Supracondylar Humerus Fracture Protocol

- Assessment of Supracondylar Humerus Fractures
  - Detailed history & physical imperative
  - Specific nerve and vascular exam imperative
  - AP & lateral radiographs imperative
  - Consider other injuries; distal radius fractures.

- Extension Type Supracondylar Humerus Fracture: Guidelines
  - Type I
    - Non-displaced (may only see fat pad signs)
    - Neurovascular intact, pain controlled, compartments soft?
      - Yes – place in long arm posterior splint with "U" with elbow at 90-100 degrees of extension; sling; follow up in clinic in 3 weeks
      - No – Same splint/sling; admit for observation
  - Type II
    - Sub-classification
      - IIA – distal fragment intersected by anterior humeral line (AHL)
      - IIB – distal fragment not intersected by AHL
    - IIB, too swollen, too obese to control fracture in cast?
      - Yes
        - Admit; splint with posterior "U" in position of comfort
        - CRPP within 12 hours with postop splint/sling (see Operative Technique for specifics)
        - Follow-up in clinic in 3 weeks post-operatively
      - No
        - If pain controlled and compartments are soft, then place in long arm posterior splint with "U" with elbow at 90-100 degrees of extension; sling; can be discharged with planned CRPP within 7 days
  - Type III
    - Anterior and posterior cortex fractured
    - Vascular intact, compartments soft?
      - Yes
        - Place in long arm posterior splint with "U" with elbow at 100-120 degrees of extension; sling; admit
        - CRPP within 12 hours with postop splint/sling (see Operative Technique for specifics)
        - Follow up in clinic in 3 weeks
      - No
        - Emergently to OR for reduction and pinning
        - Return of pulses after fracture reduction?
          - Yes- postop splint/sling (see Operative Technique for specifics)
            - Follow up in 3 weeks
        - No-return of pulses after reduction and pinning
            - Pink but pulseless vs pale
            - Pale hand: Open exploration of fracture site with vascular assistance
            - Splint and observe for compartment syndrome
            - Consider earlier follow up

- Flexion Type Supracondylar Humerus Fracture
  - Type I

- Non-displaced (may only see fat pad signs)
- Neurovascular intact, pain controlled, compartments soft?
  - Yes – place in long arm posterior splint with "U" with elbow at 100-110 degrees of extension; sling; follow up in clinic in 3 weeks
  - No – Same splint/sling; admit for observation

- Type II
  - Too swollen, too obese to control fracture in cast?
    - Yes
      - Admit; splint with posterior "U" in position of comfort
      - CRPP within 12 hours with postop splint/sling (see Operative Technique for specifics)
      - Follow up in clinic in 3 weeks
    - No
      - If pain controlled and compartments are soft, then place in long arm posterior splint with "U" with elbow at 100-110 degrees of extension; sling; can be discharged with planned CRPP within 7 days
- Type III
  - Anterior and posterior cortex fractured
  - Vascular intact, compartments soft?
    - Yes
      - Place in long arm posterior splint with "U" with elbow at 100-120 degrees of extension; sling; admit
      - CRPP within 12 hours with postop splint/sling (see Operative Technique for specifics)
      - Follow up in clinic in 3 weeks
    - No
      - Emergently to OR
      - Return of pulses after fracture reduction?
        - Yes
          - CRPP in OR with postop splint/sling (see Operative Technique for specifics)
          - Follow up in 3 weeks
        - No
          - Open exploration of fracture site
          - Consider Vascular Surgery consultation
          - Closed vs open pinning in OR with postop splint/sling (see Operative Technique for specifics)
          - Consider earlier follow up

Extension Type Fracture Patterns

Type I – completely non-displaced fracture (will only see fat pad signs)

Type II – anterior cortex disruption, posterior cortex intact and acting as a hinge

Type III – anterior and posterior cortex disruption; posterior displacement of articular fragment

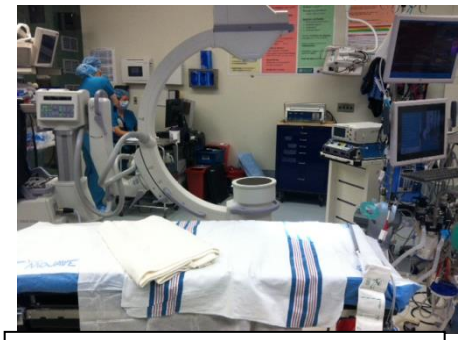
Flexion Type Fracture Patterns

Type I – completely non-displaced fracture (will only see fat pad signs; unable to distinguish from extension-type except by mechanism of injury)

Type II – posterior cortex disruption, anterior cortex intact and acting as a hinge

Type III – anterior and posterior cortex disruption; anterior displacement of articular fragment

Operative Technique for Supracondylar Humerus Fractures

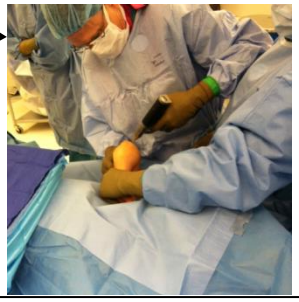


- Regular OR table
- Big C-arm flipped (i.e receiver down)

