Fractures of the shoulder girdle, elbow and fractures of the humerus

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Fractures of the Clavicle (mid-shaft).
Fractures of the clavicle
Fractures of the clavicle

• Treatment - conservative.
  – Sling or collar and cuff.

  ❑ Surgery.
  – Open fractures.
  – Neurovascular injuries.
  – 21st Century.
Complications of clavicle #’s

• Neurovascular
• Non-union 1.9%
• Mal-union > 20 mm shortening leads to pain
Distal Clavicle Fractures

- 15% of all clavicle #’s
- Lateral impaction force on point of shoulder
- 10% incidence associated head and neck injuries
- Most asymptomatic
- Little effect on function and strength
X-rays

- AP view
- Axillary or true lateral of scapula
- Anterior and posterior 45 degree oblique view
- AP stress view with 2-3kg
- 20 - 45 degree of cephalic tilt
Figure 17-55. A Knowles pin often is a preferable method...
Floating Shoulder

• Ipsilateral fractures of scapula and clavicle
• Non-operative treatment of those with less than 5 mm of fracture displacement (glenoid)
• If surgery is done, fixation only clavicle unless intraarticular glenoid fracture
SCAPULA FRACTURES

A

B

Upper Extremity
SCAPULAR FRACTURES

- ASSOCIATED INJURIES 35-98%
- 10-15% MORTALITY
- SEVERELY INJURED PATIENT
- C-Spine injury!
- ARTERIAL INJURY
- BRACHIAL PLEXUS INJURY
- PNEUMOTHORAX
- FRACTURED RIBS
- PULMONARY CONTUSION
Humeral Shaft Fractures
Non-Operative Treatment

• Modified U slab
• Hanging cast
• Functional bracing (Sarmiento)
Hanging Arm Cast

- Mid-shaft fractures with shortening
- Oblique or spiral pattern
- Should extend 2 cm proximal to fracture
- NOT transverse fractures
- 96% union
Modified U splint

• Fractures with minimal shortening
• Can be exchanged for functional brace 2 weeks after injury
• Disadvantages: lost shoulder movement, axillary irritation, patient discomfort and bulkiness
Functional Bracing

- Fracture reduction through soft tissue compression
- Prefabricated anterior shell and posterior shell
- Velcro straps
- Contraindications: massive soft tissue injury or bone loss, unreliable patient, and inability to maintain alignment
Fracture Alignment

• Up to 3 cm shortening
• 20 degrees anterior or posterior angulation
• 30 degree varus
• Mal-rotation well tolerated
Shaft Fractures and Radial Nerve Palsy

• Transverse fracture of middle third most commonly assoc. with neuropraxia
• Spiral fractures of distal third higher risk laceration or intrapment
• 86% (Morace) or 70% spontaneous recovery
• Surgical exploration only 1/3 of cases needed repair
• Late exploration (4 mos.) only 50% recovery after surgery
Indications – surgery.

- Open fractures
- Holstein-Lewis distal 1/3 fractures
- Secondary palsies developing after closed reduction
HOLSTEIN-LEWIS FRACTURE
Proximal Humerus Fractures

- 4-5% of all fractures
- 85% are minimally displaced or non-displaced
- 15% displaced = therapeutic challenge
Neer Classification

• Non-displaced # by Neer criteria reveals less 1cm displacement and 45 degrees of angulation of any fragment with respect to all others
<table>
<thead>
<tr>
<th>Anatomic Neck</th>
<th>2-part</th>
<th>3-part</th>
<th>4-part</th>
<th>Articular Surface</th>
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<tr>
<td>Surgical Neck</td>
<td>a</td>
<td>b</td>
<td>c</td>
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<tr>
<td>Greater Tuberosity</td>
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<tr>
<td>Lesser Tuberosity</td>
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<td>Fracture-Dislocation</td>
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<td>Head-Splitting</td>
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Diagnosis – Physical Exam.

- Shoulder pain
- Swelling of shoulder and arm
- Ecchymosis
- Ipsilateral hemithorax
- Lung field pathology
- Peripheral neurological exam.
- diagnosis
Radiographic Exam.

