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Case Presentation

Piriformis Syndrome With Variant Sciatic Nerve Anatomy: A Case Report

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Abstract

A 68-year-old male long distance runner presented with low back and left buttock pain, which eventually progressed to severe and debilitating pain, intermittently radiating to the posterior thigh and foot. A comprehensive workup ruled out possible spine or hip causes of his symptoms. A pelvic magnetic resonance imaging neurogram with complex oblique planes through the piriformis demonstrated variant anatomy of the left sciatic nerve consistent with the clinical diagnosis of piriformis syndrome. The patient ultimately underwent neurolysis with release of the sciatic nerve and partial resection of the piriformis muscle. After surgery the patient reported significant pain reduction and resumed running 3 months later. Piriformis syndrome is uncommon but should be considered in the differential diagnosis for buttock pain. Advanced imaging was essential to guide management.

Introduction

Piriformis syndrome is a range of symptoms that most commonly includes low back or buttock pain with or without unilateral leg pain resulting from compression of the sciatic nerve at the level of the piriformis [1]. Piriformis syndrome should be considered by clinicians after more common causes such as lumbar spine disease, sacroiliitis, greater trochanteric pain syndrome, and proximal hamstring tendinopathy have been ruled out [2]. The diagnosis of piriformis syndrome was previously thought to be purely clinical; however, additional workup with magnetic resonance imaging (MRI), computed tomography (CT), electrophysiologic studies, ultrasound, or scintigraphy can play a valuable role. Although these studies are usually helpful to exclude causes outside piriformis syndrome, an MRI neurogram can be useful in identifying anatomic anomalies of the piriformis that may lead to sciatic nerve compression [2,3]. We present a patient with piriformis syndrome, variant sciatic nerve anatomy, and low-grade sciatic neuropathy. Advanced imaging ultimately guided definitive surgical management and resolution of pain symptoms.

Case Presentation

A 68-year-old male seasoned marathon runner presented with a dull ache in his left buttock that progressively worsened so that he was unable to sit or stand for more than 10 minutes without disabling pain. At baseline, he was an avid runner, averaging 50-70 miles per week on pavement with steep hills incorporated into the runs. He was running 1 to 2 marathons annually and placing in the top 3-5 in his age group. No change had occurred in his limited stretching, warm-up, and cool-down routine, and he had not changed his shoe type prior to the injury. The patient's medical history was negative for thyroid dysfunction or diabetes. He stopped running and was limited to walking short distances because of his pain. Prior to the onset of his symptoms, he recalled twisting his back while lifting luggage, with resultant lower back pain radiating toward the upper left buttock.

On physical examination, the patient had normal muscle bulk and tone for his stated age. He had full, painless range of motion of the lumbar spine and hip and was nontender to palpation, including over the greater trochanteric bursa, piriformis, and gluteal muscles. His strength was 4+/5 and 5/5 in his left and right

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hamstrings, respectively, and he had 5−/5 weakness in his left gluteus medius with normal strength in his right gluteus medius. The remainder of his strength examination was normal, including his leg and foot intrinsic muscles, without evidence of muscle atrophy. His reflexes were +2 and symmetric at the biceps, quadriceps, and hamstrings, but the left ankle jerk was slightly less on the left compared with the right. His light touch perception was minimally decreased over the medial and lateral plantar nerve distribution in his feet, with the left greater than the right. Pinprick sensation was intact. The initial workup included a lumbar spine, hip, and pelvic MRI, which demonstrated mild facet arthropathy without nerve impingement, no evidence of tendinopathy, and no obvious sciatic nerve impingement. Electrodiagnostics suggested a left sciatic neuropathy demonstrated by positive sharp waves in the semimembranosus, long head of the biceps femoris and medial gastrocnemius and flexor digitorum longus. The H-reflex, performed in the prone position, was mildly prolonged on the left compared with the right. Evidence of positive sharp waves in the L5-S1 paraspinals also was found. However, the gluteus maximus and medius were normal, suggesting isolated denervation to the posterior primary rami without superimposed radiculopathy.

