

POINT-OF-CARE ULTRASOUND FACILITATES DIAGNOSING A POSTERIOR SHOULDER DISLOCATION

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Abstract—Background: Posterior shoulder dislocation is an uncommon disruption of the glenohumeral joint. Risk factors include seizure, electric shock, and underlying instabilities of the shoulder joint. Case Report: A 27-year-old man with a history of recurrent posterior shoulder dislocation presented to the Emergency Department with sudden shoulder pain and reduced range of motion about the shoulder after abducting and internally rotating his arm. Radiographs did not show fracture or dislocation. The treating physician suspected an occult posterior shoulder dislocation, but wanted to avoid performing a computed tomography scan of the shoulder, as the patient had undergone numerous scans during the evaluation of similar complaints. Instead, a point-of-care ultrasound was performed, demonstrating posterior displacement of the humeral head relative to the glenoid rim, confirming the presence of a posterior shoulder dislocation. The patient received procedural sedation, and the shoulder was reduced with real-time ultrasound visualization. The patient tolerated the procedure well, and had decreased pain and improved range of motion. He was discharged with a sling, swathe, and orthopedic follow-up. Conclusion: Point-of-care ultrasound of the shoulder may be used to demonstrate posterior shoulder dislocation. This may have particular utility in the setting of non-diagnostic radiographs. © 2013 Published by Elsevier Inc.

Keywords—shoulder dislocation; ultrasound; Emergency Department; posterior

INTRODUCTION

Musculoskeletal complaints are a common reason for patients to seek evaluation in the Emergency Department (ED). The shoulder is the most commonly dislocated large joint in the body. Dislocations are most common in young men who have sustained trauma, and the majority of these involve anterior displacement of the humerus relative to the glenoid fossa (1). The diagnosis is typically confirmed with radiographs.

We report a case of a patient with shoulder pain and clinical suspicion for dislocation despite non-diagnostic radiographs, in which point-of-care ultrasound was used to confirm posterior shoulder dislocation. This diagnostic approach avoided the need for a computed tomography (CT) scan, and facilitated prompt reduction of the joint.

CASE REPORT

A 27-year-old man presented to the ED with left shoulder pain. He reported sudden onset of pain and loss of range of motion about the left shoulder after rolling over in bed and reaching for an alarm clock. He stated he thought his shoulder was dislocated. His medical history was significant only for multiple prior shoulder dislocations. On arrival to the ED, his blood pressure was 118/86 mm Hg, pulse 91 beats/min, respirations 18 breaths/min, temperature 36.4°C, and pulse oximetry 97% on ambient air. Physical examination of the left upper extremity was limited by pain, but notable for decreased range of motion.
about the left shoulder, with associated shoulder tenderness. No deformity was noted. Neurovascular function distal to the injury was intact. The rest of the examination was unremarkable.

The patient was given hydromorphone and diazepam for pain control. X-ray studies of the shoulder were obtained (Figure 1), and were interpreted by the treating emergency physician and attending radiologist as negative for the presence of fracture or dislocation. Review of the patient’s chart revealed similar presentations with pain and clinical concern for shoulder dislocation. Multiple CT examinations had been performed on prior ED visits to evaluate for shoulder dislocation in the setting of non-diagnostic radiographs. Closer review of these studies showed that some confirmed shoulder dislocations, whereas others demonstrated a normally located shoulder.

Given the patient’s clinical examination, history of shoulder dislocations, and his insistence that the shoulder was not located, the treating physician suspected an occult shoulder dislocation, but wanted to avoid performing another CT scan. The patient was placed in a semi-supine position. Point-of-care ultrasound was performed with a 5–10-MHz linear transducer (SonoSite, Bothell, WA). With the posterior aspect of the deltoid groove as a lateral landmark, the probe was placed in a transverse orientation, and moved caudal and cephalad until the bony landmarks of the glenoid fossa and humeral head were appreciated. Figure 2 shows an image obtained using this technique. The humeral head was displaced posteriorly relative to the glenoid rim, confirming the suspected finding that standard radiographs were unable to demonstrate.

The patient received procedural sedation with intravenous ketamine and fentanyl to facilitate shoulder reduction. Real-time ultrasound images were obtained using the same probe positioning and landmarks. Figure 3 and the video clip show the successful correction of the posterior dislocation, with appropriate alignment of the humeral head relative to the glenoid rim. Post-reduction X-ray studies were obtained, showing a normally located left shoulder. The patient tolerated the reduction

Figure 1. Pre-reduction anteroposterior radiograph of the shoulder.

Figure 2. Pre-reduction ultrasound of the shoulder, demonstrating posterior dislocation.

Figure 3. Post-reduction ultrasound of the shoulder, illustrating corrected alignment of the humerus and glenoid rim.
procedure well, and reported decreased pain and improved range of motion. He was discharged home with a sling and swathe, with instructions to follow-up with an orthopedic surgeon.

**DISCUSSION**

Posterior shoulder dislocation is an uncommon disruption of the glenohumeral joint, representing approximately 3% of all shoulder dislocations (2–4). Known risk factors for posterior shoulder dislocations include seizure, electric shock, follow-through from throwing an object, and underlying lesions of the shoulder, such as reverse Bankart and reverse Hill-Sachs defects. Standard radiographs may fail to show posterior dislocations in up to 50% of cases (2,3). CT permits definitive visualization of the shoulder anatomy when X-ray studies are non-diagnostic or indeterminable, but with attendant cost and radiation exposure (3).

Point-of-care ultrasound has known utility in the management of shoulder dislocations. It has been used to confirm successful joint reduction, and to facilitate analgesia with intra-articular injection of local anesthetic or by regional nerve block (5–7). This case extends these observations, demonstrating that point-of-care ultrasound performed by an emergency physician can be used as an alternative diagnostic modality for posterior shoulder dislocation. To our knowledge, this is the first ED-based description of this management strategy. Importantly, using this approach obviated the need for a CT scan in this patient. Given increasing concern about the cost and radiation exposure associated with CT, ED providers may increasingly be expected to implement management plans that minimize their use (8,9). This case illustrates a representative scenario in which point-of-care ultrasound was used successfully as an alternative to CT in the setting of a non-diagnostic first-line test. Further study of the test characteristics of point-of-care shoulder ultrasound would be necessary to validate this approach to management.

**Limitations**

This report has several limitations. The patient’s initial evaluation was limited by the lack of an axillary or Y-view radiograph. This was not obtained due to patient discomfort, but might have demonstrated the posterior shoulder dislocation. In addition, ultrasound images of the dislocated shoulder were obtained using a linear probe and posterior view with the patient in a semi-supine position. This approach may be technically difficult in patients who are sedated, or who have a larger body habitus or significant muscle mass. In these individuals, using a curved probe, or employing an anterior view to obtain images of the shoulder may be preferable.

**CONCLUSION**

This case demonstrates a novel application for point-of-care ultrasound in the ED evaluation of shoulder pain and suspected occult dislocation. Emergency physician-performed ultrasound established a diagnosis of posterior shoulder dislocation that conventional radiographs were unable to demonstrate, was used to achieve definitive care for the patient, and avoided the cost and radiation associated with a confirmatory CT scan.

**REFERENCES**


**SUPPLEMENTARY DATA**

Supplementary data associated with this article can be found, in the online version, at http://dx.doi.org/10.1016/j.jemermed.2012.11.080.