

Traumatic Arm Injury After Motorcycle Crash

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Rad 4013

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Clinical History

- 21 yo female with no past medical history that presents by life flight after motorcycle collision with traumatic right upper extremity amputation
 - Stable vitals, GCS 15, no LOC, WBC 22.4, Lactic acid 5.4, tourniquet in place
 - CT chest/abd/pelvis/C-spine/brain, CTA neck, and extremity radiographs
 - Tourniquet removed and brachial artery ligated for hemostasis
 - Ortho surgery consulted

Elbow 3 views



AP

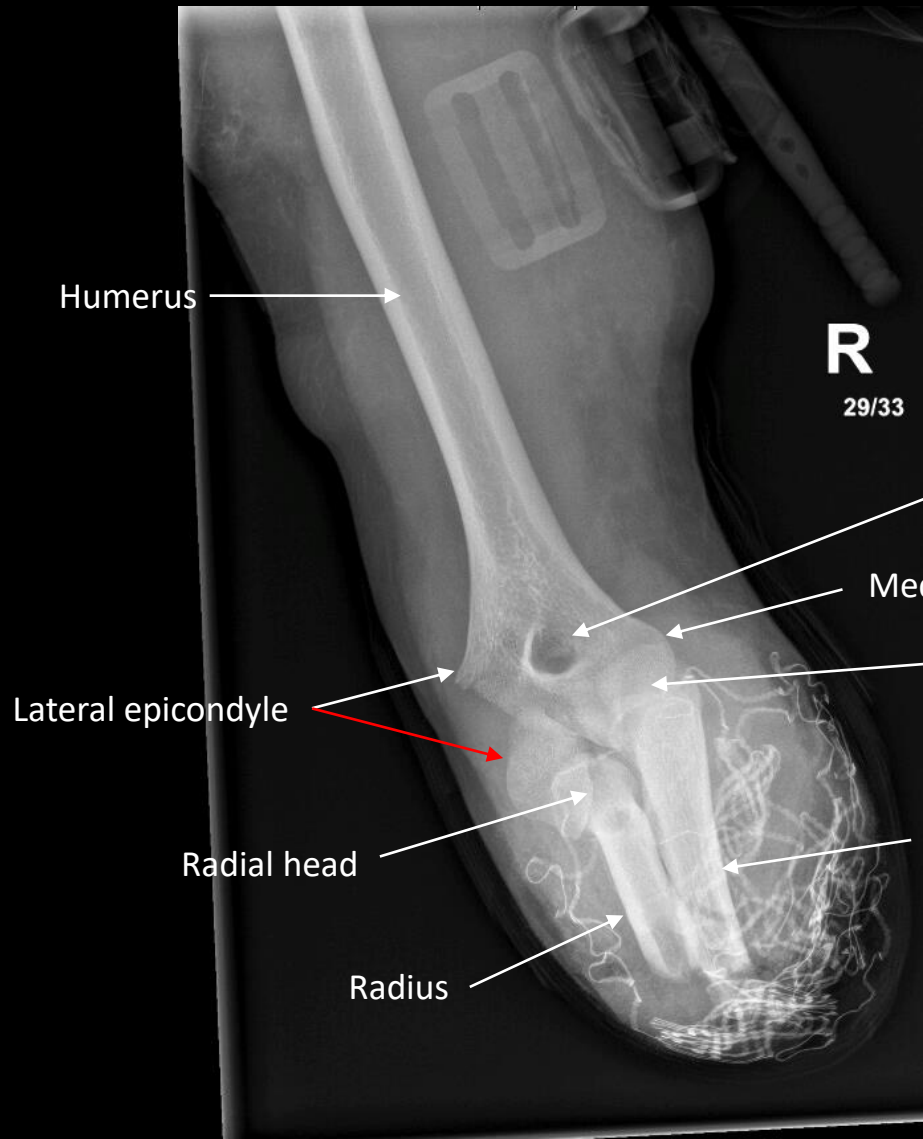


Oblique



Lateral

AP View

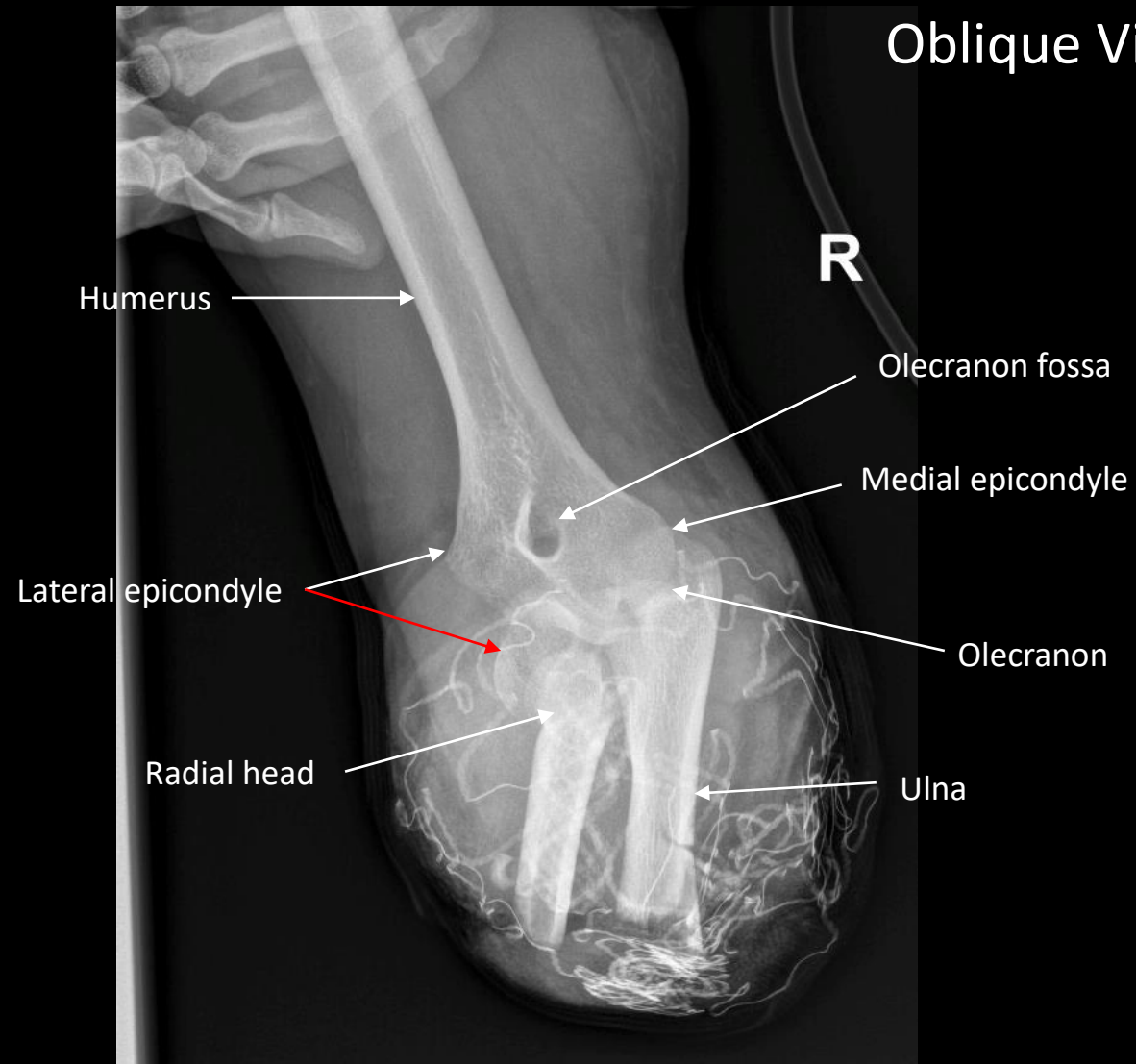


Patient



Normal

Oblique View

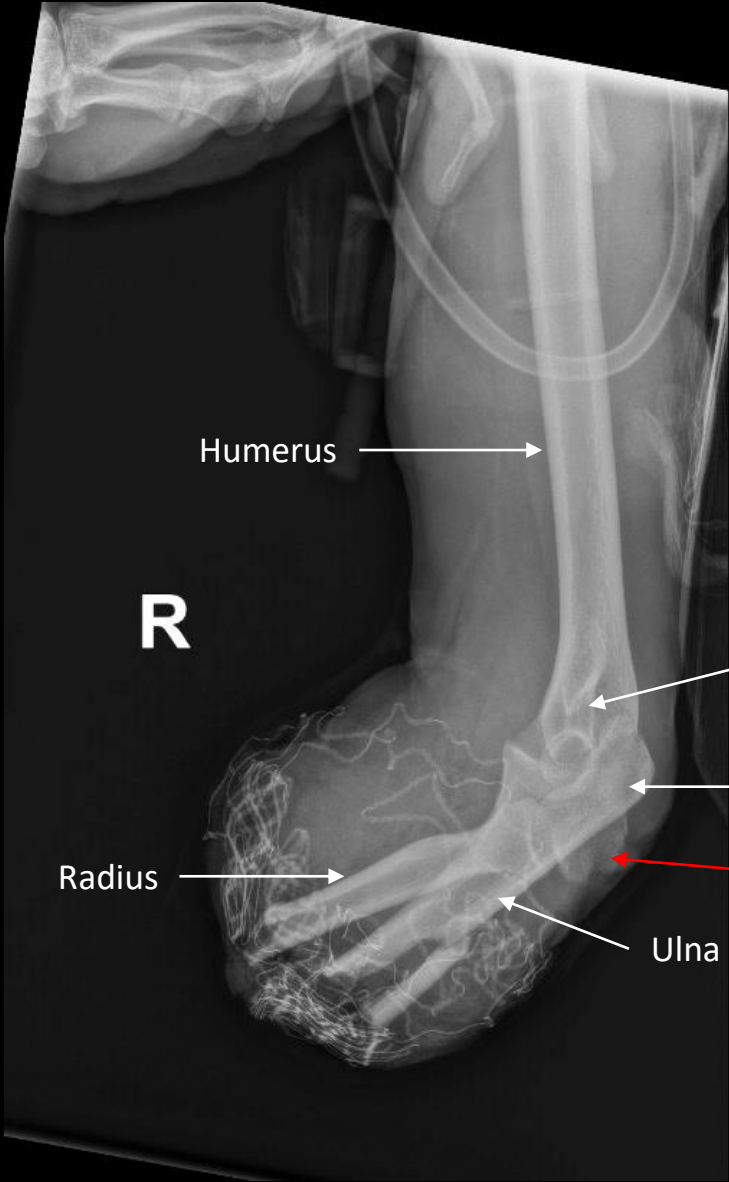


Patient



Normal

Lateral View



Humerus

R

Radius

Ulna

Olecranon fossa

Olecranon

Lateral epicondyle

Patient

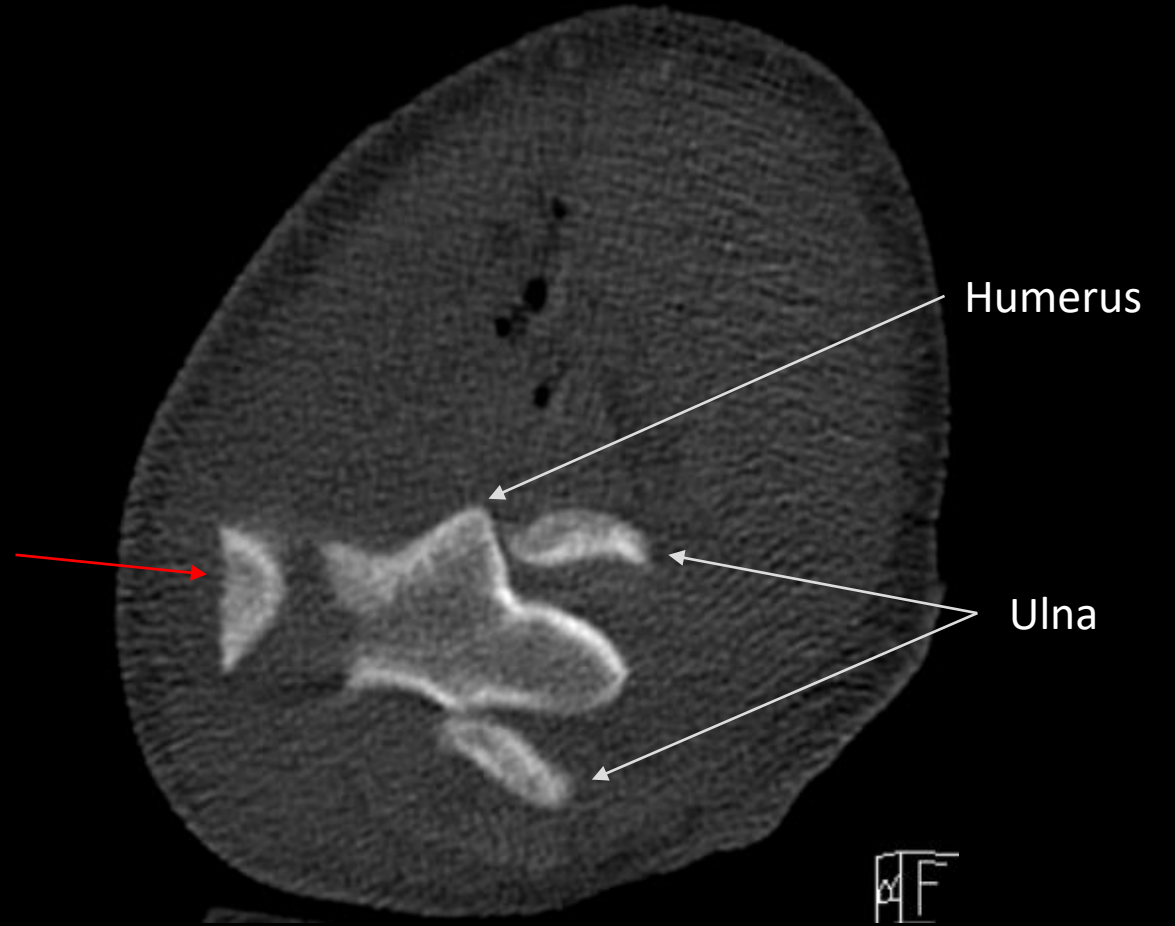


Normal

Non-Contrast CT



Coronal



Axial

3-D Reconstruction



Radiographic Findings

- Amputation of right forearm through proximal radial and ulnar shafts
- Displaced fracture of lateral epicondyle of distal humerus and subsequent dislocation of the radial head
- Lateral rotation of the displaced fragment
- Oblique fracture of proximal ulna
- Anterior dislocation of elbow

ACR appropriateness Criteria

Variant 4: Major blunt trauma. Hemodynamically stable. Suspected extremity trauma. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
Radiography extremity	Usually Appropriate	Varies
CT whole body with IV contrast	Usually Appropriate	⊕⊕⊕⊕
Radiography trauma series	Usually Appropriate	⊕⊕⊕
US FAST scan chest abdomen pelvis	Usually Appropriate	○
CT extremity without IV contrast	May Be Appropriate	Varies
CT whole body without IV contrast	May Be Appropriate (Disagreement)	⊕⊕⊕⊕
CTA extremity with IV contrast	May Be Appropriate (Disagreement)	Varies
CT extremity with IV contrast	Usually Not Appropriate	Varies
CT extremity without and with IV contrast	Usually Not Appropriate	Varies

The patient suffered blunt injury and was hemodynamically stable. The extremity radiographs were appropriate for initial imaging.