The patient participated in more than 6 months of physical therapy with a focus on core strengthening, including planks, single and double straight leg raise, small arc curl-ups, and postural modifications. He also participated in acupuncture 1 to 2 times per week. Medication interventions included gabapentin, 1800 mg/day, ibuprofen, 600 mg every 6 hours, and duloxetine, 30 mg/day. He underwent several interventions, including hydrodissection with 5 mL of 0.9% of normal saline solution adjacent to the left sciatic nerve and lateral to the proximal hamstring, percutaneous corticosteroid injection of the proximal hamstring, and a selective nerve root block in the lumbar spine, all of which were ineffective at providing any pain relief.

Seven months later, the patient continued to experience severe and debilitating pain, now intermittently radiating to the posterior thigh and foot. This pain prompted advanced imaging with a pelvic MRI neurogram to guide further management. Imaging was performed with a 3.0 Tesla scanner with dedicated coils and careful monitoring of imaging planes and acquisition parameters to best delineate the piriformis and adjacent sciatic nerve. Complex oblique images parallel and perpendicular to the piriformis demonstrated variant anatomy of the left sciatic nerve, in which the tibial and common peroneal components remained separate, and the common peroneal component deviated external to a small slip of piriformis at the sciatic notch (Figure 1). The opposite side did not demonstrate this variant. Applying this knowledge, a CT-guided botulinum toxin injection was performed to the piriformis muscle at the sciatic notch with the goal of releasing the sciatic nerve by reducing piriformis muscle contraction. This procedure provided minimal intermittent relief.

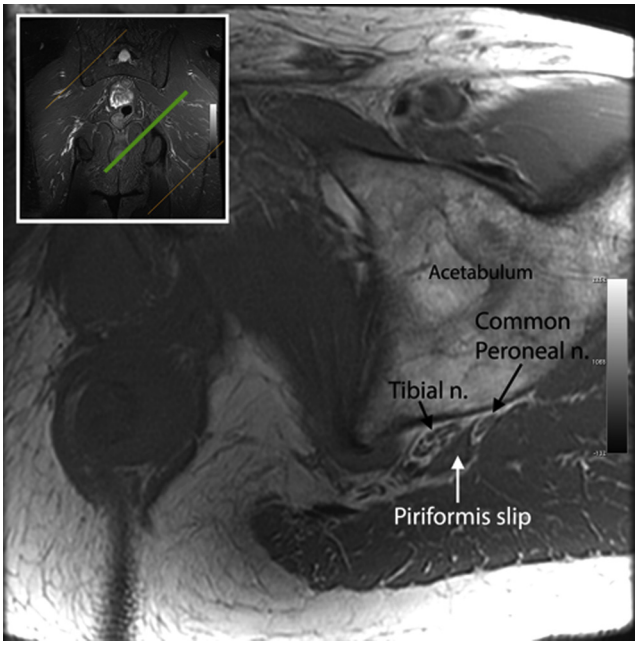

Figure 1. A coronal T2-weighted magnetic resonance image (MRI; inset) shows a green line representing the scan plane for the compound oblique T1-weighted MRI through the level just below the sciatic notch. Note the piriformis slip dividing the tibial and common peroneal components. n = nerve.

Because of the debilitating, refractory nature of his pain and the anatomic variant of the sciatic nerve found on MRI, the patient agreed to proceed with left-sided neurolysis with release of the sciatic nerve and partial myomectomy of the piriformis muscle.

Postoperative rehabilitation started with walking with an assistive device while in the hospital, and then for the next 6 weeks he advanced to walking without any excessive hip flexion. He eventually was able to walk 8-12 miles per day without pain. After 6 weeks, he advanced to the elliptical trainer and began a gradual return to run program by week 12. By 6 months, he was able to run a 10-km race slowly without pain. He continued to carefully increase his running time, and by 1 year, he was running 30-40 miles per week and had completed 3 half marathons. He reports ongoing pain relief, except for mild discomfort along the surgical site. A repeat electrodiagnostic study 9 months after the procedure demonstrated signs of reinnervation with improvement in all parameters.

Discussion

The piriformis muscle originates anteriorly at the S2−S4 sacral vertebrae, the gluteal edge of the ilium near the posterior aspect of the iliac spine, and the capsule of the sacroiliac joint. The muscle then runs laterally through the greater sciatic foramen, inserting