Radial Nerve Palsy Following Fractures of the Humerus

Mike Starecki, MD
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No Disclosures

Humeral Shaft and Radial Nerve

- 237,000 humeral shaft fractures in the US per year
- Radial nerve injuries occur in approximately 10% of all humeral shaft fractures
- Primary Nerve Injury: occurs at time of fracture
- Secondary Nerve Injury: occurs after treatment of fracture- open or closed.

* Niver & Ilyas, Orthop Clin N AM 2013
Humeral Shaft and Radial Nerve

- Shao et al, JBJS Br 2005
- Review 4,000 humeral shaft fractures
- Incidence of radial nerve palsy: 11%
- Fractures in proximal third: 1.8%
- Fractures in distal third: 23.6%

Absolute Indications to explore the radial nerve in the setting of a humeral shaft fracture
- Open Fracture
- Associated Vascular Injury
- High-velocity gunshot wounds
- Penetrating injury
- Severe soft tissue damage
- Any humerus fracture that requires surgery with a pre-operative radial nerve palsy
  - Carrol et al, JAAOS 2012

Primary Radial Nerve Palsy

- Closed humeral shaft fracture with primary radial nerve palsy
  - Study included 361 Holstein-Lewis fractures
  - There were equal outcomes for fracture healing and radial n. recovery in both operative and non-operative groups
  - Ekholm et al, JOT 2008

- This includes “Holstein-Lewis Fractures”
Secondary Radial Nerve Palsy

- Closed humeral shaft fracture with SECONDARY radial nerve palsy after closed reduction
- No consensus on operative versus non-operative treatment

In a review of 714 cases of primary and 130 secondary palsies all observed initially, there was no difference noted in recovery rates after closed management

Hak D, Orthopedics 32:111 (2009)

BOTTOMLINE - for cases with secondary nerve palsy after closed reduction

- No evidence that fracture fixation with nerve exploration improves final outcomes
- Both operative and non-op strategies are acceptable
Open Treatment Radial Nerve Palsy

* When electing for surgical management- must explore nerve and repair as needed
* This is necessary to ensure nerve is intact as well as to document nerve was not injured at time of surgery.

Posterior Approach

LARGE INCISION
VISUALIZE NERVE!
Management- Closed treatment

- When electing for non-operative treatment- both primary and secondary radial nerve palsies are treated the same
- First Office Visit-
  - Refer to OT for forearm based extension splint
  - 25° wrist extension, 30° MCP joint flexion, IP joints of fingers left free, thumb held in abduction and extension
  - BEGIN Immediate ROM of fingers and wrist
  - Prevent STIFFNESS

Management- Closed treatment

- Re-evaluate at minimum of every 4 weeks.
- Exam should include checking for a Tinel’s sign
- Progressing Tinel’s strong predictor for recovery
  - Elton & Rizzo J Reconst Micorsurgery 2008

Timing for EMG

- Baseline EMG- no sooner than 6 weeks from injury
- Repeat EMG at 12 weeks
- If findings at repeat study are the same as baseline- surgical exploration of nerve indicated
- For repeat studies that show nerve regeneration- continue expectant management
Late Radial Nerve Palsy

- In cases with no nerve recovery at 6 months or longer from the initial injury
- Recommend tendon transfer for wrist and finger extension
- Nerve repair not indicated, motor end plates will not recover

Summary and Treatment Recommendations

- Radial nerve palsy is a common problem associated with humeral shaft fractures
- Absolute indications for initial nerve exploration include high energy trauma with open fractures, vascular injuries and extensive soft tissue injury
- Initial non-operative treatment is indicated for all closed humeral shaft fractures with radial nerve palsy
- This includes "Holstein-Lewis" type fractures as well as radial nerve palsies after initial closed reduction

Summary and Treatment Recommendations

- When treating these injuries non-operatively it is important for early referral to OT for extension splinting and to obtain adequate ROM of hand and wrist
- Obtain baseline EMG at 6 weeks with repeat for comparison at 12 weeks
- If no evidence of nerve recovery at 6 months or greater, recommend tendon transfers.
Thank you