Periprosthetic Distal Femur Fractures: Fixation, Revision, etc.

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Conflict of Interest

- Consultant: Smith & Nephew, Biomet, Stryker
- Royalty: Smith & Nephew, Biomet
- Advanced Orthopedic Systems, Synthes
- Editorial Board: J Ortho Trauma, JBJS
- BOD: Foundation for Orthopedic Trauma

Periprosthetic Fractures

Increasing incidence
- Below THA (0.1%-18%)
  - 1.5% primary
  - 4% revision
- Above TKA (0.3-2.5%)
- Interprosthetic (0.5%)
**Periprosthetic Fractures**

Increasing incidence
- Below THA (0.1%-18%)
  - 1.5% primary
  - 4% revision
- Above TKA (0.3-2.5%)
- Interprosthetic (0.5%)

82 yo woman fell down a step

**Periprosthetic Knee Fractures**

Goals
- Understand injury patterns
- Improve decision-making
- Modern techniques
Periprosthetic Fractures

Classification
• Below THA
  – Vancouver Classification
• Above TKA
  – Rorabeck Classification

Vancouver Classification

Type C
  – Below prosthesis

Rorabeck Classification

• Fracture displacement
• Implant stability

– Type I
  • Fx nondisplaced, prosthesis intact
– Type II
  • Fx displaced, prosthesis intact
Rorabeck Classification

- Fracture displacement
- Implant stability

  - Type III
    - Fx displaced or nondisplaced, prosthesis loose

Periprosthetic Fractures

Critical questions
- Fracture location
- Prosthetic stability
- Bone stock
- Patient age
- Medical problems
- Gait expectations
- Expectation of union

Periprosthetic Fractures

Treatment principles
- Revise loose components
- Accurate fracture reduction
- Stable fixation
- Early "mobility"
Below a Stem

Options below hip stem
- “Treat the fracture”
- Usually a plating

Vancouver Type C

Case example

Vancouver Type C

77 yo man low speed MVC
Vancouver Type C

Case example

Above a TKA

Options Above TKA
- Retrograde intramedullary nail
- ORIF with fixed angled device
  - Blade plate
  - DCS
  - Locking plates
- Revision TKA

Rorabeck I and II

Stable prosthesis
- Nails or plates reasonable

Rorabeck I

Rorabeck II

Rorabeck III
Rorabeck I and II

Fixation technique
• Reduce before plating/ nailing
• Longer implants- “overlap”
• More screws (locking)
• Augment screws with cement (?)
• Alignment

83 yo woman fell in bathroom

Periprosthetic Fractures

Critical questions
– Prosthetic stability
– Fracture location
– Bone stock
– Patient age and medical condition
– Gait expectations
– Expectation of union
Clinical Results


- 59 patients with periprosthetic femoral fx
- Biological open-reduction internal-fixation locked plates without the use of bone grafts
- 58/59 healed after index procedure
- 3 had malalignment after failed screw fixation but all healed
- 49/59 patients returned to baseline function

Clinical Results


61 patients with periprosthetic distal femur @ TKA

- 60/61 fractures were healed with a mean 5° of valgus and neutral flexion/extension at a mean 12-month follow-up
- 4 construct failures (14%) occurred in more proximal fractures
- Only 9% (3) in fractures with far distal extension
• 85 yo woman fell at home

Periprosthetic Fractures

Critical questions
- Prosthetic stability
- Fracture location
- Bone stock
- Patient age and medical condition
- Gait expectations
- Expectation of union

• Locked plating more flexible than nail in unstable fracture…
• Clinical relevance??


• Compared LISS, 95° ABP, Retro nail
• All 3 “stable”
• Locked plate best fixation distal segment
Deformity & Nails

Entry access
• Apex-posterior

Technical - Reamer path

Periprosthetic Fractures

Critical questions
− Prosthetic stability
− Fracture location
− Bone stock
− Patient age and medical condition
− Gait expectations
− Expectation of union
88 yo woman fell at home

Critical questions
- Prosthetic stability
- Fracture location
- Bone stock
- Patient age and medical condition
- Gait expectations
- Expectation of union

Periprosthetic Fractures

Rorabeck Type III

Case example
88 yo man fell at church

Critical questions
- Prosthetic stability
- Fracture location
- Bone stock
- Patient age and medical condition
- Gait expectations
- Expectation of union

Periprosthetic Fractures
Conclusion

• Treatment goals
  – Prosthesis stability and fracture union
• Treatment depends on
  – Fracture location
  – Prosthetic stability
  – Bone stock
  – Patient age and medical condition
Thank You