

Ultrasonographic Diagnosis and Treatment of de Quervain's Tenosynovitis/Retinaculitis

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ABSTRACT

Musculoskeletal ultrasound (MSUS) has emerged as an optimal modality for diagnostic and therapeutic injections to the wrist region. de Quervain's tenosynovitis/retinaculitis (DQR) is a common condition of the wrist caused by stenosing tenosynovitis of the first dorsal compartment involving the abductor pollicis longus (APL) and extensor pollicis brevis (EPB) tendons. DQR is routinely diagnosed with Finkelstein's test and the wrist hyperflexion and abduction of the thumb (WHAT) test. These tests have high sensitivity, but low specificity. We present the case of a 70-year-old male with a history of seronegative rheumatoid arthritis and a two-week history of right wrist pain. Finkelstein and WHAT tests were positive. Point-of-care application of MSUS demonstrated inflammation in the first dorsal compartment involving the APL and EPB tendons indicating a diagnosis of DQR. MSUS-guided corticosteroid injection of the involved tendons resulted in complete resolution of the pain.

Keywords

de Quervain's tenosynovitis/retinaculitis, Finkelstein's test, musculoskeletal ultrasound, WHAT Test.

Introduction

de Quervain's tenosynovitis, better phrased as de Quervain's retinaculitis (DQR) as there is only a retinaculum and not a true tendon sheath around the first dorsal extensor compartment of the wrist, arises from inflammation of this retinaculum. Subsequent stenosis and tendinosis of the extensor pollicis brevis (EPB) and abductor pollicis longus (APL) tendons beneath the wrist extensor retinaculum also occurs. Inflammation is exacerbated by the mechanical contraction of the EPB and APL tendons within the narrow confines of the first dorsal extensor compartment. The cardinal presenting symptom of DQR is pain over the radial styloid process that is worsened by ulnar wrist deviation. Causes of DQR include overuse injury, trauma or inflammation from conditions such as rheumatoid arthritis.

DQR is relatively common with an estimated prevalence of 0.5% in men and 1.3% in women in the general population and a prevalence of 2.8 cases per 1000 person-years in women and 0.6 per 1000 person-years in military personnel [1,2]. The diagnosis is typically made clinically with Finkelstein's test, in which the examiner grasps the thumb and ulnar deviates the hand sharply. Pain along the distal radius indicates a positive test, with a sensitivity of 89% and a specificity of 14%. The diagnosis can also be made with the wrist hyperflexion and abduction of the thumb (WHAT) test with 99% sensitivity and 29% specificity [3]. Both tests demonstrate excellent sensitivity but poor specificity.

Inflammation around the EPB and APL tendons is not unique to DQR. In fact, it occurs as part of intersection syndrome (IS) as well. IS describes inflammation at the site of convergence between the tendons of the first compartment and the extensor carpi radialis longus and extensor carpi radialis brevis tendons of the second dorsal compartment [4]. Anatomically, this "crossover" occurs on average 3.95 cm proximal to Lister's tubercle on the extensor

surface of the forearm [5]. Symptomatically, these two conditions are quite similar, making precise diagnosis of DQR with the Finkelstein and WHAT tests difficult. MSUS can help to identify anatomy and inflammation, allowing for accurate diagnosis.

MSUS is advantageous as it does not subject the patient to radiation or contrast. It has therefore found a place in point-of-care diagnostics in the outpatient setting where an ultrasound machine is readily available. MSUS provides the additional benefit of direct visualization and precise administration of corticosteroids via injection for patients that have failed conservative therapy.

In this report, we describe the case of a patient diagnosed with DQR and subsequent treatment with corticosteroid injection by MSUS. We submit that the use of MSUS can be a valuable tool for the diagnosis and treatment of DQR.

Case Report

A 70-year-old Caucasian male with a known history of seronegative rheumatoid arthritis, chronic obstructive pulmonary disease, cor pulmonale, diabetes mellitus type 2 and morbid obesity presented to the outpatient rheumatology clinic with a two-week history of worsening right wrist pain. The patient's rheumatoid arthritis was well-controlled with oral sulfasalazine 1500 mg in the morning and 1000 mg in the evening. He denied any trauma to the wrist, recent falls or recent flares of his rheumatoid arthritis.

On physical examination, the patient had significant tenderness to palpation at the base of his right thumb over the radial styloid process. Pain worsened with ulnar deviation of the wrist. Finkelstein's maneuver and the WHAT test were both positive. A wrist radiograph showed no evidence of any new fractures or erosions.

