

Acute Foot Drop Due to Piriformis Syndrome Managed with Pulsed Radiofrequency: A Case Report

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ABSTRACT

Piriformis syndrome (PS) is a condition in which the piriformis muscle causes low back pain and buttock pain. Spasm of the piriformis muscle may cause radiating pain along the course of sciatic nerve (sciatica) due to the proximity of the sciatic nerve with the piriformis muscle. Foot drop due to piriformis muscle spasm is a rare clinical presentation. We have reported a case of acute foot drop due to piriformis muscle spasm managed successfully with pulsed radiofrequency (PRF) of the piriformis muscle.

Keywords: Foot drop, Piriformis injection, Piriformis syndrome, Pulsed radiofrequency.

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INTRODUCTION

Piriformis syndrome is a condition in which the piriformis muscle spasm causes low back pain and buttock pain.¹ This syndrome may present with radiating pain in the lower limb; however, foot drop due to PS is a rare disorder.² We report a case of acute-onset foot weakness (foot drop) due to piriformis muscle spasm and its successful management with piriformis injections and PRF.

CASE DESCRIPTION

A 42-year-old male patient presented with buttock pain and weakness of right foot. He gave a history of pushing a heavy object that resulted in pain and a gradual loss of power. Neurological examination showed decreased sensation in the foot (L4-L5-S1 distribution) with a decreased motor power (0/5) for dorsiflexion (Fig. 1A). Other neurological examination was normal. Treatment with injectable nonsteroidal antiinflammatory drugs and tramadol was started. In view of the "Red Flag sign", an urgent MRI of spine and hip was done which did not show any abnormality. The patient was reexamined where physical signs (tenderness in the sciatic notch and buttock pain in flexion, adduction, and internal rotation (FADIR) of the hip) were positive to suggest PS. He was managed conservatively for one more day. As the patient was in severe agony due to buttock pain and anxious about his foot weakness, ultrasound-guided piriformis injection was planned. After informed consent, in operation theatre, the patient was positioned in prone and under aseptic precautions and with noninvasive monitoring of vitals (oximeter, noninvasive blood pressure [NIBP], electrocardiogram [EKG]). Skin infiltration at needle insertion point was done with 2 mL of 2% lidocaine, a blunt-tip insulated needle (100 mm × 22 G, Stimuplex®, B. Braun, Melsungen, Germany) was inserted under a low-frequency curvilinear ultrasound probe (3–5 MHz, SonoSite® Turbo-M, Fujifilm SonoSite India Pvt., Ltd, Gurugram, India). The needle was inserted in-plane from medial to lateral to keep the needle tip in the muscle.³ A mixture of 10 mL 0.25% bupivacaine and 40 mg triamcinolone was injected (Figs 1B to D). Ten minutes after the completion of procedure, the patient showed complete pain relief and partial recovery of motor power (4/5) in the affected foot (Fig. 1E). However, this relief lasted only for 14 hours and pain with motor weakness again recurred. A similar procedure was again

