ORTHOPAEDIC AND FRACTURE

Lower limb trauma (lec 2)

Dr. Ali Saleh Aljanabi

M.B.Ch.B FICMS ortho

DISLOCATION OF THE HIP

POSTERIOR DISLOCATION (Dashboard injury)

Occurring in a road accident when someone seated in a car is thrown forward, striking the knee against the dashboard. The femur is thrust upwards and the femoral head is forced out of its socket; often a piece of bone at the back of the acetabulum (usually the posterior wall) is sheared off, making it a fracture-dislocation.

Clinical features

the leg is short and lies adducted, internally rotated and slightly flexed.

X-ray

In the anteroposterior film the femoral head is seen out of its socket and above the acetabulum.

29.1 Posterior dislocation of the hip (a) This is the typical posture in a patient with posterior dislocation: the left hip is slightly flexed and internally rotated. (b) The x-ray in this case showed a simple dislocation, with the femoral head lying above and behind the acetabulum. (c) Another patient with dislocation and an associated acetabular rim fracture. However, in some cases it may need a CT scan and three-dimensional image reconstruction to appreciate the full extent of the associated acetabular injury (d).

Classification of hip dislocation (Thompson and Epstein).

i. Dislocation with no more than minor chip fractures
ii. Dislocation with single large fragment of posterior acetabular wall
iii. Dislocation with comminuted fragments of posterior acetabular wall
iv. Dislocation with fracture through acetabular floor
v. Dislocation with fracture through acetabular floor and femoral head

Treatment

The dislocation must be reduced as soon as possible under general anaesthesia. In the vast majority of cases this is performed closed, but if this is not achieved after two or three attempts an open reduction is required.

Method to reduce

An assistant steadies the pelvis; the surgeon starts traction in the line of the femur as it lies , and then gradually flexes the patient hip and knee to 90 degrees, maintaining traction throughout. At 90 degrees of hip flexion, traction is steadily increased and sometimes a little rotation is required to accomplish reduction. Another assistant can help by applying direct medial and anterior pressure to the femoral head through the buttock. A satisfying ‘clunk’ terminates the manoeuvre.

An important test follows, to assess the stability of the reduced hip. By flexing the hip to 90 degrees and applying a longitudinal and posteriorly-directed force, the hip is screened on an image-intensifier looking for signs of subluxation. Evidence of this should prompt a repair to the posterior wall of the acetabulum.

Complications

EARLY

- *Sciatic nerve injury* damaged in10–20 per cent of cases but it usually recovers.
- *Vascular injury* Occasionally the superior gluteal artery is torn and bleeding may be profuse.
- *Associated fractured femoral shaft*

LATE

- *Avascular necrosis*
- *Myositis ossificans*
- *Unreduced dislocation* After a few weeks an untreated dislocation can seldom be reduced by closed manipulation and open reduction is needed.
- *Osteoarthritis Secondary osteoarthritis is not uncommon and is due to*

  (1) cartilage damage at the time of the dislocation

  (2) the presence of retained fragments in the joint

  (3) ischaemic necrosis of the femoral head.

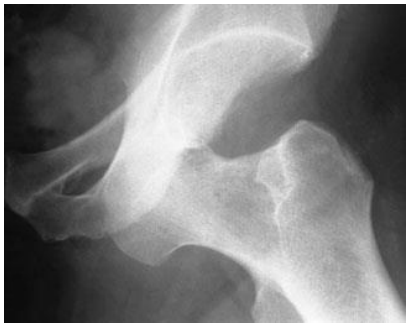
ANTERIOR DISLOCATION

Anterior dislocation is rare compared with posterior. occur when a weight falls onto the back The femoral head lie superiorly(type I - *pubic*) or inferiorly (type II - *obturator*).

Clinical features

The leg lies externally rotated, abducted and slightly flexed. It is not short, because the attachment of rectus femoris prevents the head from displacing upwards.

X-ray



In the anteroposterior view the dislocation is usually obvious,

but occasionally the head is almost directly in front

of its normal position; any doubt is resolved by a lateral film.

complications

Avascular necrosis occurs in less than 10 per cent of cases.

CENTRAL DISLOCATION

A fall on the side, or a blow over the greater trochanter, may force the femoral head medially through the floor of the acetabulum. Although this is called ‘central dislocation’, it is really a fracture of the acetabulum

FRACTURES OF THE FEMORAL NECK

The femoral neck is the commonest site of fractures in the elderly disorders such as osteomalacia, diabetes, stroke, alcoholism and chronic debilitating disease. In addition, old people often have weak muscles and poor balance resulting in an increased tendency to fall.

Pathoanatomy

- The femoral head gets its blood supply from three sources:
    1. intramedullary vessels in the femoral neck;
    2. ascending cervical branches of the medial and lateral circumflex anastomoses, which run within the capsular retinaculum before entering the bone at the articular margin of the femoral head; and
    3. the vessels of the ligamentum teres.
- Transcervical fractures are, by definition, intracapsular. They have a poor capacity for healing because:
    1. by tearing the retinacular vessels the injury deprives the head of its main blood supply;
    2. intra-articular bone has only a flimsy periosteum and no contact with soft tissues which could promote callus formation; and
    3. synovial fluid prevents clotting of the fracture haematoma.