The CT extremity without contrast was ordered later for further evaluation of fracture by Ortho

<https://acsearch.acr.org/docs/3102405/Narrative/>

Cost of Imaging

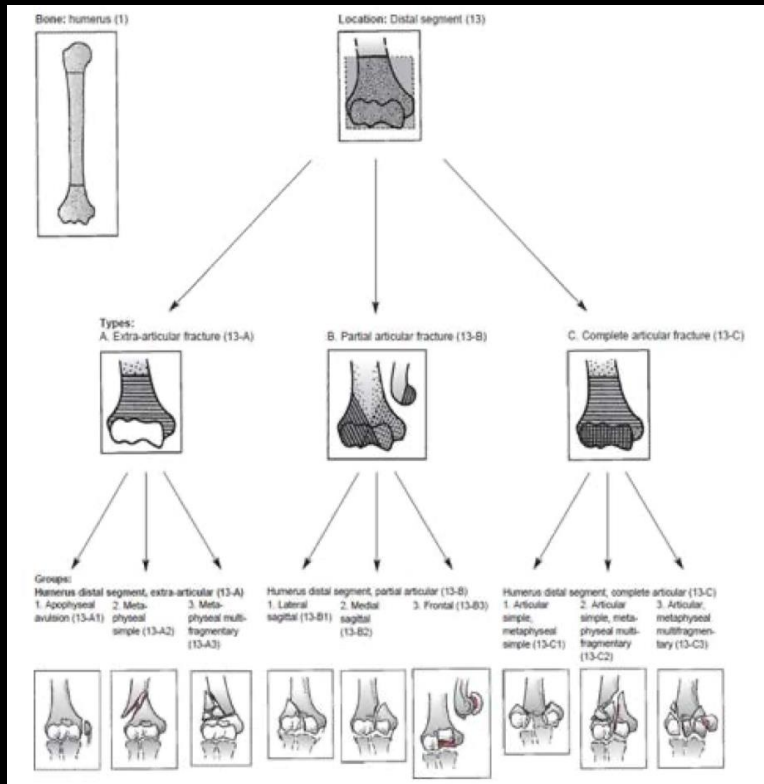
(Relevant to arm injury)

- Elbow 3 view = \$825
- Elbow 2 view = \$755
- CT upper extremity w/o contrast = \$3837

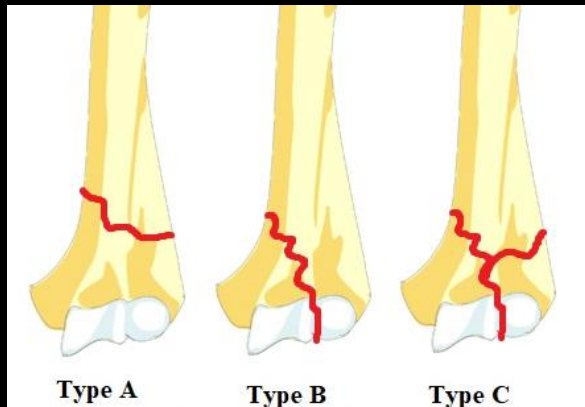
<https://www.memorialhermann.org/patients-caregivers/pricing-estimates-and-information/>

Final Diagnosis

- Complete amputation of right forearm with lateral epicondyle fracture of distal humerus



- Type B-1 fracture according to AO/OTA classification
- Partial articular fracture involving lateral condyle



Treatment Timeline

- 7/4 Guillotine right forearm amputation with WVAC placement
- 7/6 I&D and WVAC exchange
- 7/8 Open reduction and internal fixation of distal humerus

Post-Op



Discussion

- Distal humerus fractures can be managed with either surgical or non surgical approaches
- Displaced or open fractures may result in complications such as malunion, avascular necrosis, or infections and are indications for surgical management.
- The procedure performed is called open reduction and internal fixation (ORIF), where the bone fragments will be repositioned into their normal alignment and held together with plates and screws.
- Patients can start exercises to improve motion in the few days after surgery. The outcomes are generally good and patients are expected to regain full motion in about 6-12 months.

Take Home Points / Teaching points

- Plain film is appropriate to identify suspected fracture following trauma
- CT without contrast can be used to better evaluate fracture for pre-operative planning
- ORIF is the treatment of choice for displaced fractures

References

- <https://orthoinfo.aaos.org/en/diseases--conditions/distal-humerus-fractures-of-the-elbow/>
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5313024/>
- Radiopaedia.org



Questions?