

Periprosthetic Femur Fractures

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Introduction

- Cumulative risk
 - 0.4-2.5% following primary THA,
 - 1.5-4% following revisions
- Typically low energy trauma
- Consider “ pathologic #s”

Vancouver Classification

Type	
A	Near trochanteric region
G	# GT
L	#LT
B:	Situated around the stem
1	well-fixed stem
2	loose stem
3	loose stem with bone loss
C	Below distal tip of stem that the presence has little relevance

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

Struts

Medial – Lateral

Anterior - Posterior

EBM

- **P**atient population
- **I**ntervention
- **C**omparison
- **O**utcomes

Pt's with Vancouver B1
periprosthetic # of THA

Strut Graft

ORIF

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
- Haddad et al. *JBJS* 2002.

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