Peritroch Hip Fractures

Should be treated with an IMHS
Robert M Harris MD

Hip Fractures

- General principles
  - Approximately 250,000 hip fractures/year
  - Cost approximately $8.7 billion annually
  - The number of hip fractures is expected to double by the year 2050

Factors Influencing Construct Strength:

Uncontrolled factors
- Fracture geometry
- Bone quality

Surgeon controlled factors
- Quality of reduction
- Implant placement
- Implant selection

Kauffer, CORR 1980
Implant Options

- Compression Hip Screw & Side Plate
- Intramedullary Sliding Hip Screw
- Calcar Replacing Prosthesis
What's the big deal?
IM vs Plate Fixation

Implant Options
• Intramedullary Sliding Hip Screw
  – Decreased Implant Bending Strain
  – Potential Percutaneous Technique
  – Inter Troch Shaft
  – Reverse Obliquity
  – Pathologic Shaft Fracture

Special Fractures
• Reverse Obliquity
  – Fracture in Lateral Cortex
  – Untable With Sliding Hip Screw
  – Im Nail or Fixed Angle Device
Reverse Obliquity Fracture

- DCS
- Blade Plate
- IM Nail
- Resist Medial Shaft Displacement

IM Fixation: Mechanical Advantages

Key point

It is not the reduced lever arm that offers the clinically significant mechanical advantage, but rather the intramedullary buttress that the nail provides to resist excessive fracture collapse*

* Reduced collapse has been demonstrated in most every randomized study that has looked at the variable
Percutaneous Procedure

EBL, Muscle stripping, Complications, Rehab time?

Surgical wounds s/p ORIF with IM device

IM Fixation Recent History:
Theoretical Biologic Advantages

IM Devices

Which nail design is best ??

Proximal diameter?
Nail Length?
Distal interlocking?

Proximal screw?
Sleeve or no sleeve?

Lush & Kwai, JBU(AM)

One or two needed?

Nobody knows!
CHS: Unique risk of failure

Iatrogenic, intraoperative lateral wall fracture

31% risk in A2, A3 fxs
22% failure rate (vs. 3% overall)

Surgeon controlled factor: Implant selection
IM Fixation: Selected Clinical Results

- less sliding, shaft medialization*

AHRENGART, CORR ‘02

- Improved post-op mobility (4 months)
- less sliding, shaft medialization*

Pajariinen, JBIJS(B) ‘05

IM Fixation: Indications

Reverse Oblique Fractures
Pertrochanteric Fractures
Combination intertroch & subtroc fractures

Intertroch/subtrochanteric fxs
Greater mechanical demands, poorer fracture healing

Surgeon controlled factor: Implant selection
Thigh pain from short, locked nails?
Periprosthetic fracture:
Still an issue?
Anterior cortex perforation with long nails?

6% impinge/2% fx Robinson, JBJS(A) 05
Cost/ benefit?

-Nobody knows-

radius of curvature
Long Gamma Nail for IT-ST Fxs
Barquet, JOT 2000

52 consecutive fractures; 43 with 1 year f/u
- 100% union
- 81 minutes, 370cc EBL

The authors describe the key percutaneous reduction techniques that lead to successful management of these difficult fractures.

Unstable Pertroch Fractures
(OTA31A.3)

347 articles reviewed: 10 relevant; 5 RCTs*

“Evidence-based bottom line:”
- Unacceptable failure rates with CHS
- Better results with 95° devices
- Best results with IM devices*
- Best “functional outcome” not known

Kregor, et al (Evidence Based Working Group) JOT ’05

IM Fixation vs. CHS
Randomized/prospective trial of 210 pts.
Utrilla, et al. JOT 4/05

● Patients
  All ambulatory, no ASA Vs

● Fractures
  Excluded inter/subtroc fractures (31A.3)
  -- excludes the fxs KNOWN to do best with IM

● Surgeons
  Only 4, all experienced

● Technique
  All got spinals, Closed reduction, percutaneous fixation
  All overreamed 2mm, all got 130° x 11mm nail, one distal interlock prn rotational instability (rarely used)
Results

- Skin to skin time unchanged
- Fewer blood transfusions needed with IM
- Better walking ability in unstable fractures with IM
- No shaft fxs
- Fewer re-ops needed in IM group (1 vs 4)

Conclusion

- IM fixation or CHS for stable fxs
- Unlocked IM for most unstable fxs

Surgeon controlled factor: Implant selection

IM Fixation vs. CHS
Randomized/prospective trial of 210 pts.
Utrilla, et al. JOT 4/05

No difference:
- Transfusions
- Hospital stay
- Re-ops
- Mobility
- Residence

However....

- Grossly underpowered (beta error)
- 300-500/arm needed
- Any patient eligible (age 42-99)
- Used Long Nails
- Outcome measures perfunctory
  - No X-rays
  - 32% mortality
  - 21% phone/proxy only

*This is gold?
Cut Out

- Major cause of implant failure
- 80% of DHS
- 3.2 to 8%
  Cephalomedullary nail devices
  Cochrane review

Failed Fixation

- Screw Cut Out
- Screw Barrel
- Disengagement

Cut Out Resistance

TFNA Helical Blade Shows Greater Resistance in the Off-Center Position Compared to TFNA Screw and Gamma3 Screw®
**IM Hip Screws**

*Author's Opinion*

- Data supports use for unstable fractures
- RCTs document improved anatomy and *early* function
- Iatrogenic problems decreased with current designs and technique
- Indicated only for the geriatric fracture

**Postoperative Management**

- Allow all patients to WBAT
- Patients "self regulate" force on hip
- No increased rate of failure

- X-rays post-op, then 6 & 12 weeks

**Thank you**
Intra-Operative Fluoroscopy

Reduction Aids