Decompression of the Sciatic Nerve Entrapment Caused by Post-Inflammatory Scarring

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A rare case of chronic pain of entrapment neuropathy of the sciatic nerve successfully relieved by surgical decompression is presented. A 71-year-old male suffered a chronic right buttock pain of duration of 7 years which radiating to the right distal leg and foot. His pain developed gradually over one year after undergoing drainage for the gluteal abscess seven years ago. A cramping buttock and intermittently radiating pain to his right foot on sitting, walking, and voiding did not respond to conventional treatment. An MRI suggested a post-inflammatory adhesion encroaching the proximal course of the sciatic nerve beneath the piriformis as it emerges from the sciatic notch. Upon exploration of the sciatic nerve, a fibrotic tendinous scar beneath the piriformis was found and released proximally to the sciatic notch. His chronic intractable pain was completely relieved within days after the decompression. However, thigh weakness and hypesthesia of the foot did not improve. This case suggest a need for of more prompt investigation and decompression of the chronic sciatic entrapment neuropathy which does not improve clinically or electrically over several months.

Key Words : Entrapment neuropathy · Neurolysis · Piriformis · Sciatic nerve.
Subcutaneous dissection was carried proximally to the long head of the biceps femoris, the sciatic nerve was found lateral and deep to the long head of the biceps femoris. The posterior cutaneous nerve of the thigh was left intact. Postoperative course was uneventful. The intermittent shock-like pain in the leg and the cramping buttock pain on sitting, walking, and especially during voiding disappeared completely within one week postoperatively. The medication against neuropathic pain was withdrawn two weeks postoperatively. He remained pain free for the following weeks postoperatively. He remained pain free for the following weeks postoperatively. He remained pain free for the following weeks postoperatively. He remained pain free for the following weeks postoperatively. He remained pain free for the following weeks postoperatively.
the bony pelvis and epineural irritation. Purist claim that an irritated nerve in the vicinity of the piriformis muscle is not proof of a cause-effect relationship. In addition, they prefer to avoid the term "lateral syndrome" and specify the cause, for example, sciatic nerve compression by synovial bursitis or posttraumatic scarring, rather than invoke a nondescriptive term (e.g., "piriformis syndrome"). As a result, some believe that the piriformis syndrome is underdiagnosed, many, overdiagnosed. Regardless of its prevalence, the diagnosis of piriformis syndrome should only be made after excluding all other potential causes of sciatica.

**Clinical manifestation**

Sciatic nerve compression typically produces local buttock pain with radiating symptoms into the distribution of the sciatic nerve. Patients may complain of painful dysesthesias or paresthesias, or painless hypesthesis. Their symptoms may be worse with prolonged sitting, especially on hard surfaces (i.e., so-called "wallet neuritis" or hip pocket neuropathy). Patients may also note subtle weakness in the foot or toes, which may affect their gait. In more extreme cases, they may experience severe motor dysfunction in all muscles below the knee and hamstrings. Patients typically do not have back or hip symptoms.

Sciatic nerve lesions may produce typical sensory disturbance or motor weakness in the sciatic nerve distribution. In chronic cases, trophic changes may occur on the plantar aspect of the foot. Ankle and hamstring reflexes may be reduced in the affected limb, whereas the quadriceps reflex is preserved. Patients with sciatic nerve compression near the sciatic notch typically have localized pain between the posterior superior iliac spine and the greater trochanter. Frequently the diagnosis of piriformis syndrome is made without firm objective findings, and the diagnosis is largely a clinical one.

Provocative test that stretch the piriformis include forced hip internal rotation with the thigh extended; Freiberg sign, resistance to abduction and external rotation; Pace sign, voluntary adduction, flexion, internal rotation of the hip; positive Lasègue sign. Hip external rotation may lessen pain.

**Diagnostic studies**

High resolution MRI can delineate the sciatic nerve and its relationship to the piriformis muscle. Increased signal intensity or an enlarged sciatic nerve visualized on MRI in the region of the piriformis muscle is not specific for piriformis syndrome and may be suggestive of other pathologies, including inflammatory conditions, sarcoidosis, and lymphoma, to name a few differential diagnoses. Asymmetry of the nerve compared with the contralateral side is helpful, but not specific, because bilateral, fairly symmetric imaging abnormalities may be seen in patients with bilateral sciatic or lumbosacral neuropathies. The interpretation of scans after piriformis injection should be done cautiously because the appearance of the piriformis and neighboring sciatic nerve may be altered following the procedure.
Electrical studies are helpful in establishing the diagnosis and the level of injury in sciatic neuropathy and they can help differentiate other lesion and prognosticate about the severity of the injury. In most cases of reported piriformis syndrome, electrophysiological studies are normal, though some have found prolongation of the F response and H reflex latencies.

