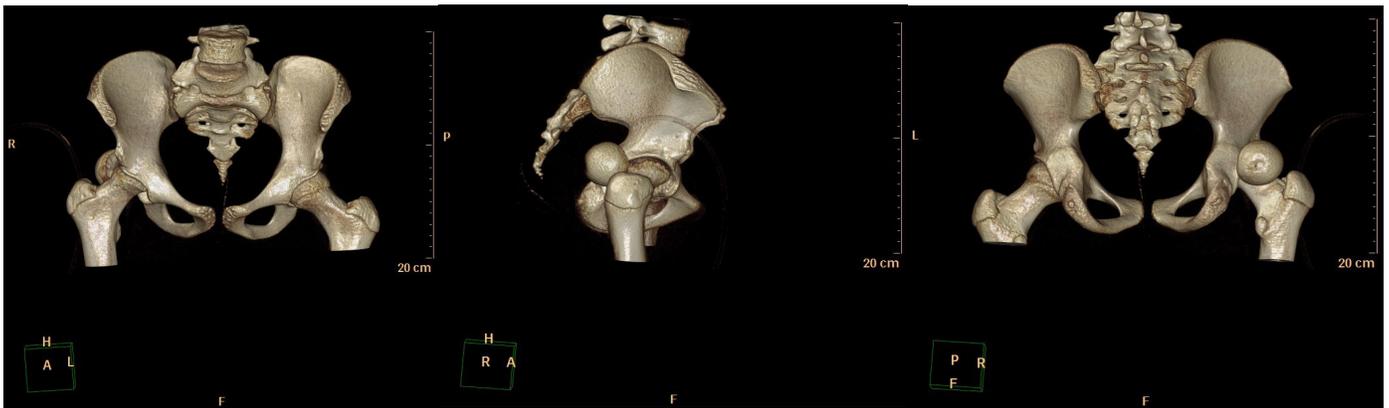


Figure 2: CT scan images below were done to assist with pre-op planning.

On arrival at our hospital, the patient was reassessed and cleared according to ATLS principles. Appropriate analgesia was given and the patient was sent for x-rays (she was not sent with her x-rays). AP and Lateral x-rays of her right hip confirmed a neck of femur fracture with the femoral head still displaced posteriorly. She was admitted to the ward for monitoring and to await surgery.

On the next available theatre list, the patient was booked for an open reduction and internal fixation. A posterior approach to the hip was taken and the femoral head was reduced. Under fluoroscopy, AP and Lat correction of the femoral head and neck was achieved. Two cannulated screws were inserted for internal fixation. The capsule was repaired (as well as gluteus medius and tensor fascia lata). Blood loss during the operation was minimal. The patient remained in skin traction for six weeks post operatively.



Figure 3: Post Op Xrays.

Discussion

Femoral neck fractures following trauma in children is rare. High energy trauma is required and usually include a fall from height, motor vehicle accidents and (but not limited to) pedestrian vehicle accidents [2-4]. Because of their rarity, femoral neck fractures are not often searched for during the initial x-ray survey and can cause a possible delay in diagnosis [3]. The child to adult femoral neck fracture ratio has been reported to be 1/130 [1]. The most common cited complications include: Avascular Necrosis (AVN) of the femora head and neck, coxa vara, non-union, delayed-union, premature physeal arrest and infection [5]. Various theories have been postulated as to the difference in paediatric femoral neck fractures when compared to the adult population. The two main differentiating factors are anatomic variations. Firstly, paediatric femoral bone excluding the physis is exceptionally strong. Therefore, a significant amount of force is needed to fracture it [5]. The second differentiating factor has to do with the blood supply around the paediatric femoral head. The blood supply to the adult hip is via intraosseous blood vessels. In children, the blood vessels cannot cross the open physis [5]. If the blood supply is however disrupted, this often leads to devastating AVN of that hip. AVN of the femoral head is the most common complication and microscopic changes, in form of necrosis, can be visible within the first twelve months after injury [6]. AVN, and eventual femoral head collapse, is often unavoidable and its management does very little to change or alter the natural history of this sequelae [7]. Ulukan et al. revealed that AVN has the largest negative impact on femoral neck fractures. Their study showed that 91% of the patients with an unsatisfactory outcome had AVN of the affected hip [5]. Several factors have been identified as key role players in the development of AVN of the femoral head and neck. Moon et al. reports patient age and fracture type to be the two most important [8]. Age below eight years was considered a better prognosis, with the risk of AVN increasing 1.14 times for each year thereafter. Various figures have been quoted when it comes to the risk and rate of AVN in cervicotrochanteric, transcervical, transepiphyseal and intertrochanteric fractures. The risk of AVN is 15, six and four times higher in transepiphyseal, transcervical and cervicotrochanteric as compared to intertrochanteric fractures [8]. Transcervical fractures have the highest rate of AVN (43%), followed by cervicotrochanteric (14%) [8].

Currently, no absolute management plan exists. The American Academy of Orthopaedic Surgeons (AAOS) has not yet published appropriate use criteria for this. The management of traumatic neck of femur fractures remains a challenge. Timing to surgery remains controversial. In the adult population, early

reduction and fixation of fractures have been proven to improve outcome and reduce complications. A systematic review by Yerosian et al. of 935 children reported that the rate of AVN was 4.2 times higher in patient with delayed treatment compared to those within 24 hours [9]. The nature of the fracture type and the surgeon's ability will ultimately determine whether the procedure will be an open reduction and internal fixation or a closed reduction and percutaneous pinning. Anatomical reduction (or as close as possible to) should be the aim. Evidence comparing the incidence of AVN in open vs. closed procedures are still lacking [4]. Both open and closed procedures have their benefits and draw-backs and should be considered on a case-by-case basis. If an open procedure is needed, access to the hip joint can be obtained via an anterior approach (Smith-Peterson), anterolateral approach (Watson-Jones) or lateral approach (Hardinge). Capsular decompression remains controversial, with little evidence providing any form of support. The capsular hematoma can be drained with a large bore needle after closed reduction or during an open procedure and capsulotomy. Theoretically, this should reduce the incidence of osteonecrosis, but has not been backed by statistically significant evidence [9].

The ultimate goal of surgery in a paediatric neck of femur fracture is to provide good stability, allow for pain-free range of movement and cause as little growth retardation as possible.

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Authors Information: Jacobus Rademan*; Nabeela Adam
Orthopedic Departments, Frere Hospital, East London, Eastern Cape, South Africa.

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