- Patient supine and moved to edge of OR table

- 1015 drape placed just proximal to shoulder
- 1 Chlorhexidine prep stick

- C-arm acts as hand table
- Down sheet, up sheet, four blue OR towels stapled together, upper extremity drape



- Surgeon uses small Synthes driver and smooth K-wires
- 1st assist controls forearm

- Wires bent, cut, felt placed against skin after stability confirmed wth live fluoro through ROM

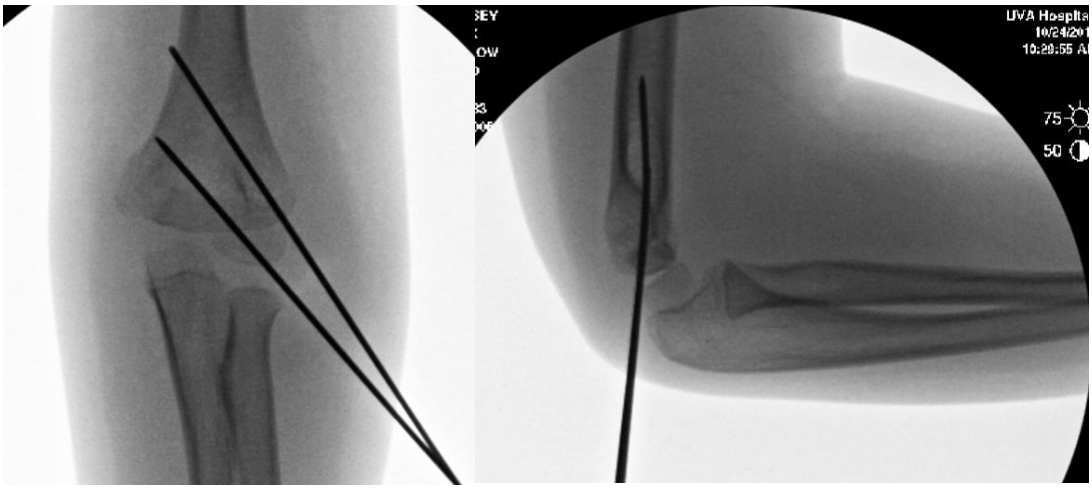
- Long arm splint (sizes for average-sized patient)
  - 2" stockinette
  - 2" or 3" soft cast padding (Webril)
  - 3" fiberglass posterior slab (5 thick)
  - 3" fiberglass sugar tong (5 thick)
  - 3" ACE wrap
  - Overwrapped with coban
- Adult small sling with safety pin over distal opening to keep sling in place

Operative Tips:

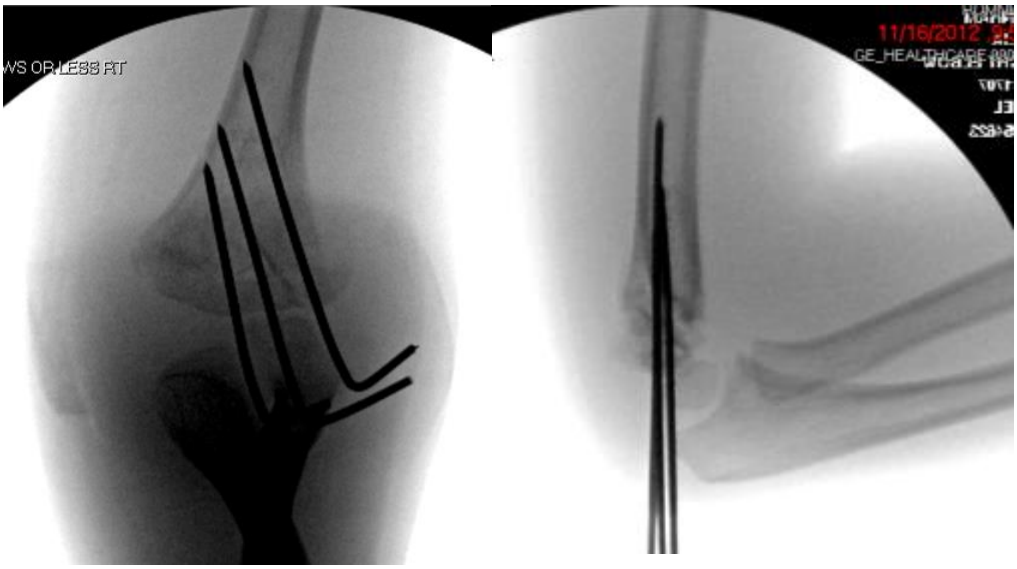
- Reduce in frontal plane, then traction with flexion (use extension if flexion-type fracture)
- Pin diameter should be approximately the same size as the humeral cortex thickness (generally, use 1.6mm or 0.062")
- Pinning – 2 lateral pins preferable; if unstable on fluoro, then add a third lateral pin or medial pin (open)
- Consider using radiolucent hand table if 1) possible vascular repair 2) open fracture 3) flexion type fracture

Pinning Techniques

2 lateral K-wires



3 Lateral K-wires



2 Lateral, 1 Medial K-wires (must assure ulnar nerve safe when placing medial pin)