Mechanism of injury

The fracture usually results from a simple fall; however, in very osteoporotic people, less force is required perhaps no more than catching a toe in the carpet and twisting the hip into external rotation.

Some patients may have experienced minor symptoms of a preceding stress fracture of the femoral neck.

In younger individuals, the usual cause is a fall from a height or a blow sustained in a road accident. These patients often have multiple injuries and in 20 per cent there is an associated fracture of the femoral shaft. Occasionally, stress fractures of the femoral neck occur in runners or military personnel.

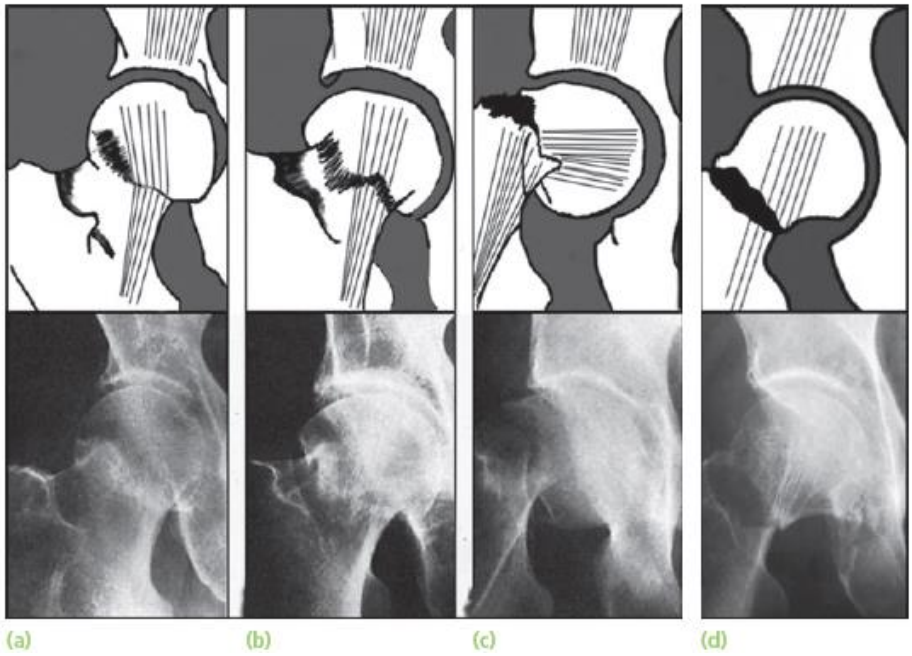
Garden classification

Stage I is an incomplete impacted fracture, including the so-called abduction fracture in which the femoral head is tilted into valgus in relation to the neck.

Stage II is a complete but undisplaced fracture.

Stage III is a complete fracture with moderate displacement.

Stage IV is a severely displaced fracture.



29.5 Garden's classification of femoral neck fractures
(a) *Stage I*: incomplete (so-called abducted or impacted) – the femoral head in this case is in slight valgus.
(b) *Stage II:* complete without displacement.
(c) *Stage III:* complete with partial displacement – the fragments are still connected by the posterior retinacular attachment; the femoral head trabeculae are no longer in line with those of the innominate bone.
(d) *Stage IV*: complete with full displacement – the proximal fragment is free and lies correctly in the acetabulum so that the trabeculae appear normally aligned with those of the innominate.

X-ray

In ***Garden I fractures*** the femoral head is in its normal position or tilted into valgus and impacted on the femoral neck stump. The medial cortex may be intact. The femoral head stress trabeculae are normally aligned with the innominate trabeculae.

In ***Garden II fractures*** the femoral head is normally placed and the fracture line may be difficult to discern.

In ***Garden III fractures*** the anteroposterior x-ray shows that the femoral head is tilted out of position and the trabecular markings are not in line with those of the innominate bone; this is because the proximal fragment retains some contact with the neck stump and is pushed out of alignment.

In ***Garden IV fractures*** the femoral head trabeculae are normally aligned with those of the innominate bone; the reason is that the proximal fragment has lost contact with the femoral neck and lies in its normal position in the acetabular socket.

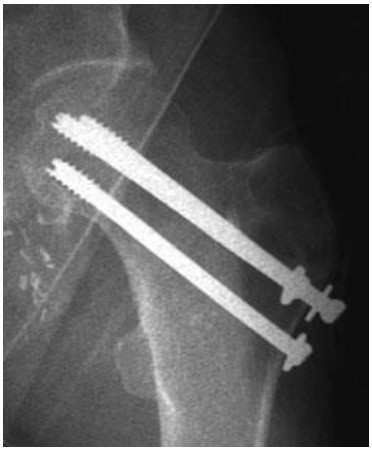
Treatment

Initial treatment consists of pain-relieving measures and simple splintage of the limb in traction .

non-operative treatment of undisplaced(Garden Stages I and II) in dementia or surgically unfit patient

Displaced fractures will not unite without internal fixation or Prosthetic replacement

in any case elderly people should be got up and kept active without delay if pulmonary complications and bed sores are to be prevented.



