Fractures of the Neck of Femur: General Aspects: Review Article

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Abstract

Femoral neck fractures (FNF) are common and account for over 50% of all hip fractures. Standard treatment for FNF is surgical. The surgical treatment can be either internal fixation or arthroplasty, depending on bone quality, fracture severity and patient's age. Over the past decades, great effort has been put into deciphering specific biomechanical characteristics of FNF to develop an optimised fixation construct.

KeyWords: Femoral neck fractures, Young adults, Cannulatedscrews.
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Introduction:

Proximal femoral fractures are the most commonly encountered orthopedic injuries and usually occur in elderly patients. The capsule of the hip joint attaches along the intertrochanteric line anteriorly but it extends for only half this distance on the posterior aspect of the femoral neck. Basicervical fractures are, therefore, always partly extra capsular most femoral neck fractures require operative treatment.The treatment depends upon the age of the patient, displacement and location of the fracture.

In general, extra capsular fractures have a rich blood supply and heal satisfactorily with internal fixation, whereas intra capsular fractures do not unite easily and often require a hemi-arthroplasty.(1)

Classification

1- Anatomic Location

1. Subcapital
2. Transcervical
3. Basicervical

2- Pauwel's classification(1)(Figure 1)

1. Less than 30 degrees.
2. Between 30 and 70 degrees.
3. More than 70 degrees.

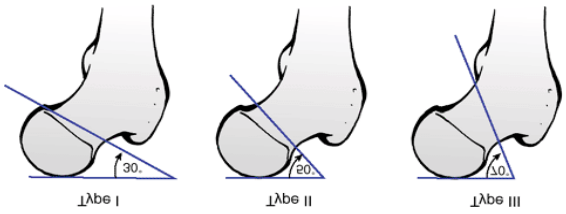

Figure (1): The Pauwe'ls classification of femoral neck fractures is based on the angle the fracture forms with the horizontal plane. As fracture progresses from type I to type III, the obliquity of the fracture line increases and, theoretically, the shear forces at the fracture site also increase.(2)

3- Gardenclassification (Figure 2)(3)

This is based on the degree of displacement

Type I: Incomplete/valgus impacted

Type II: Complete and non displaced on AP and lateral views

Type III: Complete with partial displacement; trabecular pattern of the femoral head does not line up with that of the acetabulum.

Type IV: Completely displaced; trabecular pattern of the head assumes a parallel orientation with that of the acetabulum.

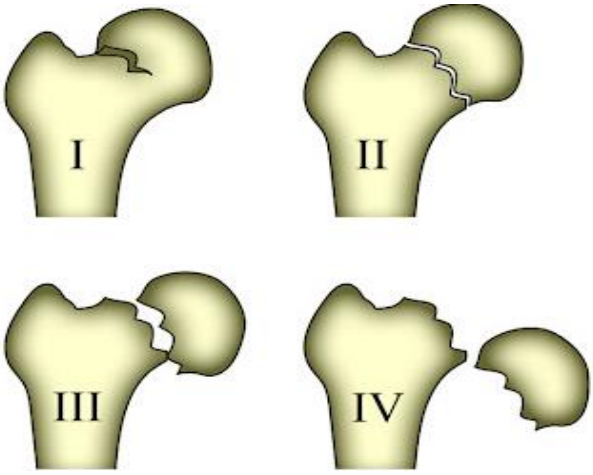

Figure (2): Garden classification.[3]

Options of Treatment

The following points are to be considered.

1. **Age of the patient: Based on the age the following groups were made.**
   a) Children 0-12 years.
   b) Adolescents 12-20 years.
   c) Young adults 20-60 years
   d) Above 60 years (old age)
2. **Site of fracture**
   a) Sub-capital.
   b) Trans cervical.
   c) Basal type.
3. **Displacement of fragments:**
   i) Undisplaced fracture.
   ii) Displaced fracture
4. **Duration of fracture:**

1-21 days - fresh, more than 21 days - neglected fracture

Age 1-16 years: When the growth plate is intact [3, 4, 5].

Any implant used for internal fixation either should not cross the epiphysial plate or only that implant should be used which will produce least possible damage to it.

1. **Subcapital fracture:**In undisplaced fracture the internal fixation with 2 to 2.5 mm Kirschner wire (K-wire) or Moore's pin is done. Two to three pins or wires should be used. If the fracture is displaced then closed reduction and internal fixation with K-wires or Moore's pins is used.
2. **Trans cervical fracture**: In undisplaced fractures internal fixation with K-wires or Moore's pins is recommended. If the fragments are displaced then closed reduction and internal fixation with K-wires or Moore's Pins is required.
3. **Basal fractures**: Undisplaced: Internal fixation with 2.5 mm K-wire or Moore's pins or cancellous or cannualated screws is recommended. When screws are used for internal fixation; these must remain distal to the epiphyseal plate to avoid destruction of the plate (which is likely to lead to deformity of the head of femur and shortening of the limb).

If the fracture is displaced, then closed reduction and internal fixation with K-wire, Moore's pins or screws should be done.

If closed reduction fails then, open reduction and internal fixation with K-wires, Moore's pins or screws (it is easier to do open reduction on an ordinary operation table than fracture table) is recommended. Alternatively McMurrays osteotomy with one and a half hip spica or abduction osteotomy with internal fixation with 135 angled pediatric blade plate or pediatric DHS sparing the epiphyseal plate can be done.

Post operatively skin traction for 4-6 weeks or hip spica is applied to prevent the child from bearing weight before the fracture unites. **Age 20-60 years (young adults)**

1.Sub-capital fracture[6, 7]

Undisplaced: Internal fixation with 2-3 cancellous or cannulated screws should be used.

Displaced: Closed reduction and internal fixation with cancellous or cannulated screws is recommended. Closed reduction internal fixation with 2 screws and one free fibular graft has also been used.

2.Transcervical fracture:

Undisplaced: Internal fixation with cancellous or cannulated screws should be used.

Displaced fractures: Closed reduction and internal fixation with cancellousor cannulated screws, three or four screws are used[8, 9].If closed reduction fails then

1. Open reduction and internal fixation with cancellous or cannulated screws is done.
2. Open reduction and internal fixation with screws and free fibular graft or muscle pedicle bone graft based on quadratus femoris or sartorius or tensor fascia femoris are useful.

3. Basal fracture:

Undisplaced: Internal fixation with DHS with anti-rotational screw should be used.

Displaced fractures: Closed reduction and internal fixation with DHS or cancellous or cannulated screws is done. If closed reduction fails then open reduction and internal fixation with screws or DHS.

Above 60 years of age:

1. Sub-capital fracture:

Undisplaced fracture

1. Internal fixation with cancellous or cannulated screws.
2. Replacement arthroplasty, hemiarthroplasty, bipolar or total hip arthroplasty.

Displaced fractures

Replacement arthroplasty as above is the treatment of choice:Closed reduction and internal fixation with cancellous or cannulated screws and free fibular graft may be tried, if closed reduction fails replacement arthroplasty should be done.

2. TranscervicalUndisplaced:

1. Internal fixation with cancellous or cannulated screws.
2. Replacement arthroplasty.

Displaced:

1. Closed reduction and internal fixation with screws.[9]
2. Replacementarthroplasty - hemi arthroplasty, bipolar or total hip arthroplasty.
3. If closed reduction fails - Replacement arthroplasty.

3. Basal fracture:

Closed reduction and internal fixation with screws or DHS.

If closed reduction fails then Replacement arthroplasty.

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