- AP shoulder
- Lateral
- Axillary
- Valpeau – noncompliance with positioning of axillary view
- CT – tuberosity displacement, head splitting #’s, associated glenoid #’s
Treatment – Minimally Displaced #

• Conservative
• Mobilize early
• Physiotherapy
Treatment – Severely Displaced

• ORIF
• Anatomical reduction
• Stable Fixation
• Gentle mobilization
Humerus neck fractures
A 3-part fracture of the upper end of the humerus with the head displaced medially and inferiorly (a). The head fragment has been raised with the elevator; the greater tuberosity automatically returns to the anatomical position and a K-wire has been passed through the shaft fragment into the head (b). The completed reconstruction (c).
TYPES SUPRACONDYLAR #

- EXTENSION-TYPE
- MOST COMMON
- INCIDENCE 5-8yrs
- RARE AFTER 15yrs
- MORE DISPLACEMENT OLDER KIDS (10yr)
- M:F 2:1
ANATOMY

- Brachial artery
- Median nerve
- Supratrochlear artery
- Anterior ulnar recurrent artery
ANATOMY

- Median nerve
- Brachial artery
GARTLAND CLASSIFICATION

• TYPE 1
  • UNDISPLACED

• TYPE 2
  • MINIMAL DISPLACED
    intact post cortex

• TYPE 3
  • DISPLACED
    Post-med
    Post-lat
Gartland classification.
RADIOLOGY

• LATERAL
• Elbow in 90 flexion
• Flag sign
• Fat pad-post / ant
TREATMENT PROTOCOL

EXTENTION TYPE 1 #

• IMMOBILIZE ABOVE ELBOW-POP SPLINT 90°.
• HOSPITALIZE ELEVATE PAIN RX OBSERVATION q1-2h.
• NOTES.
• 3 WEEKS F/U
• EVALUATE # +ROM
• MOBILIZE
TREATMENT PROTOCOL
EXTENTION TYPE 2 #

• EVALUATE DISPLACEMENT/ANGULATION/ ROT.
• STABLE
• CLOSE REDUCTION G/A

• Stable #
I. Back-Slab
II. FORE ARM PRONATION
III. HOSPITALIZATION
IV. 3 WEEKS F/U
V. MOBILIZE
TREATMENT PROTOCOL
EXTENTION TYPE 2 #

• **UNSTABLE**
• CLOSE REDUCTION
• 2 X PERCUTANEOUS K-WIRES

• POST OP SPLINT 30-45 FLEXION
• HOSPITALIZATION
• 3 WEEKS F/UK – REMOVE WIRES
• MOBILIZE
• 4 WEEKS F/U
TREATMENT PROTOCOL
EXTENTION TYPE 3 #

• MORE TRAUMA

• MORE DISPLACEMENT

• MORE SWELLING

• MORE COMPLICATIONS

• 3 STEPS

• REDUCTION #

• EVALUATE REDUCTION

• MAINTAIN REDUCTION
TREATMENT PROTOCOL
EXTENTION TYPE 3 #

• METHODS

• DUNLOP TRACTION

• CLOSE/ORIF 2 X K-WIRES
CLOSED REDUCTION WITH K - WIRES

• TRACTION
• ELBOW Ext.
• FOREARM IN SUP.
• LENGTH-
• VARUS / VALGUS
• ROTATION
• FLEXION ELBOW PRESSURE OLECRANON.
• PRON. FOREARM
CLOSED REDUCTION WITH K WIRES
Supracondylar fractures
Complications
COMPLICATIONS

- NERVE
  - ANT INT OSS.
  - RADIAL
  - MEDIAN
  - ULNAR
- VASCULAR
- COMPARTMENT SYNDROME (MOST NB!!!)
- CUBITUS VARUS
- STIFFNESS
- PINTRACT INFECTION
- REMANIPULATION
- HETEROTOPIC OSSIFICATION
THE END

THANK YOU