Introduction

- Cumulative risk
  - 0.4-2.5% following primary THA,
  - 1.5-4% following revisions

- Typically low energy trauma

- Consider “pathologic #s”
## Vancouver Classification

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td>Near trochanteric region</td>
</tr>
<tr>
<td>G</td>
<td># GT</td>
</tr>
<tr>
<td>L</td>
<td>#LT</td>
</tr>
<tr>
<td><strong>B:</strong></td>
<td>Situated around the stem</td>
</tr>
<tr>
<td>1</td>
<td>well-fixed stem</td>
</tr>
<tr>
<td>2</td>
<td>loose stem</td>
</tr>
<tr>
<td>3</td>
<td>loose stem with bone loss</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>Below distal tip of stem that the presence has little relevance</td>
</tr>
</tbody>
</table>
Case

? Treatment options B1

↓

ORIF
Is it really that simple??

- Mennen Plate
- Low or High Tension
- 4.5 LCDCP
- Cables
- Unicortical/Bicortical
- Proximal Screws
- Distal Screws
- Wires
- Anterior - Posterior
- Struts
- Medial – Lateral
EBM

- **Patient population**: Pt’s with Vancouver B1 periprosthetic # of THA
- **Intervention**: Strut Graft
- **Comparison**: ORIF
- **Outcomes**: Union, Complications
Search

- EMB Reviews
- Cochrane
- ACP Journal Club
- Medline
- Pubmed

0 RCT
0 metaanalysis
23 reviews
133 cohort studies
Laboratory Studies
Clinical Cohorts
Take Home Message
Laboratory Studies

• Ogden et al.
  – *Orthop Trans* 1978

• Compared lateral plate vs allograft
• plate fixation resulted in much greater stress shielding
Laboratory Studies

• Dennis et al.
  – J Arthroplasty 1996;5:236-238

• Synthetic composite femurs

• 2 constructs were significantly more stable:
  – Plate with prox unicortical screws and distal bicortical
  – Prox cables and distal bicortical screws
  – Cable alone was the worst
Laboratory Studies

• Dennis et al.
  – *J Orthop Trauma* 2001;15:177-180

• Lateral plate with unicortical screws and distal bicortical screws VS 2-strut allograft

• Plate was significant stronger in axial and bending and equal in torsion
Laboratory

- 2 experiments Vancouver

**Variables**
- # of cables on each side of the #
- High (520 N) vs low (320 N) tension
- Cables vs smooth wires
- Strut #, position, length

**Conclusions**
- Double > single strut
- A-L vs A-M no difference
- 4>3>2
- Plate-allograft were similar to intact femur
SUMMARY: Laboratory Studies

Plates have greater stress shielding

Lateral plate with proximal unicortical screws is most stable

Addition of anterior strut produces an even stronger configuration

Secure implants with cables rather than wires, at least 4 cables per side
Clinical Cohorts

- Periprosthetic Femoral Fractures Around Well-Fixed Implants: Use of Cortical Onlay Allografts with or without a Plate

Periprosthetic Femoral Fractures Around Well-Fixed Implants: Use of Cortical Onlay Allografts with or without a Plate

- 4 Centers (Mayo, Sinai, UBC)
- 40 consecutive pts from 1992-96
- Vancouver B1
- Retrospective
- Outcomes
  - Union
  - Cortical index
  - Function
Periprosthetic Femoral Fractures Around Well-Fixed Implants: Use of Cortical Onlay Allografts with or without a Plate

- 40 pts: 19 struts, 12 plate and 1 strut, 9 plate and 2 struts
- Morselized allograft was used in 29
- Wires in 9 struts, cables in the rest
- Fixation pts ranged from 2-6
Periprosthetic Femoral Fractures Around Well-Fixed Implants: Use of Cortical Onlay Allografts with or without a Plate

• Results
  – 98% union (1 was noncompliance)
  – Union ~ 1 yr
  – 4 malunions
  – F/U 6- 24 mths
  – 98% returned to pre-op function level
  – Cortical index 1.41 (1.03-1.67)
Take Home Message

• **Allograft**
  – supported in the literature
  – adds biology
    • enhance healing
    • increase bone stock
    • less stress shielding

• **Plate**
  – stronger, may avoid malunions
Take Home Message

• Position
  – Beware of varus stem
  – M-L vs A-L

• Soft Tissue
  – Avoid excessive stripping especially of linea aspera (anterolateral)

• Use cables not wires