IMAGING FOR RESIDENTS

A 72-year-old Male Patient with Right Buttock Pain

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Section 2—Answer

Interpretation

A low-frequency curve transducer is placed at an oblique angle of 20° between the sacrum and greater trochanter to identify the piriformis muscle. The muscle extends from the anterior sacrum, through the sciatic notch, and then attaches onto the greater trochanter of the femur. The gluteus maximus muscle lies above the piriformis muscle. The piriformis muscle at the painful side appeared more swollen than that at the asymptomatic side (Figure 1). Disorganized muscle fibers were also identified (Figure 2). The sciatic nerve, which has a hyperechoic flattened structure, is deep beneath the piriformis muscle (Figure 3). The sciatic nerve was more hypoechoic and swollen at the painful side (Figure 3A) than at the sound site (Figure 3B). Piriformis syndrome with concomitant sciatic nerve entrapment neuropathy was thus diagnosed by ultrasound.

Discussion

The only muscle that courses through the greater sciatic foramen is the piriformis muscle. It is innervated by the first and second sacral nerve roots. The sciatic nerve, which is the largest nerve in the body and located below or within the piriformis muscle, is derived from the L4–S3 nerve roots. It descends along the posterior thigh, superficial to the adductor magnus muscle, until it reaches the popliteal fossa where it divides into the tibial and common peroneal nerves [1].

Patients with piriformis syndrome complain of buttock pain with or without pain radiating to the leg. Numbness, dysesthesia, and weakness in the area innervated by the sciatic nerve are associated with compression of the sciatic nerve by the piriformis muscle.

The clinical presentation includes somatic and neuropathic components. The somatic component underlying piriformis syndrome is myofascial pain syndrome of the piriformis muscle. It can be associated with small external rotators of the hip and the hamstring muscles. The neuropathic component refers to the irritation of the sciatic nerve.

The pathologic process of sciatica nerve compression is variable. It can be caused by: (1) direct trauma in the sacroiliac or gluteal areas; (2) myofascial trigger points, hypertrophy, or spasm of the piriformis muscle; (3) abscess, hematoma, myositis, bursitis of the piriformis muscle; and (4) neoplasms in the area of the sciatic notch or within the substance of the piriformis muscle [2].

Piriformis syndrome can be diagnosed by physical examinations such as palpation and the flexion, adduction,
and internal rotation (FAIR) test; diagnostic injection; imaging studies such as magnetic resonance imaging (MRI) and ultrasound; and electrophysiological and electromyography examinations. Piriformis syndrome can mimic lumbar radiculopathy, posterior facet syndrome, sacroiliac joint dysfunction, gluteal myofascial pain, or primary hip pathology. Most patients with lumbar radiculopathy experience back pain associated with reflex, motor, and radiating pain, based on the dermatome distribution. However, most cases of piriformis syndrome are not characterized by neurological deficits typical for a radicular syndrome such as declined deep tendon reflexes and myotomal weakness [3]. Furthermore, lumbar radiculopathy and sciatica nerve entrapment can coexist as a “double crush” syndrome.

Clinicians used to diagnose piriformis syndrome by physical examination. Standard anteroposterior radiographs of the pelvis and hips can be obtained. However, lateral views of the hips and either computed tomography or MRI of the lumbar spine are recommended to rule out the possibility that the symptoms experienced by a patient are originating from the spine or the hip joint; these

Figure 1  The piriformis muscle (gray arrows) lies beneath the gluteal maximus muscle. The piriformis muscle is more hypoechoic and thicker at the affected site than at the sound side. Gmax = gluteal maximus.

Figure 2  (A) Longitudinal view of the piriformis muscle at the affected site. The piriformis muscle, which lies above the ilium and between the greater trochanter and sacrum, is swollen with disorganized muscle fibers. (B) Longitudinal view of the piriformis muscle at the sound site. The piriformis muscle fiber has a normal fibrillary pattern. FN = femoral neck; Gmax = gluteus maximus; GrT = greater trochanter; Piri = piriformis muscle.

Figure 3  (A) Longitudinal view of the sciatic nerve at the affected site. The probe is placed at an oblique angle of approximately 45° above the ilium. The sciatic nerve lies deep beneath the piriformis muscle. The sciatic nerve at the painful site is swollen and hypoechoic. (B) Longitudinal view of the sciatic nerve at the sound site. Gmax = gluteus maximus; Piri = piriformis muscle; Scia n = sciatic nerve.
examinations can also be used to exclude lesions from other structures [2].

Ultrasound is a useful imaging tool to evaluate the piriformis muscle. Hip internal rotation and external rotation under sonography can help in identifying the origin and insertion of the piriformis muscle. An investigator can recognize the abnormal echotexture of the piriformis muscle at the painful side by comparing it with the sound site.

The sciatic nerve lies below the piriformis muscle. The inferior gluteal artery as well as vein accompany the sciatic nerve. The superior gluteal artery is between the gluteus maximus and piriformis muscle. The pudendal artery and nerve are medial to the sciatic nerve [1]. Ultrasound can also be used to examine the lumbar facet joints, hips, sacroiliac joints, and adjacent muscles. Sonoguide injection is a widely used method for treating piriformis syndrome. It also avoids collateral damage to adjacent nerves and vessels. In this patient, we found swelling of his piriformis muscle and the subgluteal segment of the sciatic nerve. This case of piriformis syndrome highlights the usefulness of ultrasound in diagnosing the etiology of buttock pain.

References

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