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Journal

Proceedings of the UCLA Department of Medicine, 14(1)

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Publication Date

2011-02-03

CLINICAL VIGNETTE

Navigating Through the Aches and Pains: The Utility of Musculoskeletal Ultrasound in the Diagnosis of Common Rheumatic Disorders

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Case Report

A 46-year-old female complained of arthralgias and myalgias for several years. The patient was evaluated by 2 rheumatologists for possible connective tissue disease. Her ANA was positive at titer of 1:160 in a nucleolar pattern. The investigation found negative double stranded DNA antibodies, negative Smith and RNP antibodies, negative SSA and SSB antibodies and normal complement levels. The rheumatoid factor and HLA B27 were negative. The patient's markers of inflammation, sedimentation rate, and C-reactive protein have been repeatedly normal. She had no history of anemia, leukopenia, or thrombocytopenia. The patient was diagnosed with fibromyalgia.

She presented to our practice with diffuse body pain, non-restorative sleep and multiple tender points. The patient also reported paresthesias of the left arm for at least one year. The pain and numbness over the left arm were worse in the morning. She denied oral ulcers, dry eyes, dry mouth, Raynaud's phenomenon, and photosensitivity. While she reported episodic swelling of her hands and feet, she was not able to localize swelling to the joints. Family history was unremarkable.

Physical examination was significant for left wrist tenderness, swelling, and pain with range of motion. Bilateral first carpal-metacarpal joint bony hypertrophy and tenderness to palpation was also present. In

the left hand only, the proximal interphalangeal joints and metacarpal

phalangeal joints were tender to palpation, but no swelling was appreciated. Tinel sign was positive bilaterally. The patient had pain with range of motion and tenderness to palpation in both knees and second metatarsal phalangeal joints. Multiple fibromyalgia tender points were also positive (12 out of 18), with exquisite cervical paraspinal muscle spasm and tenderness.

Based on the history and physical exam findings, the diagnosis of fibromyalgia was confirmed, but additional possible diagnoses warranted further work up. The finding of wrist swelling raised the possibility of inflammatory arthritis. The pain in the left hand, along with positive Tinel sign, supports the diagnosis of carpal tunnel syndrome (CTS). The cervical spine muscle spasm and left arm parasthesias points to possible radiculopathy. A magnetic resonance imaging (MRI) of the cervical spine and ultrasound of the left wrist were ordered to elucidate the pathology. The patient refused nerve conduction studies (NCS).

MRI of the cervical spine revealed circumferential disc bulge at C5-C6, with C7 nerve root impingement. In the setting of left arm and hand pain and parasthesias, the MRI findings supported the diagnosis of C7 radiculopathy. Musculoskeletal ultrasound performed in the office found

tenosynovitis of the extensor and flexor tendons, and edema and enlargement of the right median nerve with nerve cross-sectional area measuring 22 mm² (Normal: 8-10 mm²). Tenosynovitis is diagnostic of an inflammatory arthritis. Sonographic measurement of the cross-sectional area of the median nerve was found in several studies to correlate well with the presence of carpal tunnel syndrome¹. In one study of patients with electrodiagnostic confirmed carpal tunnel syndrome, the sensitivity and sensitivity of ultrasound was 89% and 100% respectively for the diagnosis².

Discussion

This case portrays a diagnostic challenge often encountered in rheumatology practice. The patient's myofascial pain syndrome confounded the additional diagnosis of inflammatory arthritis. The left arm neuropathic pain could have been explained by C7 radiculopathy alone, but the presence of subtle left wrist swelling and positive Tinel sign was suggestive of comorbid CTS. The benefits of sonographic evaluation of the wrist were twofold. The findings of median nerve enlargement confirmed the diagnosis of CTS; and, the presence of tenosynovitis established the etiology of median nerve entrapment as the result of inflammatory arthritis.

Ultrasound is an inexpensive, non-invasive, and effective imaging modality increasingly used in the diagnosis of musculoskeletal disorders. High-resolution musculoskeletal ultrasound was found to be more sensitive and reproducible than clinical evaluation for the assessment of joint inflammation^{3,4,5}. Abnormalities in early inflammatory arthritis include synovitis, tenosynovitis, and bone erosions⁶. All these findings are readily identifiable on musculoskeletal ultrasound.

The diagnostic utility of ultrasonography in CTS has been evaluated in several studies. In mild cases of CTS, ultrasound was as effective as nerve conduction studies in detecting abnormalities, with correct detection in 65% of individuals tested⁷. The sensitivity increased to 75% when the two modalities were combined. In addition, visualization of the carpal tunnel by ultrasonography has the advantage of elucidating the etiology of nerve entrapment.

Given situations where multiple factors contribute to musculoskeletal pain (i.e. fibromyalgia, neuropathic pain, joint inflammation), ultrasound can contribute to early diagnosis and avoidance of more costly and invasive imaging modalities.

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Submitted on February 3, 2011