Injection of local anesthetic agent and steroids are frequently used for both diagnostic and therapeutic purposes. However, the literatures regarding nerve blocks is largely uncontrolled[11,12,14]. A negative effect of a single or series of sciatic nerve block is helpful in negating a diagnosis. A positive effect is still nonspecific and must be interpreted with caution[11,13,14].

Treatment of sciatic entrapment neuropathy

Nonoperative measures including nonsteroidal anti-inflammatory agents and medication to treat neuropathic pain, a course of physical therapy to stretch the piriformis and reduce spasm is helpful in many cases. Some have advocated injection with botulinum toxin A in relieving piriformis spasm. Trigger point injections may be helpful also[12,14].

Surgery should be performed for patients with findings consistent with a diagnosis of sciatic neuropathy who do not improve clinically or electrically over 4 to 6 months[11,13,14]. However, it was suggested that surgery should be performed as a last option in patients diagnosed with piriformis syndrome who have failed nonoperative therapy and who have had all other diagnoses excluded. Even with this preselection, surgery in piriformis syndrome was often unrewarding[4,8,9].

For localized pathology near the sciatic notch, a muscle-splitting approach thorough limited skin incision may be possible. For a more extensive dissection of the sciatic nerve, the approach with a modification of the Henry exposure of the sciatic nerve is needed[9]. The gluteus maximus can be detached from its insertion and reflected medially[10]. Neurolysis may include freeing fibrous bands or ligating enlarged veins. Some suggested intraoperative electrical studies are helpful in localizing the site of and determining the extent of neural injury, as well as prognosis on recovery[11,12,14].

In our case, we first localized the sciatic nerve just distal to the inferior margin of the gluteus maximus and followed its proximal course to sciatic notch. We found the dense adhesion scar resulting from previous drainage operation in the middle of the gluteus maximus, and a transverse muscle-splitting approach was done to find an entrapped sciatic nerve without detaching the gluteus. An external neurolysis of the sciatic nerve was possible without much difficulty.

CONCLUSION

Sciatic nerve compression and entrapment can occur most commonly in the buttock level. Although compression of the sciatic nerve producing neurological symptoms and signs from mass lesion, scarring, and bony proliferation are well described, the report dealing surgical decompression of sciatic entrapment neuropathy is rare. Sciatic entrapment neuropathy caused by adhesion scar or inflammation around the sciatic notch should be decompressed surgically to avoid possible neurologic sequelae as shown in this case.

References
1. Adams JA: The piriformis syndrome -- report of four cases and review of the literature. S Afr J Surg 18: 13-18, 1980
2. Banerjee T, Hall CD: Sciatic entrapment neuropathy. Case report. J Neurosurg 45: 216-217, 1976
3. Bendzus M, Riedemann P, Perez J, Kolzenburg M, Reiners K, Solymosi L: Painful vascular compression syndrome of the sciatic nerve caused by gluteal varicocities. Neurology 61: 985-987, 2003
4. Demaereel P, Petrie C, Wilsms G, Plecs C: Sciatica caused by a dilated epidural vein: MR findings. Eur Radiol 9: 113-114, 1999
5. Durrazzi Z, Winnie AP: Piriformis muscle syndrome: an underdiagnosed cause of sciatica. J Pain Symptom Manage 6: 374-379, 1991
6. Filler AG, Haynes J, Jordan SE, Prager J, Villablanca JP, Farahani K, et al.: Sciatica of nondisc origin and piriformis syndrome: diagnosis by magnetic resonance neurography and interventional magnetic resonance imaging with outcome study of resulting treatment. J Neurosurg Spine 2: 99-115, 2005
7. Fishman LM, Schaefer MP: The piriformis syndrome is underdiagnosed. Muscle Nerve 28: 646-649, 2003
8. Henry AK: Extensile Exposure, ed 2. Edinburgh: Churchill Livingstone, 1973
9. Hughes SS, Goldstein MN, Hicks DG, Pellegrini VD Jr: Extrapelvic compression of the sciatic nerve: an unusual cause of pain about the hip: report of five cases. J Bone Joint Surg Am 74: 1553-1559, 1992
10. Puranen J, Orava S: The hamstring syndrome: a new diagnosis of gluteal sciatic pain. Am J Sports Med 16: 517-521, 1988
11. Spinner RJ, Thomas NM, Kline DG: Failure of surgical decompression for a presumed case of piriformis syndrome. Case report. J Neurosurg 94: 652-654, 2001
12. Spinner RJ, Tiel RL: Sciatic nerve compression and piriformis syndrome in Midha R, Zager EL (eds): Surgery of Peripheral Nerves: A Case-Based Approach. New York: Thieme, 2008, pp186-191
13. Stewart JD: The piriformis syndrome is overdiagnosed. Muscle Nerve 28: 644-646, 2003
14. Tiel RL: The surgical treatment of entrapment neuropathies of the lower extremity. Semin Neurosurg 12: 109-124, 2001
15. Tiel RL, Kline DG: Piriformis syndrome. J Neurosurg Spine 5: 102-104: author reply 104-108, 2006