



Presumed Iatrogenic Musculocutaneous Nerve Injury after Subpectoral Biceps Tenodesis Reevaluated with Diagnostic Ultrasound Showing Parsonage-Turner Syndrome: A Case Report.

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Introduction

Parsonage-Turner Syndrome or neuralgic amyotrophy is a rare neurological condition of unknown etiology, which primarily affects motor nerves. It is hypothesized that it is an immune-mediated process that is associated with an antecedent event, such as infection, strenuous exercise, surgery, or vaccination in approximately 50% of cases¹. Diagnosis may be difficult in the post-surgical setting and may be misdiagnosed as an iatrogenic surgical complication, including nerve transection or stretch injury of the brachial plexus. Parsonage-Turner Syndrome is characterized clinically by the onset of severe shoulder pain for several weeks followed by weakness and muscle atrophy². Parsonage-Turner Syndrome is typically a clinical diagnosis supported by MRI, electrodiagnostics, and more recently, musculoskeletal ultrasound. Musculoskeletal ultrasound may be used to diagnose as well as provide some insight into prognosis. Ultrasound of peripheral nerves affected by Parsonage Turner Syndrome may demonstrate focal or diffuse nerve enlargement, focal constriction (hourglass-like deformity), torsion, or fascicular entwinement³. There is some evidence that has demonstrated a significant correlation between no spontaneous recovery of nerve function and constriction/torsion/fascicular entwinement³. This case demonstrates the diagnostic utility of musculoskeletal ultrasound in the setting of a presumed iatrogenic surgical complications.

Case Description

39 year old female status post right subacromial decompression and subpectoral biceps tenodesis was complicated by post-operative pain, elbow flexion weakness, and paresthesias within the right lateral antebrachial cutaneous (LABC) nerve distribution due to presumed iatrogenic musculocutaneous nerve injury. An EMG/NCS was performed two months postoperatively which showed no response to the LABC sensory nerve action potential (SNAP) and denervation of the brachialis muscle with reduced recruitment. Four months later, repeat EMG/NCS demonstrated decreased amplitude of the right LABC SNAP, however this may have been due to contamination from the superficial radial nerve. Additionally, there was denervation of the brachialis without volitional motor units. The patient was referred to Peripheral Nerve Clinic for evaluation for possible nerve transfer surgery for the presumed iatrogenic injury to the musculocutaneous nerve.