Complications

General complications deep vein thrombosis, pulmonary embolism, pneumonia and bed sores

Avascular necrosis

Non-union More than 30 per cent of all femoral neck fractures fail to unite

Osteoarthritis Avascular necrosis or femoral head collapse may lead, after several years, to secondary osteoarthritis of the hip.

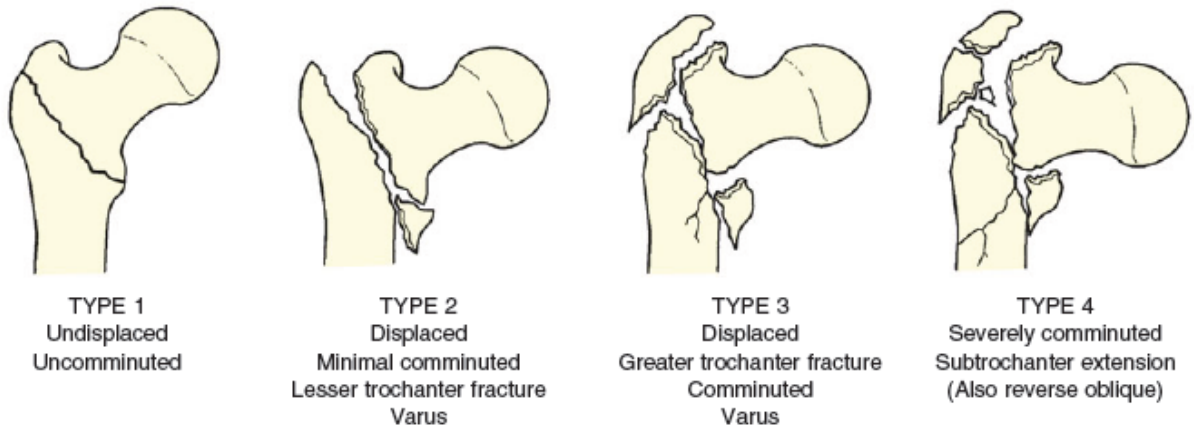
INTERTROCHANTERIC FRACTURES

Intertrochanteric fractures are, by definition, extracapsular. Trochanteric fractures unite quite easily and seldom cause avascular necrosis.

Divided into stable and unstable varieties and this includes .

1. there is poor contact between the fracture fragments, as in four-part ntertrochanteric types (greater and lesser trochanter, proximal and distal femoral fragments), or if the osteromedial cortex is comminuted.
2. the fracture pattern is such that forces of weightbearing continually displace the fragments further, as in those with a reverse oblique pattern or with a subtrochanteric extension.
3. osteoporosis leading to poor quality grip by the fixation implants.

The importance of fracture pattern is detailed in the classification by **Kyle (1994)**



29.11 Intertrochanteric fractures – classification Types 1 to 4 are arranged in increasing degrees of instability and complexity. Types 1 and 2 account for the majority (nearly 60 per cent). The reverse oblique type of intertrochanteric fracture represents a subgroup of Type 4; it causes similar difficulties with fixation.

Clinical features

The patient is usually old and is unable to stand. The leg is shorter and more externally rotated than with a Trans cervical fracture (because the fracture is extracapsular) and the patient cannot lift his or her leg.

Treatment

Almost always treated by early internal fixation because

(a) To obtain the best possible position

(b) To get the patient up and walking as soon as possible and thereby reduce the complications associated with prolonged sitting.

29.14 Intertrochanteric fractures – treatment Anatomic reduction is the ideal; but stable fixation is equally important. Types 1 and 2 fractures (a,b) can usually be held in good position with a compression screw and plate. If this is not possible, an osteotomy of the lateral cortex (c,d) will allow a screw to be inserted up to the femoral neck and into the head of the femur; this can be used as a lever to reduce the fracture so that the medial spike of the proximal fragment engages securely into the femoral canal; fixation is completed with a side plate. Reverse oblique fractures (e,f) are inherently unstable even after perfect reduction; here one can use an intramedullary device with an oblique screw that engages the femoral head. (Courtesy of Mr M Manning and Mr JS Albert).

Complications

EARLY

complications are the same as with femoral neck fractures, reflecting the fact that most of these patients are in poor health.

LATE

- *Failed fixation* if union is delayed, the implant itself may break. In either event, reduction and fixation may have to be re-done.
- *Malunion* , Varus and external rotation deformities are common. Fortunately they are seldom severe and rarely interfere with function.
- *Non-union*. If healing is delayed (say beyond 6 months) the fracture probably will not join and further operation is advisable;