Humeral Fractures

Proximal humerus #
- Common #, particularly elderly osteoporotic women with falls.
- Usually FOOSH, direct blow or 2o to seizure/electrocution ± post shoulder dislocation
- Axillary nerve and artery most commonly injured (>50% if displaced)
- High incidence of AVN (esp if anatomical neck/articular surface involved)
- 80% undisplaced or impacted
- OT (<15%) for:
  - Open # or >2 part #s
  - Impaction or splitting of >50% articular surface
  - Fracture/dislocation where reduction has not been fully successful

Neer Classification
- Displacement = >1cm, Angulation = >45 deg
- 1 part (80%; no displacement/angulation)
- 2 part (most common; displacement of 1 element eg fracture of surgical neck or GT or LT)
- 3 part (displacement of 2 elements; humeral head in contact with glenoid)
- 4 part (displacement of 3+ elements; dislocations of GH joint)

Management
- 3 part or more/displaced #s need OT unless well aligned
- BAS best; early mobilisation to prevent frozen shoulder

Complications
- Most often axillary nerve related to surgical neck. Also radial or musculocutaneous nn.
- Vascular – axillary artery
- Shoulder dislocation
- AVN: in 3-4 part #
- Malunion
- Stiffness
- Hill-Sachs lesion
  - posterolateral humeral head compression #, can follow anterior shoulder dislocation
- Reverse Hill-Sachs lesion
  - compression # of anteromedial humeral head, can follow posterior shoulder dislocation

Humeral shaft #

Epidemiology
- Peak in 30’s/70’s
- Consider NAI if child<3y
- Common site of pathological # (esp breast Ca); middle 1/3 most common
- Short oblique: difficult to reduce and maintain
- Long spiral: tend to heal rapidly; high incidence of non union if large gap between segments
- Transverse: have delayed healing

Complications
- Brachial artery injury
- Radial nerve injury
  - 10-20%; Most common in middle and distal 1/3. Usually recovers over 6-8/52 with conservative treatment
  - Also ulnar and median nerves
- Displacement (common due to many muscle attachments), Non-union
Management
U slab with collar and cuff (functional brace for transverse)
Physio/mobilisation
OT if:
  >20deg AP angulation, >30deg varus/valgus angulation, >2.5cm shortening
  Radial nerve palsy post-reduction
  Multi trauma, open, floating elbow, ipsilateral forearm injury
  Vascular compromise

Supracondylar/transcondylar fractures
Most extension-type injuries (>95%) from FOOSH
Transcondylar fractures more common in elderly
Supracondylar fractures more common in children. Peak aged 5-8y. 2M:1F

Gartland Classification
I - non-displaced
II - displaced but posterior cortex intact
III - completely displaced

Management
Non-/minimally displaced #: long arm posterior POP with elbow at 90° (110° if displaced)
May need OT if:
  Open # o <50% bony apposition
  Dorsal angulation >15o from norm (45o)
  Lat/med tilt>10o
  Flexion displacement.
  Neuro checks for compartment syndrome

Intercondylar fractures
T- or Y-shaped fractures with varying displacement between condyles and humerus
Most fractures require surgery because they are displaced otherwise as above

Condylar fractures
Lateral condyle fractures are more common than medial
Lateral condylar SHI # easily missed
Usually due to direct impact on a flexed elbow. Also sudden adduction or hyperextension.
If medial epicondyle – find avulsed fragment as may be in jt between olecranon/humerus
Aspiration of joint haemarthrosis relieves discomfort. Management as for supracondylar

Capitellum Fracture
Fracture involving distal humeral articular surface.
Undisplaced fractures splinted, displaced require surgical fixation

Complications
Nerve injury: risk to median, radial & ulnar nerves
Vascular injury: risk to brachial artery
Compartment syndrome
Volkmann’s ischaemic contracture: neurovasc compromise 2o missed compartment syndrome
Stiffness: early range of motion may prevent or reduce its severity
Cubitus varus – mainly cosmetic; Post-traumatic arthritis: can result from the initial articular impact
Heterotopic ossification
Mal-union
**Pathological #s**
Site of 5-10% pathological fractures
Bone pain preceding fracture
Limb swelling predating fracture, or marked post-fracture swelling
Cystic abnormality on x-ray
History of malignancy, particularly metastatic; Paget's disease of bone