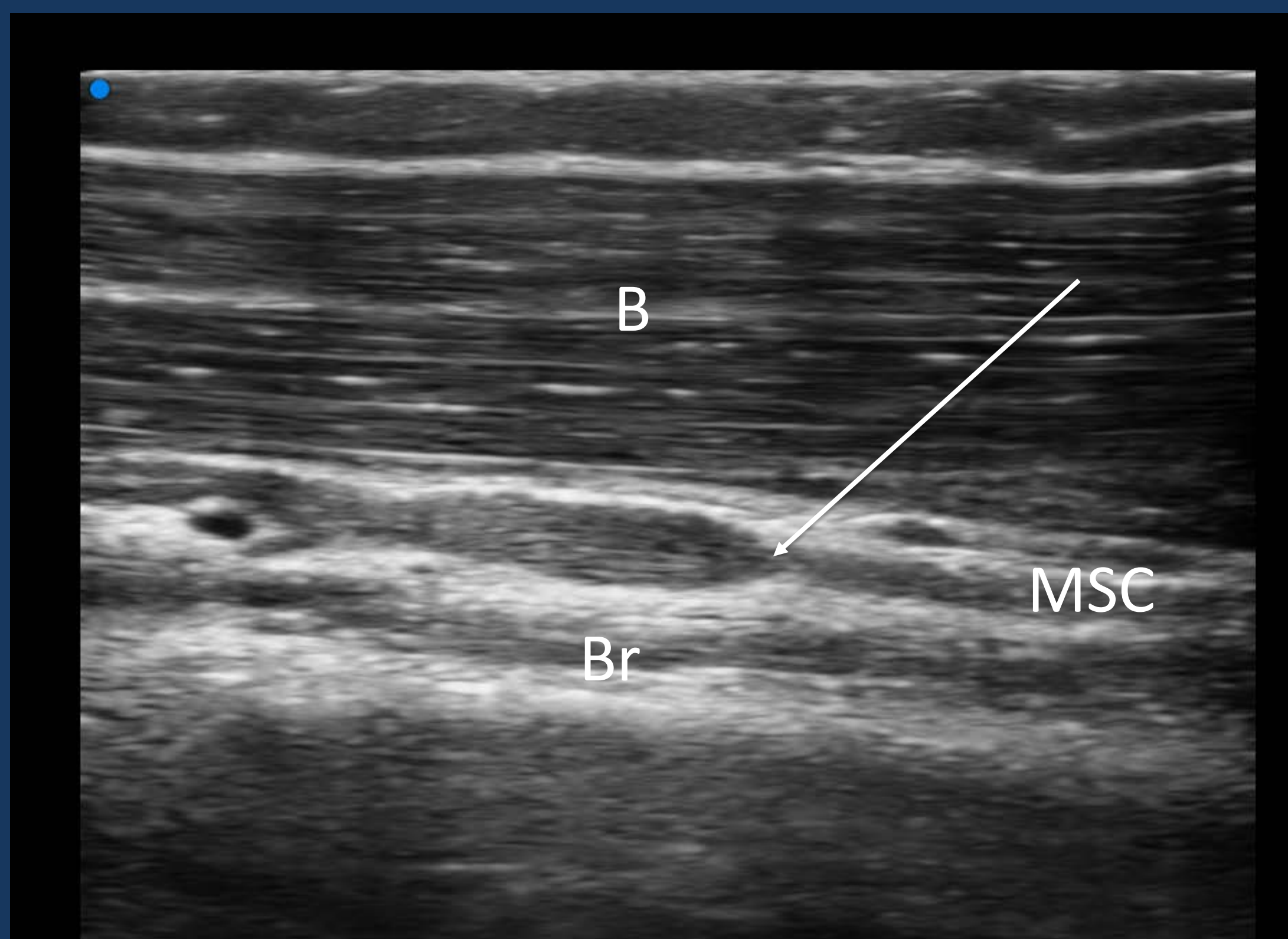


FIGURE 1. Long-axis view of the right mid-brachium. The biceps (B) is superficial; An Arrow showing the area of focal constriction of the musculocutaneous nerve (MSC). The Brachialis (Br) is deep to the MSC.

