Update on periprosthetic fractures around the knee

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Headlines

Background and Epidemiology
Classification-systems
Treatment-Algorithms
Pearls and Pitfalls
Background

► Periprosthetic fractures around the knee (distal femur, Tibia and Patella,) is registered with increasing frequency.

► Obtaining stable osteosynthesis remains a surgical challenge even for experienced trauma surgeons.

► Deep infection being the major complication

► One year mortality is high (up to) 25% in periprosthetic supracondylar femur fractures
38,000 operated fx.
In the Danish Fracture data base

The Danish Fracture Database can monitor quality of fracture-related surgery, surgeons' experience level and extent of supervision.
Andersen MJ1, Gromov K, Brix M, Troelsen A; Danish Fracture Database collaborators.

0.8%
Is periprosthetic fractures
Generel principles (femur and tibiae)

If the prosthehesis is **stable**, Open reduction with or without bonegrafting is generally indicated

If the prosthesis is **loose**, revision arthroplasty to a stemmed component is recommended

Remember in some cases conservative treatment can give good results, and few complications
Diagnosis of loosening

► Radiographs – standard
  ▪ Lucent zones – habitual/acute loosening

► Fluoroscopy
  ▪ May be helpful

► Intraoperative
  ▪ Only positive findings are valid

► CT scan
  ▪ Can be useful

► Arthroplasty surgeon
  ▪ Valuable

Type I: Undisplaced fracture, prosthesis stable.

Type II: Displaced fracture, prosthesis stable.

Type III: Unstable prosthesis with or without fracture displacement.
Type I, undisplaced, stable prosthesis

Can be treated conservatively with good results, in the elderly with low demands.

You need compliance and good functional bracing, to get good results.

Gold standard in many clinics is minimally invasive locking plates. Active ROM and weightbearing from day one.
Type II. displaced fracture, stable prosthesis

LISS and MIPO

Relative stability

Lenght, Axis and Rotation

Close to-anatomical Reduction

Remember medial Support

Retrograde nailing also a possibility
Type III. Unstable prosthesis

If loose, then revision......but
Some cases can be fixed with locking plates

Be prepared for resection/allograft
Osteoporosis or bone loss
Low demanding elderly

Always confer with arthroplasty surgeon
Indication
Technical decision
In conclusion, the intramedullary fibular strut allograft with polyaxial locking plate did not prove to be significantly better than the polyaxial locking plate in a periprosthetic distal femur fracture model.
pitfalls

Incorrect placement of the plate
Screws in the joint!!

Strangulating the Iliotibials
Pain, and decreased ROM

Screws in the Fracture area
Causes non-union

Aware of hyper Extension.
Instability
When walking
Correct plate
Placement means
No screws in the
Joint.
Or in the notch
Best bonestock.

Cut a window in the
Tractus to allow the
Tendon to move on the
plate

Relative stability
No screws in the
Fracture area.
Absolute stability
Use lag-screws

Pillow under femur
And ankle stretch
Will avoid hyper-
Extension in the
fracture
Fractures of the distal femur carry a mortality risk comparable to that of hip fractures.

One year mortality 25%

Important
Classification – tibia

  - 102 tibial fractures with TKR
  - Type I: 60% Tibia plateau fracture
  - Type II: 21% Fracture around prosthesis
  - Type III: 17% Fracture distal of prosthesis
  - Type IV: involving the tibial tubercle

- Suffix
  - A: Stable prosthesis
  - B: Loose prosthesis
  - C: Intraoperative fracture
Type II A, IIIA, IV A. (stable prosthesis can be treated using principles of Modern fracture treatment.

Type I B and II B (loose prosthesis) is best treated with revision surgery.

Type I C, II C and III C (intraoperatively) fractures

IC: fixation
II C: bonegrafting, weightbearing restrictions
III C: Conventional fracture treatment
Felix type IIIa, stable prosthesis

Minimal invasive surgery, is good for the fragile soft tissue

Double plating for stability, use it if necessary

Good functional result, can be achieved with good stability and immediate training
Pearls and pitfalls Tibiae

Pearls

Use VA locking plates for more options and better screwpurchase

Use minimal invasive techniques

Get very good stability, use two plates if necessary

Get as close to anatomical reduction as possible

Pitfalls.

Soft tissue is fragile and thin around the knee

Extensor mechanism is fragile in fractures involving the tibiae tubercle

Do not mix basic principles of fracture management (AO)
Take home message

1. Refer to specialist

2. All treatment possibilities must be at hand

3. Experienced trauma and arthroplasty surgeon should work together

4. Know the pitfalls, and how to avoid them.

5. Keyword is stability.

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