Ultrasound-Guided Interventional Procedures of the Wrist and Hand

Anatomy, Indications, and Techniques

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KEYWORDS

• Ultrasound • Wrist • Hand • Tendinopathy • Arthritis • Ganglion • Finger
• Trigger finger

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INTRODUCTION

Tendon-related and joint-related disorders of the wrist and hand region are common clinical conditions that may result in significant functional limitations. When clinically indicated, precisely placed injections can facilitate the diagnosis and management of patients presenting with wrist and hand pain or dysfunction. During the past decade, Ultrasound (US) has emerged as an optimal modality for diagnostic and therapeutic injections about the wrist and hand region because of the superficial location of most wrist and hand targets. More recently, US-guided (USG) interventions have been used for the definitive surgical treatment of selected wrist and hand disorders. This article provides an overview of some of the common indications and techniques for USG procedures of tendon-related and joint-related disorders of the wrist and hand, including:

- Radiocarpal (RC) joint arthritis
- Scaphotrapeziotrapezoidal (STT) joint arthritis

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- Trapeziometacarpal (TM) (first carpometacarpal [CMC]) joint arthritis
- Metacarpophalangeal (MCP) joint, proximal interphalangeal (PIP) joint, and distal interphalangeal (DIP) joint arthritis
- First dorsal compartment (DC) tenosynovitis (de Quervain syndrome)
- Ganglion cysts
- Stenosing tenosynovitis (trigger finger)

KEY POINTS FOR WRIST AND HAND ULTRASOUND-GUIDED PROCEDURES

- The authors recommend the use of sterile technique with sterile probe covers and sterile gel, but multiple methods have been described to prevent infection during USG interventions.[1]
- For the superficial structures in the wrist and hand, the authors recommend a high-frequency (>10 MHz) linear-array transducer. A small-footprint (hockey stick) transducer may be advantageous, but is not required.
- Although most procedures can be performed sitting or supine, the authors prefer supine positioning for patient comfort and ergonomics, as well as to reduce the risk of vasovagal episodes. Use of an arm board can further optimize positioning during USG procedures.
- Needle selection depends on procedure-specific and patient-specific factors, as well as operator preference. In general, using the smallest-gauge needle to accomplish the procedure minimizes patient discomfort.
- The type and amount of injectate are based on clinical indication, patient-specific factors, and clinician preference. Particulate corticosteroids are hyperechoic with US visualization, and thus may obscure the target when injected. Furthermore, larger particulate steroids may clog smaller-gauge needles.

RADIOCARPAL JOINT

The RC joint is a synovial joint consisting of the articulation between the distal radius and the proximal carpal bones, and is supported by several ligaments and muscle-tendon units, as well as the triangular fibrocartilage complex.[2] A variety of injuries may occur in the wrist, including dislocations, chronic instability, inflammatory arthritis, and osteoarthritis.[3–5] For example, prior scaphoid fractures or scapholunate or lunotriquetral ligament injuries have been shown to predispose to STT joint arthritis.[5,6]

The RC joint is best visualized using a high-frequency linear-array transducer placed dorsally over the distal radius in the anatomic sagittal plane with the wrist pronated and in slight flexion (**Fig. 1**). Common pathologic findings on US include joint effusions, thickening of the synovium/synovitis, articular space narrowing, cortical irregularities, and osteophyte formation.[7]

In patients who fail conservative management for the conditions discussed earlier, diagnostic and/or therapeutic injection of the RC joint may be considered. Furthermore, aspiration of effusion may be indicated as part of the diagnostic work-up for crystalline and inflammatory arthropathies.[3] The reported accuracy rates of palpation-guided (PG) and USG injections into the wrist joint in the clinical setting range from 25% to 97% and 79% to 94% respectively.[8–11]

TECHNIQUE FOR ULTRASOUND-GUIDED RADIOCARPAL JOINT INJECTION

For injection of the RC joint, the patient is placed supine with the hand fully pronated and the wrist in slight flexion with the use of a towel (see **Fig. 1**A). Placing the wrist in