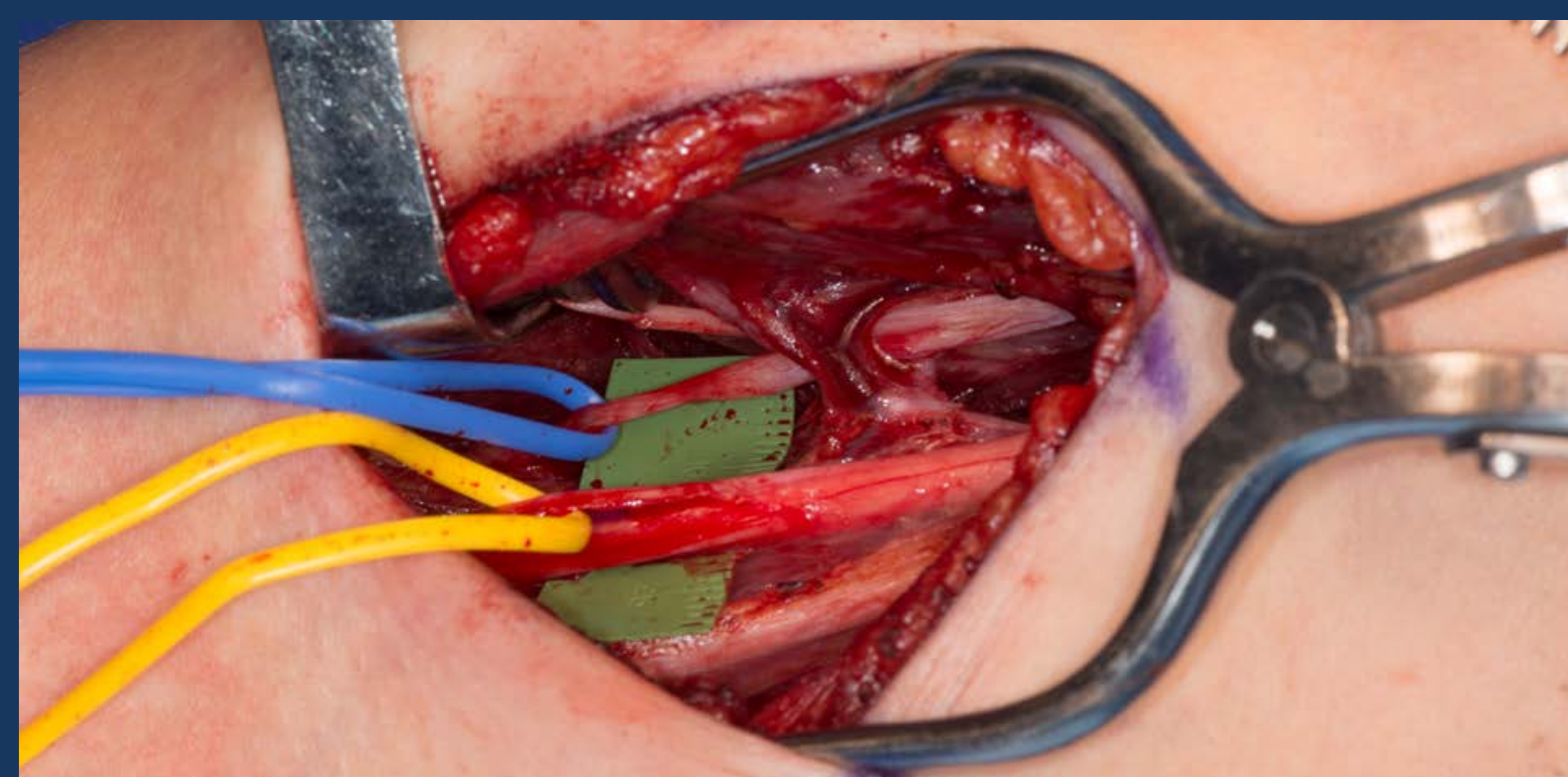


FIGURE 2. Intraoperative photo of the hourglass-like deformity of the brachialis motor branch of the musculocutaneous nerve (blue) and the fascicle to the flexor carpi radialis of the median nerve (yellow) prior to fascicular transfer.

