SOUNDING BOARD: Ultrasound-Guided Elbow Arthrocentesis

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Introduction

Emergency physicians must consider septic arthritis when evaluating patients presenting with a painful and swollen elbow. The clinical exam, even in combination with serum laboratory markers, is not adequately sensitive to rule out a septic joint making arthrocentesis with synovial fluid analysis mandatory once the presence of a new effusion has been verified.1

Overlying tissue edema and obesity often limit the ability of clinicians to assess accurately the presence of an effusion and palpate classic landmarks needed for “blind” joint aspiration.2

Sonography has proven to be superior to both the physical exam and plain film radiography in detecting the presence of joint effusions, while also confirming alternative diagnoses such as cellulitis, abscesses, and soft tissue hematomas.3,4

The absence of effusion in the capsule surrounding the elbow joint on ultrasound (in conjunction with the clinical exam) may prevent an unnecessary invasive joint aspiration.4

Along with delineating anatomical landmarks and detecting the presence of joint effusion, point-of-care ultrasound can be used to guide needle aspiration during arthrocentesis.

Ultrasound guidance has been shown to improve success rates compared to classic landmark techniques, and having a simple protocol can be invaluable for the clinician performing elbow arthrocentesis.5

Procedure

Elbow Effusion Identification by Bedside Ultrasound

We recommend using the linear transducer (10-5MHz) for both the identification of the effusion and needle guidance for the arthrocentesis (Pic 1A). The elbow can be assessed for the presence of effusion from both the lateral and posterior approaches, with the lateral approach preferred for arthrocentesis.4

We always recommend first examining the non-affected elbow with ultrasound for clinical comparison of the joint capsule. For the lateral approach to the elbow joint capsule, the goal is to find the soft triangular junction between the lateral epicondyle of the humerus, the radial head, and the olecranon.

The patient should be placed in a sitting upright position with the affected arm abducted, resting to the patient’s side, pronated, and flexed to 90 degrees (Pic 2). Place the transducer along the proximal forearm in a longitudinal fashion, parallel to the shaft of the radius, and with the probe marker towards the patient’s head.

Slide the probe proximally until the rounded radial head and the lateral epicondyle are visualized (Pic 3). The capitellum is the articular surface of the distal humerus and articulates with the radial head. Superficial to the radio-capitellar joint space is the common extensor tendon, which can be easily identified and avoided with ultrasound. An effusion of the joint capsule will appear as a hypoechogenic fluid collection that displaces the fat pad superficially (Pic 4).

Ultrasonographic Key Findings

1. The absence of an effusion in the capsule of the elbow joint on ultrasound (in conjunction with the clinical exam) may prevent an unnecessary invasive joint aspiration.

2. The presence of effusion in the capsule surrounding the elbow joint on ultrasound (in conjunction with the clinical exam) allows for easier visualization of the joint space.

3. The probe can be placed over the center of the elbow with the probe marker towards the patient, and the screen can be lined up to ensure that the screen is directly opposed to the ultrasonic machine opposite the provider.

4. The screen can be used to identify the joint capsule, ensuring proper needle placement.

5. The ultrasound probe is contralateral to the elbow, allowing for direct visualization of both the ultrasound image as well as the location of the joint capsule aspiration.

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Arthrocentesis is a sterile procedure, and the patient should be draped and prepped in the standard manner. Place the ultrasound probe in a sterile sheath and position the ultrasound machine opposite the provider so that the screen is in direct line of sight (Pic 5A).

We recommend placing towels or sheets under the elbow to elevate the joint and make the procedure easier to perform. Locate the lateral radio-capitellar joint space and ensure the

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center of the probe is located at the middle of the effusion. The clinician performing the arthrocentesis should be aware of the depth of the joint capsule effusion during the procedure, as well as actively aspirating the syringe as the needle advances. Ultrasound-guided medial and posterior approaches to the elbow joint capsule are alternative techniques, and will not be addressed in this tutorial.

**Summary**

Point-of-care ultrasound can be an ideal tool for assessment for the presence of elbow joint capsule effusion as well as needle guidance for arthrocentesis. A simplified scanning protocol that relies on classic bony landmarks, while looking for underlying anechoic joint capsule effusion can be an ideal tool in the evaluation of the patient with a swollen elbow. A real-time out-of-plane technique for elbow arthrocentesis can be easily incorporated to improve procedural success.

**References**


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