

Journal Club: 29 June 2016

Chairman: Mr Harish Kapoor (Consultant)

Attendees: Lazlo Toth, Sandy Wood (consultants). Anthony Theodorides, Juergen Messner, Milad Ahmadi, Chun Tang (Registrars). Amy Lindh (CT2). Tanya Tordorff, Andrew White (Advanced Nurse Practitioners).

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Theme: Knee trauma: a review of three papers

Reviewer: Anthony Theodorides

Zhu Y, Hu CF, Yang G, Cheng D, Luo CF. Inter-observer reliability assessment of the Schatzker, AO/OTA and three-column classification of tibial plateau fractures. *J Trauma Manag Outcomes* 2013;7:7.

Background:

To compare the interobserver reliability of the Schatzker, AO and their new proposed three column classifications of tibial plateau fractures.

Methods:

- 50 cases of all fractures selected from 278 consecutive tibial plateau fractures that were treated with open reduction internal fixation
- Random series
- Four observers: knee T&O consultant, musculoskeletal radiologist, attending doctor, senior resident
- None involved in care of selected patients
- Choice made with aid of schematic diagrams
- Untimed training session
- Inclusion criteria: > 18y, closed, n/v intact, no compartment syndrome

Outcomes:

- Mean interobserver reliability for Schatzker classification: 0.57 (moderate agreement)
- Mean interobserver reliability for AO classification: 0.62 (substantial agreement)
- Mean interobserver reliability for three column classification: 0.77 (substantial agreement)

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Strengths of the study

- Introduction of new and useful classification system
- Good reasoning for choosing topic – addresses limitations of existing classification systems
- Range of observers
- Training session
- Used diagrams – good/bad
- Rigid assessment of fractures and use of observers
- Appropriate conclusion

Methodological concerns

- Not clear what experience the observers have
- No power analysis
- No mention as to whether 50 cases are enough
- No details given on range of fractures presented
- Not clear if same or different fractures used for all three classifications
- Mean Kappa values: 0.57, 0.62, 0.77 – no statistical analysis
- AO and 3 Column both substantial agreement but three times bigger difference between Schatzker and AO (0.15 vs 0.05)

Conclusion

Three column classification based on CT scans can identify posterior fractures. Shows substantial agreement in assessment of interobserver reliability, which is higher than Schatzker and AO classifications.

Robertson A, Nutton RW, Keating JF. Aspects of current management: dislocation of the knee. *J Bone Joint Surg [Br]* 2006;88-B:706- 11.

Background:

Review paper on current management of knee dislocations.

- Serious injury w long term consequences
- Impair return to employment and activities
- After spontaneous reduction will underestimate ligamentous injury
- 0.2% of all ortho injuries
- MVA - > 1/2
- Sports injuries <1/3
- 14-44% associated w multiple trauma
- 5% bilateral

Injury pattern:

- Temporal: Acute <3/52, Chronic > 3/52
- Anatomical: Direction of tibia (Kennedy classification); Ligamentous injury (Schenk classification)
- Kennedy: Anterior, posterior, lateral, medial, rotatory
- Unreliable for predicting ligamentous injury
- Difficult classify if reduced spontaneously, or before arrival to hospital

Mechanism of injury:

- Anterior – hyperextension ~40%
- Posterior – dashboard ~33%
- Lateral ~18%
- Medial ~4%
- Rotatory ~5%
- Beware of intact but functionally incompetent PCL

Associated injuries:

- Vascular injury can vary
- 4.8% in low energy
- 65% in high energy
- Increased detection w MRA
- CPN higher incidence (45%) with disruption to PCL and PLC
- Fractures: distal femur, prox tibia, Segond fractures, PCL avulsion

Clinical:

- Detailed n/v exam with clear documentation
- Serial recordings especially if reduce dislocation
- ABPI – very sensitive but not specific
- ABPI < 0.90. PPV of 100% for presence of vascular injury requiring intervention
- If spontaneously reduced, extent of injury less obvious
- Uncontained haemarthrosis – extensive bruising/swelling on sides

Imaging:

- AP/lateral radiographs
- Routine angiography?
- More important in PVD, signs impaired circulation, reduced ABPI
- MRA

Management:

- Reduce, temporarily stabilise
- If vascular injury need urgent revascularisation
- Bypass popliteal artery or repair
- External fixator
- Temporary vascular conduit
- Delayed ligament reconstruction 6-12 months later to allow tourniquet use

Ligament reconstruction:

- Need intact capsule for arthroscopy (6-12 weeks)
- Need PCL to reduce joint and a base for rest of ligaments
- Anteromedial arthrotomy reconstruct ACL/PCL
- Allograft vs ipsilateral/contralateral grafts
- Repair vs reconstruction

Common peroneal nerve injury:

- 20%
- 28% of these complete disruption

- Rest - extensive damage but in continuity
- Spontaneous recover 20%
- Short segment damage better than long segment
- Nerve graft of Tib post transfer to restore dorsiflexion

Rehabilitation:

- Careful supervision
- More cautious than single ligament
- Hinged knee brace
- TWB
- FWB @ 3/12
- Stiffness
- MUA/arthrolysis

Outcomes:

- 39% normal
- 40% Abnormal
- 21% several abnormal
- Better w ligament reconstruction
- Most common complication: stiffness & failure of some part of reconstruction
- 50% post-traumatic OA

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Strengths of the study

- Good overview
- Summary of salient points
- Good use of literature to support points

Methodological concerns

- Current management: Not enough detail on examination - pitfalls of ligament exam in multi injured knee. No mention of dimple sign.
- Authors quote 100% PPV of arterial injury requiring surgical intervention if ABPI < 0.9 but no clarification on diabetic patients/calcified arteries which skews ABPI result
- No mention of where popliteal artery injured – points of tethering#
- No mention of hinged brace vs external fixator
- No mention of reperfusion injury and need for prophylactic fasciotomies
- Pro allograft. Perhaps could have provided bit more detail into ligament reconstruction techniques
- More detail into rehab and recommended exercises - closed prior to open chain; prioritizing quads prior vs hamstring exercises and their timing
- No mention of PCL brace
- Misspelt Achilles throughout paper

Arastu MH, Kokke MC, Korley REC, Buckley RE. Coronal plane partial articular fractures of the distal femoral condyle: current concepts in management. *Bone Joint J* 2013; 95-B:1165-71.

Background:

- Hoffa # - coronal plane # of posterior femoral condyle
- 0.65% of all femoral #
- Hoffa 1904
- Lateral FC – 78-85%
- Often missed, especially if associated w distal femoral inter- or supracondylar fractures (38%)

Clinical evaluation:

- Pain, effusion
- If open 2.8 times more likely to have Hoffa #
- CT in all high energy intra-articular distal femoral # or occult signs

Management:

- Poor outcomes with conservative measures
- Must obtain anatomical reduction and rigid fixation as involves large part of articular weight bearing surface
- High shear forces on weight bearing and flexion
- No consensus on surgical approach
- Depends on fracture configuration

Operative fixation:

- Use ideally 2 x6.5mm screws PA
- Much stronger construct than compared to 3.5mm screws
- Headless screws reduce damage to articular cartilage
- PA screws stronger construct than AP screws

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Strengths of the study

- Good overview of an important and often missed fracture
- Summary of literature and salient points in each paper
- Explains difficulty in recommending particular approach given heterogeneity of evidence

Methodological concerns

- More illustrations to clarify point and easier to follow e.g. fractures, method of fixation and surgical approaches