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Cannulated cancellous screw fixation in fracture neck of femur in children

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Abstract

Femoral neck fractures in children are severe injuries with the possible complication, the most serious of which is Avascular Necrosis. 24 patients (14 boys and 10 girls) of fractures of neck femur were treated with cannulated cancellous screws in our study. All patients were followed up for a period of 18 months (13months to 26 month). All patients had union with mean duration of 13.4 weeks. One patient had Avascular Necrosis, One patient had varus collapse and one patient had shortening of limb more than 1.5cm. Internal fixation of fracture neck of femur gives better results and functional outcome.

Keywords: Cannulated cancellous screw fixation, fracture neck, femur, children

Introduction

Femoral neck fractures in children are severe injuries with the possible complication, the most serious of which is Avascular Necrosis (AVN) [1-3]. Healthy children rarely sustain a fracture of the femoral neck, it is usually the result of high energy injury. Previous studies have reported a high rate of complications [2, 3], including Avascular Necrosis, coxa vara, premature physal closure, Undisplaced intracapsular fractures are predominantly treated with a minimally invasive fixation technique, whereas the standard treatment for displaced intracapsular fractures is still a subject of discussion.

Methods & Material

24 patients of fractures of neck femur were evaluated prospectively in our study. 14 boys and 10 girls under 16 years of age were followed up for a period of 18 months (13months to 26 month) The fractures were classified according to the Delbet system as described by Colonna [4] We included 13 type-II and 11 type-III displaced fractures. Pathological fractures and fractures associated with head dislocations were excluded from study. On admission routine investigations including complete blood count was done. Surgery was planned on emergency but not urgent basis, in most of cases on next day within 24 hours of the admission. Traction was avoided during preoperative period. On traction table reduction was achieved using leadbetter's technique [5]. In 2 cases open reduction was done using standard smith Petersen approach. After achieving reduction guidewire was inserted in centre of the neck in AP and lateral view. Then another guidewire was inserted at a lower level than first wire, in AP view just above the calcar and in lateral view at posterior level. Then 3rd guide wire was inserted at the level of second guide wire in AP view and in the centre in lateral view. Level of wire was kept just proximal (about 5mm proximal) to the physis. After measuring length Cannulated cancellous screws of 6.5mm with washer were fixed. In patients with small neck, 4 mm cannulated cancellous screws were used. Sutures were removed on 10th day. Boot and bar cast was given to all patients just to maintain post operative immobilization. In post operative period non weight bearing exercise were initiated after 2 weeks and after 6th weeks toe touch walking was started and after radiological union full weight bearing started. All patients were followed up on 1st week, 4th week, and 6th week then monthly till union.

Results

There were 14 boys and 10 girls in our study. Mean age was 7 years (2 to 14 years). The mean follow-up done was 18 months (13 months to 26 months). There were 13 type II and 11 type III patients according to Delbet system of classification. All fractures were due to high-energy injury, and all were displaced fractures. 14 fractures were due to road traffic accidents, 8 fractures were due to fall from height and 2 fractures were due to fall on ground. 6 fractures were totally displaced while 18 fractures were partially displaced. 20 patients were operated within 24 hours of injury while 4

patients were operated after 24 hours of injury due to delayed presentation. 22 fractures were reduced by closed means and 2 patients required open reduction. Union was achieved in all patients at means duration of 13.4 weeks (9th week – 20 week). 21 patients (87.5%) had no complications from the fracture and returned to full function with a normal range of movement of the hip. Avascular necrosis was seen in 1 patient and 2 fractures showed varus collapse. There was no infection in any patients. In 2 patients limb shortening >2cm was seen after 6 months.



Fig 1: A 9 year old girl with # neck of femur (A) operated with CRIF with CC screws (B) 6th week follow up X-ray (C), 10th week follow up xary (D), clinical images (E, F, G)

Discussion

Fractures of neck of femur are quite common in paediatric age group and they are associated with many complications like Avascular Necrosis, Coxa Vera, non union, shortening, premature fusion of physis. Preoperative skin traction was avoided so as to prevent traction of remaining blood vessels. All patients were operated within 24 hours of presentation so as to reduce risk of non union. Papakostidis *et al.* [6] did a metaanalysis to find out relation between timing of surgery and complications. He found that there was no association between timing of surgery and AVN but he found positive

association between timing of surgery and non union. Rate of AVN is found to be higher in proximal (Delbet type I and II) fractures as compared to distal fractures (Delbet type III and IV) and in displaced fractures as compared to undisplaced fractures [7, 8]. Although there are several studies supporting effect of timing and development of AVN [9], In our study aim of early surgery was to reduce risk of non union. During reduction of fracture manipulations was done gently avoiding sudden jerks so as to prevent further damage to vasculature of the neck of the femur.

Flynn *et al.* [10] conducted study to evaluate roll of internal fixation in fractures of neck of femur and found good results. In his study one patient has non union, one has AVn and one patient had premature fusion of physis.

In our study, we did open reduction in 2 patients. In the cases where close reduction was not possible, open reduction was done to prevent malreduction. Song KS [2, 3] found that open reduction of neck femur fracture was associated with anatomical reduction and better union while non union were more in closed reduction.

Conclusion

Internal Fixation of fracture of neck femur gives better results with good functional outcome. Most important factor determining outcome is anatomical reduction.

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