Supracondylar Fracture of the Femur in Children

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Abstract

Objective:
A retrospective review of 59 supracondylar femoral fractures occurring in 56 children between 1991 and 2004 (14 years) was performed to assess treatment methods and outcomes.

Design:
Patient ages ranged from 1 month to 15 years, with a mean of 3.2 years (median 1.5 years). There were 6 high-energy injuries and 34 as a result of the child being dropped or a fall. Abnormal bone contributed to 17 fractures in 14 patients with minimal trauma.

Intervention:
Displaced fractures were managed by reduction and fixation. Undisplaced fractures were treated by plaster immobilisation.

Results:
Manipulation, with or without percutaneous “K” wire fixation was adequate in the management of majority of these fractures. Two children had a stiff knee with the remainder recovering to their pre-injury status.

Conclusion:
Our experience from this study suggests that impacted, undisplaced and minimally displaced supracondylar femur fractures are well managed in a long leg or pipe stem cast. Reduction and stabilisation better manage displaced high-energy fractures.

(Keywords: Supracondylar fracture, Femur, Children).

Introduction

Supracondylar non-physeal femoral fractures in children are said to be rare, though Smith et al (1) found that these fractures comprised 12% of femoral fractures in their unit. Undisplaced supracondylar fractures of the femur are more common in children with paralytic disorders (1). Little has been published on this injury, though well-known authors (2, 4, and 5) have commented on the difficulty of managing these fractures. The literature did not seem to accord with our experience of this fracture, so we reviewed our cases to assess their treatment and outcomes for this injury.
reduced and fixed with retrograde titanium nails. The closed displaced fracture was reduced closed and fixed with percutaneous crossed K wires. Initial traction with a Thomas splint or Gallows traction and then a plaster hip spica was used in 7 patients. The remaining 50 patients were placed in a long leg or pipe stem plaster.

Complications:
Backup of the titanium nails was managed by trimming them. The fracture healed well and the nails were removed at 1 year. Plaster pressure sores occurred in 2 insensate patients. Two children had residual knee stiffness, though they have been stiff pre-injury due to spasticity. One patient re-fractured after returning too soon to contact sports. The re-fracture was treated conservatively and united in a good position. Post healing X-rays showed no residual deformity in our review group.

Follow-up varied from 2 weeks in a 1month infant to 11 months in an open fracture.

Discussion

Femoral supracondylar fractures comprised 7.5% of femoral fractures in our unit between 1991 and 2004. Smith et al found this fracture comprised 12% (7% displaced, 5% undisplaced) of femoral fractures in their unit, but Butcher & Hoffman (4) reported that in their experience displaced femoral supracondylar fractures made up only 1% of femoral fractures. Only 3% of our fractures were significantly displaced with a further 49% being greenstick or minimally displaced. Our findings are therefore very similar to those reported previously in smaller series. Smith et al (1) reported three patterns of injury for femoral supracondylar fractures: –
(i) A low energy injury in normal bone resulting in an undisplaced fracture.
(ii) A low energy injury in abnormal bone resulting in a displaced fracture.
(iii) A high-energy injury resulting in a displaced fracture.

The majority of our patients had undisplaced or minimally displaced fractures, which were treated conservatively. Out of fifty-six patients, fourteen with seventeen fractures (29% of fractures) had abnormal bone due to underlying medical conditions. This compares well with the 33% with predisposing medical conditions noted by Smith et al. None required surgical intervention. Nine patients in this group sustained accidental fractures at the hands of their parents or siblings.

Six displaced fractures resulted from being hit by moving vehicles but only two were significantly displaced. Despite a median age of 1.5 years, none of the patients our series was found to have sustained a non-accidental injury (NAI). NAI should be considered in children presenting with a fracture aged less than 12 months and in all children with disability. Our patients were much younger than those described by Smith et al (1) whose mean age was 6 years 10 months. Immobilisation in a long leg or pipe stem plaster was adequate treatment for most of our cases. The maximum period of immobilisation was six weeks, with a median value of three weeks. We discharged patients after obtaining check x-rays confirming fracture healing in good alignment. We did not re-operate on any patients for malunion. Our displaced fractures in normal bone were reduced and fixed, with no resulting malunions. The patients with displaced fractures and abnormal bone were not managed aggressively as all were wheelchair bound with low requirements. Two patients had residual stiffness but it was unclear how much stiffness was present before the fracture as a consequence of the underlying medical problem. Indeed, pre-fracture stiffness may have been a predisposing factor for the fracture in addition to abnormal bone.

Conclusion(s)

Our experience from this study suggests that impacted, undisplaced and minimally displaced supracondylar femur fractures are well managed in a long leg or pipe stem cast. Reduction and stabilisation better manage displaced high-energy fractures.

Reference(s)

Illustrations

Illustration 1

Figure 1-Supracondylar fracture in abnormal bone-AP view

Illustration 2

Figure 2-Supracondylar fracture in abnormal bone-Lat view
Illustration 3

Figure 3-Healed supracondylar fracture in abnormal bone-AP view

![Illustration 3](Image)

Illustration 4

Figure 4-Healed supracondylar fracture in abnormal bone

![Illustration 4](Image)
Illustration 5

Figure 5 Displaced supracondylar fracture AP view

Illustration 6

Figure 6-Displaced supracondylar fracture lat view
Illustration 7

Figure 7-Displaced supracondylar fracture-post op x-ray

Illustration 8

Figure 8-Displaced supracondylar fracture-post op x-ray
Illustration 9

Figure 9-Healed displaced supracondylar fracture- AP x-ray

Illustration 10

Figure 10-Healed displaced supracondylar fracture-Lat x-ray
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