PROC (BAYL UNIV MED CENT)
2020;33(3):465–466

https://doi.org/10.1080/08998280.2020.1758006

Taylor & Francis
Taylor & Francis Group

Hydrodissection as a therapeutic and diagnostic modality in treating peroneal nerve compression

Bo Song, MD[a,b], Anuj Marathe, BBA[b], Bradley Chi, MD[a,b], and Prathap Jayaram, MD[a,b]

[a]H. Ben Taub Department of Physical Medicine and Rehabilitation, Baylor College of Medicine, Houston, Texas; [b]Baylor College of Medicine, Houston, Texas

ABSTRACT

A 51-year-old man presented with pain in the region of his left patellar tendon and fibular head. He had previously undergone three L5 epidural steroid injections and physical therapy without relief. Prior magnetic resonance imaging was significant only for fat pad impingement, and electromyography and nerve conduction studies were negative. Ultrasound demonstrated an enlarged peroneal nerve suggestive of peroneal nerve entrapment. Three ultrasound-guided hydrodissection procedures offered symptomatic improvement and identified an area posterior to the fibular head that was unable to be hydrodissected, indicating scar tissue causing peroneal nerve compression. The patient was referred for peroneal nerve decompression at the area of entrapment with complete symptom relief. This case is unique in describing the ability of hydrodissection to identify nerve compression not visualized with other diagnostic tests.

KEYWORDS Fibula; hydrodissection; neuropathy; peroneal nerve; ultrasound

Peroneal neuropathies are the most common lower limb mononeuropathies and often present as foot drop with sensory deficits.[1,2] The most common site of entrapment is at the fibular neck. Symptoms arise from external compressive forces, direct trauma, or fibular fractures/dislocations causing traction injuries from tearing of the vasa nervorum.[1–3] Magnetic resonance imaging (MRI) is the standard for diagnosis of peroneal nerve palsies in the lower extremity, but electromyography and nerve conduction studies are also helpful.[2,4] Treatment of peroneal nerve neuropathies has historically been surgical, involving dissection and decompression.[4] However, recurrence rates after surgery can reach as high as 30% and can be complicated by neurovascular damage.[4]

CASE DESCRIPTION

A 51-year-old man presented with a 9-month history of pain at his left patellar tendon and fibular head. The pain was intermittent, burning, worse with exercise and repetitive ankle dorsiflexion, and improved with rest. MRI of his left knee revealed fat pad edema in the quadriceps suggestive of fat pad impingement. He was prescribed physical therapy for 12 weeks without relief. Subsequently, he was diagnosed with an L5 radiculopathy, undergoing three L5 epidural steroid injections with no relief. His pain worsened, and the patient was referred to outpatient physical medicine for evaluation.

Examination revealed full knee and ankle range of motion. No effusion was appreciated, and he had negative McMurray and drawer tests. Physical exam was significant for 4/5 extensor hallicus longus strength and tenderness over his posterior fibular head and patellar tendon. Ultrasound examination demonstrated an enlarged peroneal nerve at the fibular head measuring 1.31 cm in circumference, suggestive of peroneal nerve entrapment. He underwent a left peroneal nerve hydrodissection with 5 mL of saline and 1 mL of steroid with immediate pain relief for 3 days *(Figure 1a)*. He was then referred for nerve conduction study/electromyography, which was negative for any focal left peroneal/tibial neuropathy or lumbar radiculopathy (Supplemental Figure). He returned 2 weeks later for the same hydrodissection procedure at a more proximal location along the peroneal nerve, which yielded immediate pain relief, though less than that

Corresponding author: Bo Song, MD, H. Ben Taub Department of Physical Medicine and Rehabilitation, Baylor College of Medicine, 7200 Cambridge St., Suite 10C, Houston, TX 77030 (e-mail: bs6@bcm.edu)

Supplemental data for this article are available online at https://doi.org/10.1080/08998280.2020.1758006.
Received March 29, 2020; Revised April 12, 2020; Accepted April 16, 2020.