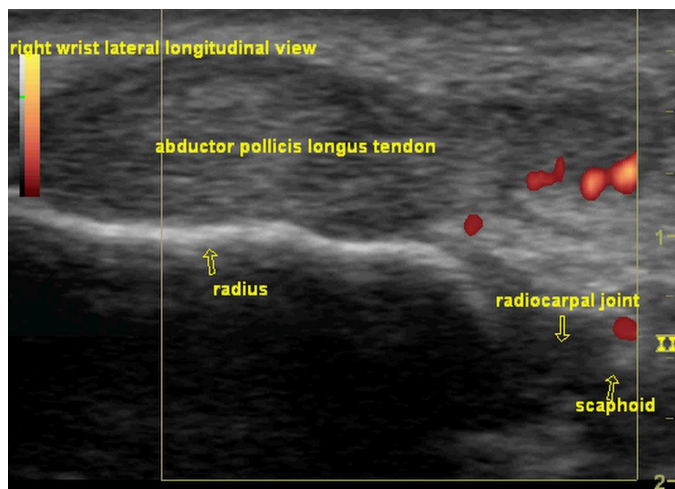


Figure 1: Lateral longitudinal view of the right wrist showing the 3 classic features of tendinosis of the APL. Doppler findings demonstrate increased blood flow around the tendon, suggestive of retinaculitis.

A point-of-care MSUS was obtained. High frequency 11 MHz was utilized, given the superficial location of the involved structures. Grey scale and doppler images were obtained. In the lateral longitudinal view of the wrist, the EPB and APL tendons showed thickening and loss of fibrillar architecture. Imaging further

showed decreased echogenicity and thickening of the dorsal retinaculum. Grade 3 power doppler signal was noted around both tendons underneath the dorsal retinaculum (Figure 1). No sub-compartment or tendon slips were identified. These findings supported the diagnosis of DQR. Subsequently, an ultrasound-guided triamcinolone injection around the APL and EPB tendons was performed with sterile technique and direct visualization of the shaft and bevel of the needle throughout the procedure. The patient tolerated the procedure well with no complications. He experienced immediate relief followed by a complete resolution of the symptoms over the next several days.

Discussion

Over the last decade, MSUS has emerged as an excellent modality for the diagnosis and treatment of hand and wrist pathology, including DQR. As evidenced in this case, an accurate point of care diagnosis and effective treatment can be performed with the assistance of MSUS.

A growing body of research has further supported the use of MSUS as a means for the diagnosis and treatment of DQR. Using MSUS to confirm first extensor compartmental anatomy, Kwon et al. identified an intra-compartmental septum in 19 of 19 wrists and its absence in 23 of 24 wrists. These results matched those found during intraoperative observation, suggesting accurate visualization can be obtained by means of MSUS [6]. A small study performed by Das and Prabhu utilized MSUS and identified thickening of the dorsal retinaculum in all 15 study participants, a finding also noted in this case [5].

Retrospectively, Hajder et al. demonstrated long-term relief in 91% of patients following ultrasound-guided triamcinolone injections [8]. Similarly, McDermott et al. demonstrated at least partial improvement of symptoms in 97% of patients following ultrasound-guided injections in a prospective study [9].

Functional outcome following steroid injection depends, in part, on the presence of anatomical variations such as compartment septations, also called sub-compartments, and multiple tendon slips. The presence of sub-compartments may be more important than multiple tendon slips. For example, the EPB sub-compartment can be missed because of its small, separate, deep location. Detecting these anatomical variations can improve injection accuracy and treatment results. In addition to showing dorsal retinaculum thickening and inflammation around the APL and EPB tendons, MSUS also allows direct visualization of the needle entering the peri-tendinous area underlying the retinaculum. This may help decrease the incidence of complications including intra-tendinous injection, which can lead to tendon-rupture, fat atrophy and skin hypopigmentation. MSUS appears to be particularly beneficial for confirming injection into the correct sub-compartment when a dividing septum is present in the first dorsal compartment. A cadaveric study that assessed the accuracy of injections using MSUS showed 100% injection accuracy in 50 wrists within the first extensor compartment, and 96% accuracy (26/27) into the EPB sub-compartment, when present. Without the use of MSUS,

accuracy rates were only 52% and 7%, respectively [10].

MSUS is an asset in the diagnosis and treatment DQR and is superior to Finkelstein's test and the WHAT test. Direct visualization allows for accurate identification of anatomic structures and pathologic abnormalities, as well as precise administration of steroid injections. Small studies assessing the accuracy of MSUS have shown promise. Further large-scale studies are needed to further determine the sensitivity and specificity of this modality as well as its effects on complication rates of steroid injection treatment.

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