Non-union of Intra-articular Proximal Fractures

3rd Advanced Course on Knee Surgery
January 17th – 22nd 2010, Val d’Isère

Incidence
- Unknown
- 1 case in 988 intraarticular tibial fractures (Moore J Orthop Trauma)
- 2 cases in 60 fractures (Bokker CORR 1984)
- Other series of over 200 fractures: no nonunions (Burri CORR 1979 / Rasmussen JBJS 1973 / Tscherne CORR 1993)

Why is it uncommon?
- Uncommon due to large appositional cancellous bone and abundant blood supply of the proximal tibia (Borelli et al J Orthop Trauma 2002)

Important factors
- Malreduction at index surgery
- High energy trauma (soft tissue damage / bony defects)
- Infection?

Why is it challenging?
- Uncommon / less experience
- Small size of articular fragments
- Poor bone quality
- Soft tissue attachments different after trauma/surgery

Nonunion
- No bone healing 6 months postinjury
Literature

• Case reports
• Describing individual cases with minimal data on treatment / outcome
  (Schatzker CORR 1997, Papageolopoulos Injury 2006)

Literature

• “Open reduction and internal fixation of intraarticular tibial plateau nonunions”
  (Toro-Arbealez / Gartner et al Injury 2007)

• Study conducted at Hospital Special Surgery, NY, USA: 5 patients with nonunion were treated using specific treatment protocol.

Toro-Arbealez / Gartner et al Injury 2007

• 5 pts, 3 females, 2 males, mean age 50.4 y (41-62y)
• Fracture due to traffic accident / fall
• Nonunion was defined: non evidence of healing at 6 months (confirmed with X-ray/ CT scan / intraoperative exploration)
• One atrophic, four oligotrophic nonunions
• Schatzker classification: 2 type IV, 1 type V, 2 type VI
• Previous surgery all ORIF, average 2.4 surgery’s
• Time between referral and injury: 6.4 months (range 4-8)

Surgical treatment: ORIF, debridement of the nonunion, correction of deformity, bone grafting, arthrolysis and strict postop rehab protocol
• All healed at 12.8 weeks, FU mean 3.7 y
• No complications
• One postop FFC 10°, one limited flexion 110°
• Four patient returned to pre-injury activity level
• Significant improvement in KSRS score, both function / pain, adequate alignment
• But in 2/5 pts TKA performed 5/16 months postop, both cases had significant articular / meniscal injury observed intraoperatively

Technical details surgery

• Removal of hardware
• Arthrotomy / submeniscal approach to examine menisci / cartilage
• Exposure proximal tibia (subperiosteally) at the nonunion site (based on axial CT scan)
• In cases of deformity: femoral distractor at concave side of deformity
• 5 cultures obtained prior to AB profylaxe

Technical details surgery

• Debridement fibrous tissue at nonunion site
• Fragment mobilized with elevators / dental picks / K-wire
• Opening IM canal with drill to allow ingress of bloodflow
• Fragment reduced and provisional fixation with K-wires
• Control of reduction with fluroscopy and estimation of defect
• Bonegraft with iliac crest autologous graft
• Butress plate or antiglide plate with lag-screws
• 46 y male
• Lateral plateau
• Tibular neck
• ORIF cannulated screws
• Nonunion with flexion deformity PL tibial fragment

Our own database 1 nonunion in 51 intraarticular proximal tibial fractures

• Female, 56y, traffic accident in Sri Lanka
• 2 y after ORIF
• VAS 5
• functional impairment
• flexion/ext 100/0
• No signs of infection

Nonunion of anterior side and posterior medial fragment

But also degenerative intraarticular changes
Patient scheduled for TKA: repair nonunion important prior to arthroplasty????

Conclusions
Extremely rare

The treatment protocol described seems successful in treating nonunion

But in 2/5 a TKA was performed

No information in literature about outcome of a TKA in cases of nonunion

Thank You