Humeral Shaft Fractures in Overhead Throwing Athletes

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Introduction

Goals/Objectives

Review the biomechanics leading to fracture, discuss current management principles, address common controversies, and examine the author’s treatment of these rare cases.

Methods

The patients in this study are residents of North Philadelphia who sought care at the Temple Emergency Department (from 2011 to 2019). The diagnoses were confirmed by a musculoskeletal radiologist. All patients were seen, evaluated, and consented for surgery by the attending physician. Data including pre and postoperative conditioning and a lesser degree of cortical adaptation, compared to those with an increase in bone mass when throwing is performed regularly. This could better explain fractures that occur with minimal throwing force.

Case 1: 27-year-old right hand dominant male graphic designer presents with right arm pain after he fell a pop while throwing a baseball. He denied any prodromal pain. Postoperative radiographs revealed a distal third spiral humeral shaft fracture. He was neurovascually intact on exam with no evidence of radial nerve palsy. Both nonoperative and operative management was discussed with the patient.

Case 2: 26-year-old right hand dominant male who presented to clinic with right arm pain after throwing a baseball and hearing a loud pop. He denied any prodromal arm pain but did start playing baseball a couple of months ago after a long hiatus. Radiographs demonstrated a spiral humeral shaft fracture. Patient was neurovascually intact on exam.

Case 3: 26-year-old right hand dominant male barbers presents to the emergency department with right arm pain after throwing a softball. He was found to have right humeral shaft fracture with a butterfly fragment. He had no neurosurgical deficits and was placed in a coaptation splint.

Results

Case 1: This patient ultimately underwent open reduction and internal fixation using plate and screws through a posterior triceps sparing approach 8 days after injury. Postoperative course was uneventful at 6 weeks and was not seen again until 16 months after surgery for medial arm pain after working out. He was thought to have triceps tendinosis which was treated with anti-inflammatory medication and activity modification.

Case 2: Patient underwent open reduction and internal fixation 3 days after injury. He did well post operatively and had follow up of 3 months. At that time, the fracture was completely healed with no hardware complications on radiographs. Patient developed shoulder stiffness with overhead activities which was treated with steroid injection into proximal biceps tendon.

Case 3: Patient then underwent open reduction and internal fixation of humeral shaft fracture with plate and screws through a triceps split approach 10 days after injury. Patient was observed overnight right in the hospital. He was discharged postoperative day one in stable condition. He was seen in clinic 3 weeks postoperatively and was subsequently lost to follow up. At that visit, the incision was well approximated and he was neurovascually intact.

Discussion

Overhead throwing is an uncommon mechanism for humerus fractures. In the cases presented above, all were recreational athletes in their mid-20s who presented to the ED with shoulder pain consistent with thrower’s fracture. None of the patients had prodromal symptoms. All were neurovascually intact upon presentation and underwent open reduction and internal fixation within 2 weeks of injury.

As stated previously, a concerning complication associated with humeral shaft fractures is neurovascular injury. The surgical repair of these fractures can occur with minimal throwing force. Overhead throwing is an uncommon mechanism for humerus fractures. In the cases presented above, all were recreational athletes in their mid-20s who presented to the ED with shoulder pain consistent with thrower’s fracture. None of the patients had prodromal symptoms. All were neurovascually intact upon presentation and underwent open reduction and internal fixation within 2 weeks of injury.

The traditional treatment option for humeral shaft fractures is functional bracing. Sarmento et al demonstrated that bracing achieve good functional outcomes, similar to those treated surgically, with surgical approaches approaching 96 percent without significant cosmetic deformity. Recent data has questioned this claim, and over the last decade, surgical management with open reduction and internal fixation has increased 13.1 percent. Surgical management is indicated in open fractures, vascular injury, or unacceptable angulation. The presence of radial nerve palsy is not an indication for open reduction and internal fixation. Many radial nerve injuries recover with time; however, several current studies have shown that surgical exploration after injury occurs a higher likelihood of regaining radial nerve function as compared to patients undergoing nonsurgical treatment.

Despite recent trends towards surgical fixation for humerus fractures in young and active males, operative intervention does not come without risks such as secondary radial nerve palsy. The incidence of iatrogenic nerve palsy has been reported between 6% and 32%. Higher rates are seen during the use of external fixators and the lateral approach during fracture fixation. All of the cases presented underwent open reduction and internal fixation. Many radial nerve injuries recover with time; however, several current studies have shown that surgical exploration after injury occurs a higher likelihood of regaining radial nerve function as compared to patients undergoing nonsurgical treatment.

Conclusions

Humeral shaft fractures as a result of overhead throwing can be considered rare stress fractures which are often preceded by prodromal pain. Radial nerve palsy is a potential complication of humeral shaft fractures, although it is not an indication for surgical exploration as has been demonstrated in many other studies. Surgeons and those treating these fractures must be aware of the potential complications of thrower’s fractures unless there are underlying medical conditions precipitating the patient from surgery.

References


