Unstable Intertrochanteric and Subtrochanteric Proximal Femoral Fractures

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Fracture Types

- **31-A2**
  - Multifragmentary pertrochanteric fractures
  - 31-A2.1 stable after reduction
  - 31-A2.2 and 31-A2.3 unstable after reduction, involves greater trochanter.
Fracture Types con’t

- 31-A3
  - True intertrochanteric fractures
  - 31-A3.1 reverse oblique
  - 31-A3.2 transverse
Forces around proximal femur

- Significant forces act on the proximal femur
  - Medial compression
  - Lateral tension
- Displacement of fracture will occur in direction of muscle forces
- Natural progression – VARUS deformity
Which Implant?

- Implant choice should be based on
  - One which assists with reduction
  - Allows maintenance of that reduction
  - And is biologically friendly to allow fracture to heal

- Intramedullary device or Plate and Screws?
**Intramedullary Nails**

- Preserve periosteal blood supply – smaller footprint
- Reaming induces a bone graft effect and reduces the need for delayed union bone grafting
- Load sharing implant
- Biomechanically more stable.
Intramedullary Nails

- Mahomed et al *Clin Orthop* 1994
  - Gamma nail 2X stronger than DHS for unstable #
  - Biomechanical comparison of single load to failure
  - IM nails 300-400% body weight
  - Plate 100-200% body weight

- Meta-analysis
- Compared intra- and extra-medullary fixation of subtrochanteric fractures
- Outcome measures – operative time, blood loss, complications, failure of fixation, nonunion, length of hospital stay and functional recovery
- Reduced operative time and lower failure rate with IM nails

- Comparison of gamma nail vs fixed angle plate
- 4X higher complication rate in plate group (30%) vs nail (7.5%)
- Time to union 2 months nail group vs 3.5 months in plate group
- Shorter operative time, less blood loss and quicker support-free walking in nail group
Sadowski et al. JBJS 2002;84:372-381

- Comparison of DCS vs IM nail for reverse oblique fractures in the elderly.
- Implant failure / non union
  - DCS 35%
  - IM Nail 5%
- IM Nail also associated with reduced intra-operative blood loss, reduced operative time and reduced hospital stay
Plating Proximal Femoral Fractures

- IM nails great for femoral shaft fractures were they aid in reduction
- As # becomes more metaphyseal, results are less predictable
- Displacement of fracture will occur in direction of muscle forces until cortex contacts implant (Ostrum et al 2005;19(10):681-6)
Proximal Femoral Plate

- Assists in reduction of # and prevents progression into varus.
- Load Sharing device
- IM Nails very rarely achieve reduction or compression of the fracture – ‘hang the bone on the implant.’
- Studies have illustrated a 5% failure rate of IM nails requiring revision

- 121 pts with subtrochanteric or trochanteric # treated with PFN
- Intra-operative technical difficulties in 23 pts (19.1%)
- Operative revision required in 6 pts 4.9%
- Main reason for failure was poor reduction and wrong choice of screws

**REDUCTION OF # IS THE KEY** – easier with plate fixation

- 426 pts randomised to CHS or Gamma nail
- Blood loss less in CHS group
- Difficulties with distal locking in Gamma nail group
- Post-op walking ability same in both groups
- CHS preferred implant except for highly fragmented fractures
Union rate of Subtrochanteric # with blade-plate fixation

- **Siebenrock et al** *Injury* 1998;29 Suppl 3:C7-15
  - 15pts, 93% union rate (14/15)

- **Van Meeteren et al** *Injury* 1996 Dec;27(10):715-7
  - 40pts, 98% union rate

  - 47 pts, 2 groups direct and indirect reduction
  - 100% union rate in indirect reduction group
So Which Implant?

- Regardless of implant, REDUCTION of # is the key

    - PFN vs Medoff Sliding Plate in 203pts
    - No major differences in functional outcome or major complications between treatment groups

  - Lee et al *J Trauma* 2007;(63):1283-91
    - 66pts av age 36yrs, comminuted subtrochanteric #
    - IM nail held no advantage over DCS

- IM vs EM implants for extracapsular hip #
- SHS appears to be superior for trochanteric #
Which Implant?

- One that aids with reduction of fracture
- One that allows fracture to heal
- One that you are technically competent with
- Choice is up to you!