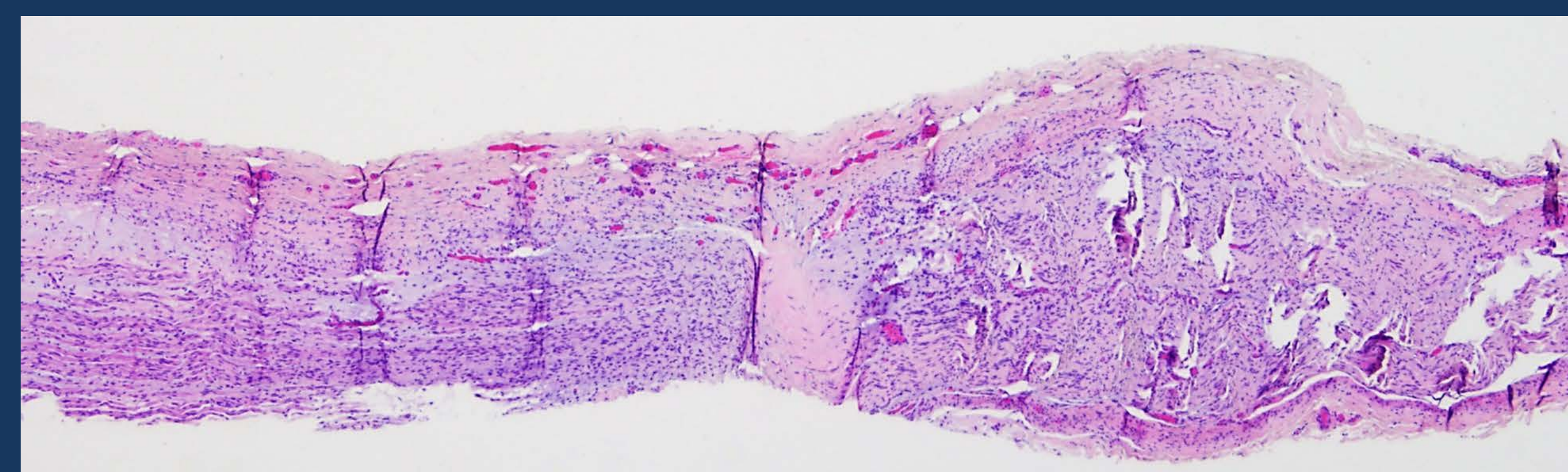


FIGURE 3. Peripheral nerve demonstrating an hourglass-like constriction characterized by fibrosis, scar formation, and lymphocytes (X20).

Case Description Cont.

On initial evaluation at the Peripheral Nerve Clinic, exam was significant for continued elbow flexion weakness as well as scapular winging which was not previously apparent due to post-operative shoulder immobilization. The ultrasound was significant for swelling of the musculocutaneous nerve in two discrete areas in the mid-upper arm distal to the site of surgery as seen in FIGURE 1. The distal brachialis muscle was noted to be hyperechoic and atrophic. The supraclavicular brachial plexus was unremarkable. These findings were consistent with Parsonage-Turner Syndrome. As a result, the hourglass-like segment was excised and a fascicular transfer with a FCR fascicle to the brachialis motor branch distal to the diseased segment was performed. The specimen was sent to pathology for evaluation, which showed scar formation, fibrosis, and lymphocyte infiltration within the excised nerve as seen in FIGURE 3.

Conclusion/Discussion

A patient status post subacromial decompression and biceps tenodesis with presumed iatrogenic injury of the musculocutaneous nerve was evaluated with ultrasonography which showed an hourglass-like deformity of the musculocutaneous nerve in the mid-upper arm, which was much distal to the surgical site. These findings were consistent with Parsonage-Turner Syndrome instead of an iatrogenic surgical complication. Iatrogenic nerve injury and Parsonage-Turner Syndrome are both rare, yet significant complications of the biceps tenodesis procedure. The correct diagnosis may be difficult due to non-specific EMG results as well as masking of focal weakness and scapular winging due to post-operative immobilization of the shoulder. This case demonstrates the utility of a diagnostic musculoskeletal ultrasound evaluation in differentiating Parsonage-Turner Syndrome and a presumed iatrogenic surgical complication. Ultrasound may soon become the standard of care for diagnosis, determining prognosis, and guiding treatment for post-operative complications of peripheral nerves.

References

1. Tsairis P, Dyck PJ, Mulder DW. Natural History of Brachial Plexus Neuropathy: Report on 99 Patients. *Arch Neurol.* 1972;27(2):109-117.
2. Van Eijk JJ, Groothuis JT, Van Alfen N. Neuralgic amyotrophy: An update on diagnosis, pathophysiology, and treatment. *Muscle Nerve* 2016; 53:337.
3. Arányi Z, Csillik A, Dévay K, et al. Ultrasonographic identification of nerve pathology in neuralgic amyotrophy: Enlargement, constriction, fascicular entwinement, and torsion. *Muscle Nerve* 2015; 52:503.
4. Pan, Yongwei et al. Hourglass-like Constriction of Peripheral Nerve in the Upper Extremity: A Clinical Review and Pathological Study. *Neurosurgery*2014; 75:10-22.