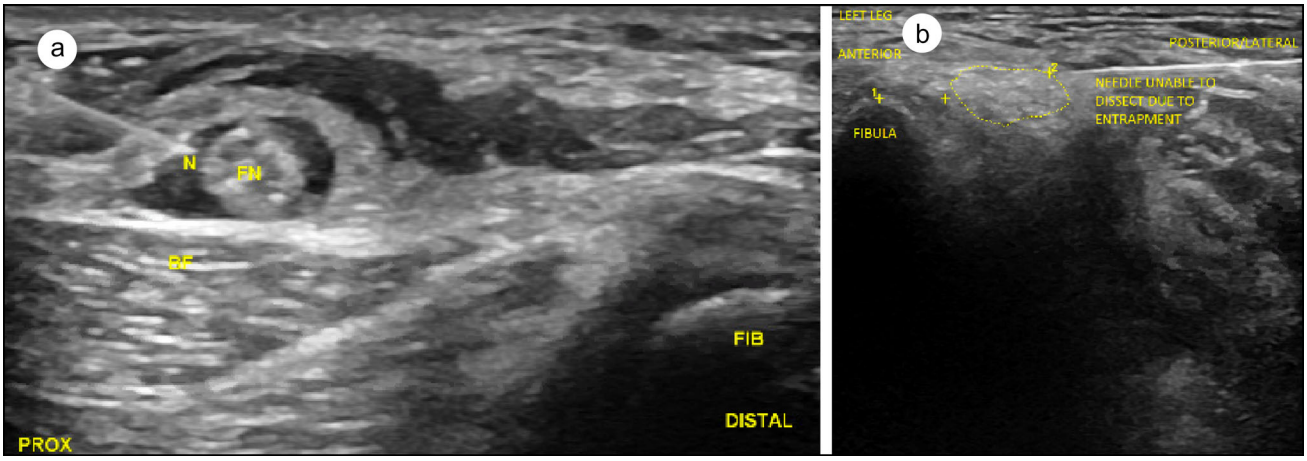

Figure 1. **(a)** Hydrodissection injection with 5 mL of normal saline and 1 mL of steroid around the fibular/peroneal nerve. BF indicates biceps femoris; FIB, fibula; FN, fibular nerve; N, needle; PROX, proximal. **(b)** Area of compression around the fibular nerve unable to be hydrodissected due to scar tissue.

from the first injection. A third and final hydrodissection procedure was performed 2 weeks later along the entire length of the peroneal nerve, revealing an area 0.55 cm posterior to the fibular head where the nerve was entrapped and unable to be hydrodissected due to surrounding scar tissue *(Figure 1b)*. He was then referred to plastic surgery, where he underwent a left leg common peroneal nerve decompression with complete symptom relief.

DISCUSSION

Hydrodissection involves injection of a nonirritating solution around a nerve to reduce compression from surrounding tissue.[4] It has been medically utilized in a variety of ways, including in dissection, breast reconstruction, and ophthalmology.[5,6] It has also been used with ultrasound guidance in peripheral nerve entrapment with two goals: (1) to restore function to the nerve and (2) to release soft tissue adhesions causing entrapment.[4,5,7] Methods differ, and saline, anesthetics, steroids, platelet-rich plasma, and dextrose have all been utilized to varying efficacy.[8]

While a relative paucity of cases have specifically reported hydrodissection of the peroneal nerve, the procedure has been described as successful in other neuropathies.[4] DeLea et al found that hydrodissection for patients with carpal tunnel syndrome provided significant improvements in pain and vasomotor changes.[5] Choi et al used hydrodissection to separate the ulnar nerve from the medial epicondyle in patients with cubital tunnel syndrome with symptomatic and electrophysiological improvement.[5] Tagliafico et al also showed success in treating meralgia paresthetica with a similar protocol.[5]

A comprehensive literature search only elicited one case of hydrodissection being used to treat peroneal nerve compression. Tabor et al described successful use of ultrasound-guided hydrodissection and ganglion cyst aspiration in a patient with common peroneal neuropathy with foot drop.[4] However, in that case nerve compression was caused predominantly by a ganglion cyst, which was aspirated with relief in pain. In addition, diagnosis was obtained successfully via electromyography and MRI, which were negative in the current case. Thus, the current case provides a unique scenario in which ultrasound alone only identified signs of peroneal nerve inflammation, whereas ultrasound with hydrodissection delineated the exact area of compression. Although there is limited data on the risks and benefits of this evolving modality, this minimally invasive technique can be considered a tool in treating and diagnosing suspected nerve compression injuries before surgical intervention.

ORCID

Bo Song http://orcid.org/0000-0003-1622-1927
Prathap Jayaram http://orcid.org/0000-0001-6209-5410

1. Craig A. Entrapment neuropathies of the lower extremity. *PMR*. 2013;5:S31–S40.
2. Katirji MB, Wilbourn AJ. Common peroneal mononeuropathy: a clinical and electrophysiologic study of 116 lesions. *Neurology*. 1988; 38(11):1723–1723. doi:10.1212/WNL.38.11.1723.
3. Baima J, Krivickas L. Evaluation and treatment of peroneal neuropathy. *Curr Rev Musculoskelet Med*. 2008;1(2):147–153. doi:10.1007/s12178-008-9023-6.
4. Tabor M, Emerson B, Drucker R, Brunk E. High-stepping cross-country athlete. *Curr Sports Med Rep*. 2017;16(5):314–316. doi:10.1249/JSR.0000000000000396.
5. Cass SP. Ultrasound-guided nerve hydrodissection. *Curr Sports Med Rep*. 2016;15(1):20–22. doi:10.1249/JSR.0000000000000226.
6. Bokey EL, Keating JP, Zelas P. Hydrodissection: an easy way to dissect anatomical planes and complex adhesions. *ANZ J Surg*. 1997; 67(9):643–644. doi:10.1111/j.1445-2197.1997.tb04616.x.
7. Evers S, Thoreson AR, Smith J, Zhao C, Geske JR, Amadio PC. Ultrasound-guided hydrodissection decreases gliding resistance of the median nerve within the carpal tunnel. *Muscle Nerve*. 2018;57(1): 25–32. doi:10.1002/mus.25723.
8. Wu YT, Chen SR, Li TY, et al. Nerve hydrodissection for carpal tunnel syndrome: a prospective, randomized, double-blind, controlled trial. *Muscle Nerve*. 2019;59(2):174–180. doi:10.1002/mus.26358.