completed ulnar shaft stress fracture in a fast-pitch softball pitcher

Roger E. Wiltfong, MD; Katherine H. Carruthers, MD, MS; James E. Popp, MD

Abstract

Stress fractures of the upper extremity have been previously described in the literature, yet reports of isolated injury to the ulna diaphysis or olecranon are rare. The authors describe a case involving an 18-year-old fast-pitch softball pitcher. She presented with a long history of elbow and forearm pain, which was exacerbated during a long weekend of pitching. Her initial physician diagnosed her as having forearm tendinitis. She was treated with nonsurgical means including rest, anti-inflammatory medications, therapy, and kinesiology taping. She resumed pitching when allowed and subsequently had an acute event immediately ceasing pitching. She presented to an urgent care clinic that evening and was diagnosed as having a complete ulnar shaft fracture subsequently needing surgical management. This case illustrates the need for a high degree of suspicion for ulnar stress fractures in fast-pitch softball pitchers with an insidious onset of unilateral forearm pain. Through early identification and intervention, physicians may be able to reduce the risk of injury progression and possibly eliminate the need for surgical management. [Orthopedics. 2017; 40(2):e360-e362.]

Stress fractures are relatively common injuries in athletes; however, the lower extremities are far more frequently involved than the upper extremities. A study by Iwamoto and Take-da reported that a single sports medicine clinic identified 196 stress fractures in 10,726 patients during a period of 10 years. Of the fractures identified, almost half occurred in the tibial shaft. Stress fractures of the upper extremities have been previously described in the literature, yet reports of isolated injury to the ulna diaphysis or olecranon are rare and most frequently involve baseball players. To the authors’ knowledge, there has been only 1 case of an ulnar shaft stress fracture in a fast-pitch softball pitcher published in the United States. In that case, the patient’s condition was diagnosed early and successfully treated with nonoperative management. In contrast, the current authors describe a case involving a fast-pitch softball pitcher who presented with an ulnar shaft stress fracture that, because of the rarity of this type of injury, was misdiagnosed in the acute setting. Thus, further sport participation was allowed and ultimately led to completion of the fracture and the need for operative intervention.

Case Report

An 18-year-old, left-hand–dominant female fast-pitch softball pitcher was referred to the authors’ institution after being diagnosed with an ulnar fracture. She was otherwise healthy but reported a long history of left elbow and forearm pain. Four weeks prior to presentation, the patient had thrown 120 pitches during a weekend tournament, which exacerbated her chronic pain. Afterward, she visited her primary physician, who diagnosed her condition as elbow tendinitis. Radiographic results were reportedly negative. Treatment in-
cluded ice, anti-inflammatory drugs, kinesiology taping, and therapy. One day prior to her referral to the authors’ institution, she developed severe worsening of her pain after a hard throw, which led to an inability to continue the game. This was associated with nonspecific paresthesias in her hand and fingertips. She presented to an urgent care clinic that night and an ulnar shaft stress fracture was diagnosed on radiograph (Figure). She was referred to the senior author (J.E.P.) for definitive treatment.

On examination, the skin and soft tissue envelope were intact. There was tenderness and ecchymosis over the area of her known ulnar fracture. She had good active flexion and extension at her fingers, wrist, and elbow. She had intact motor and sensory innervation to her hand as well as intact distal pulses. Treatment options were discussed with the patient and her family, and a decision was made to proceed with open reduction and internal fixation of the ulnar shaft.

Surgery proceeded through a subcutaneous approach to the ulna after an axillary block and preoperative antibiotics. The fracture was reduced anatomically and lagged with a 3.5-mm lag screw followed by a 6-hole 3.5-mm neutralization plate. There were no complications, and the patient was discharged home the same day. Postoperatively, she was started on an early rehabilitation program to work on passive range of motion. After 4 weeks, she began active range of motion and strengthening exercises. At 2.5 months postoperatively, she had returned to softball. Final range of motion at the elbow was 5° to 155° with 75° of forearm rotation in each direction. This matched the contralateral side. She was symptom free and had grossly equal strength.

**DISCUSSION**

Ulnar shaft stress fractures are rare injuries, although there are reports in the literature. To the authors’ knowledge, 4 cases of ulnar shaft stress fractures occurring in fast-pitch softball pitchers have been described. Only 1 case was in the United States and involved a 17-year-old girl who improved with conservative treatment measures. The other 3 cases were described in a single article from Japan; however, treatment of these individuals was not discussed. To the current authors’ knowledge, their case report is the first to describe a fast-pitch softball pitcher who sustained an ulnar shaft stress fracture that was treated as tendonitis and eventually completed because of continued softball participation.

A variety of mechanisms of injury have been described for ulnar shaft stress fractures depending on the sport involved. An article by Tanabe et al described what is believed to be the mechanism of injury in fast-pitch softball pitchers. Using high-speed cinematography, they analyzed the throwing mechanics of 6 healthy competitive fast-pitch softball pitchers. It was found that during windmill delivery, the forearm becomes strongly pronated. The revolving force of the radius on a relatively fixed ulna may exert powerful torsional and shear stresses on the ulna. Tanabe et al also used computed tomography scans to study the cross-sectional anatomy of the ulna and determined that the middle third has a relatively small cross section and thin cortices. Therefore, they believed that when repetitive torsional forces and shear stresses are applied to the ulna, it is reasonable to conclude that stress fractures would be most frequent in the middle third of the bone, as seen in the current case.

**CONCLUSION**

Stress fractures are diagnosed through a combination of clinical history, physical examination, and diagnostic imaging. This may include radiographs, bone scans, ultrasonography, and magnetic resonance imaging. Radiographic results may initially be negative but are more likely to become positive with time.

Magnetic resonance imaging and bone scans are highly sensitive in the detection of stress fractures, although magnetic resonance imaging is more specific. Diagnostic modalities should be tailored to the level of suspicion and urgency of diagnosis. Treatment generally includes analgesics and reducing activity to the level of pain-free functioning. The current patient completely fractured her ulna when returning to softball with a symptomatic ulnar shaft stress fracture. This reaffirms that both sports medicine physicians and orthopedic surgeons should have a high level of suspicion for ulnar stress fractures in ball-throwing athletes with slow-onset unilateral forearm pain.

**REFERENCES**