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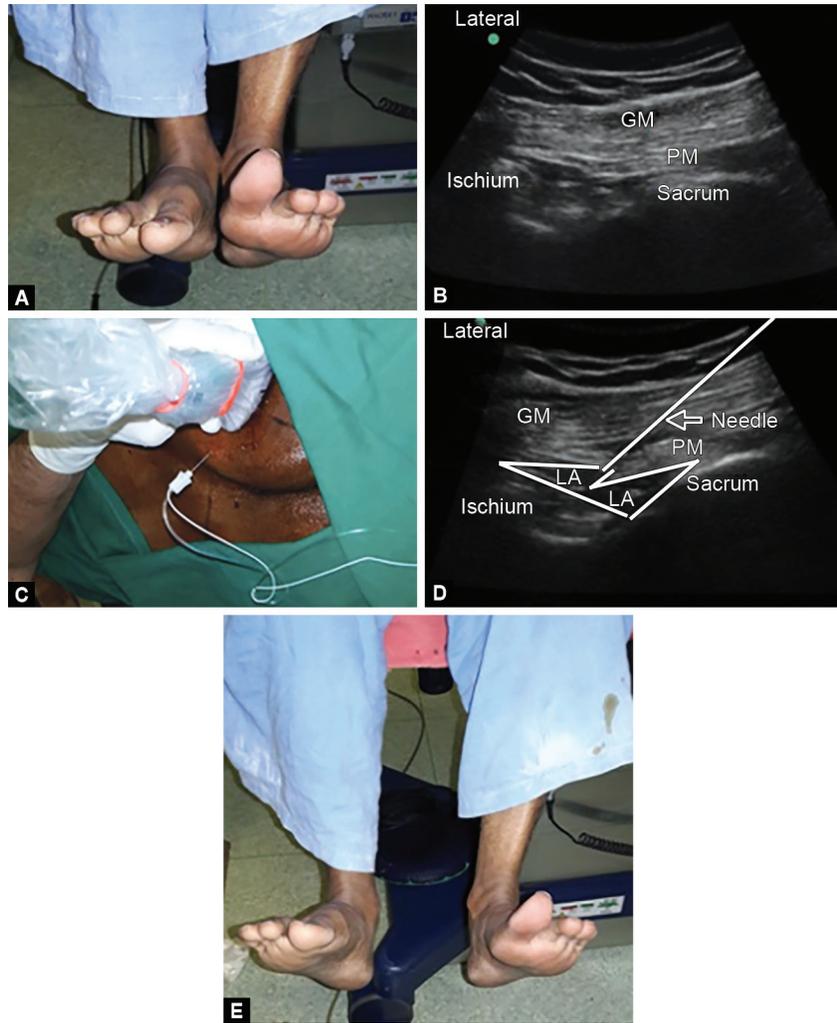
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repeated after 24 hours, which relieved his symptoms completely for 36 hours, but symptoms reappeared again. This time the pain was of almost similar intensity (8/10 on a numeric rating scale where 0 = no pain and 10 = worst possible pain), but foot power was 2/5. After 24 hours when no further improvement noticed, (PRF was done. A 20 G radiofrequency (RF) cannula with a 10 mm active tip was inserted in to the muscle, and using a radiofrequency generator (Cosman RFG-1A, Cosman Medical, Inc. 76 Cambridge Street Burlington, MA 01803 USA), PRF was done for 8 minutes (50 V, 2 Hz, 42°C, impedance 250–350 ohms) followed by the injection of 10 mL 0.25% bupivacaine and 4 mg dexamethasone (Figs 2A and B). The patient again showed complete pain relief and recovery of muscle power (5/5) (Fig. 2C). The patient was discharged after observation for 2 days post-procedure and was reviewed again after 1 week. The patient was still asymptomatic at 3 weeks following the PRF.

DISCUSSION

We report a case who suffered from severe symptoms of PS and foot drop allegedly after pushing a heavy object. Pain and foot weakness were initially treated with piriformis injections twice, and the patient recovered completely after each injection, but relief was short-lived (14–36 hours). PRF treatment provided him with complete recovery and sustained relief.



Figs 1A to E: (A) Right-side weakness of dorsiflexion (foot drop); (B) Sonoanatomy of the right side of the piriformis area; (C) Insulated nerve stimulator needle directed toward right piriformis muscle under a low frequency curvilinear ultrasound probe; (D) Sonoanatomy showing needle direction and spread of the local anesthetic mixture; (E) Recovery of motor power in the right foot after injection. GM, gluteus maximus muscle; PM, piriformis muscle; LA, local anesthetic

Piriformis syndrome is not uncommon and may constitute up to 5% of cases of low back, buttock, and leg pain.¹ However, foot drop due to PS is rare.² Definitive diagnosis of PS is often difficult because there are no universally accepted diagnostic criteria.^{4,5} MRI may help in the diagnosis only if some evident pathological findings are seen.^{2,6} Diagnosis is mostly clinical, which can be confirmed by response to the local anesthetic injection into the piriformis muscle, which helps in both diagnostic and therapeutic purposes.³ In our case, when MRI did not show any positive findings related to spinal cause of foot weakness, we had a high suspicion of PS based on clinical examination, which was later confirmed with relief of symptoms after piriformis injection. Many therapies to treat PS have been advocated. Injection remains a good choice as it is less invasive and have diagnostic as well as therapeutic potential.³ Therapeutic piriformis injection can be given with fluoroscopic or ultrasound guidance (USG). We used USG in our case because it is now a preferred choice due to the avoidance of radiation and higher accuracy.⁷ We used PRF treatment when injections with local anesthetic and steroids could only provide short-lived relief. PRF has been used to treat myofascial pain syndrome (MPS),⁸ soft

tissue pain,⁹ and management of PS in a pregnant patient with malignancy.¹⁰

The exact mechanism of prolonged pain relief by PRF is still not fully understood. However, many theories have been proposed. Firstly, PRF is known to be involved in the expression of the c-fos gene at lamina I and II in the dorsal root ganglia.¹¹ This c-fos gene expression encourages increased production of endorphin that modulates analgesic action by inherent change in the dorsal horn, which may be responsible for prolonged analgesic effect.¹² Secondly, the strong magnetic field formed during the PRF treatment might reduce the transmembrane potential of the A δ fiber or C-fiber in or around the muscle, which might have also affected the neuronal environment and thereby influenced the analgesic effect and duration of analgesia.¹³ Our case also showed a prolonged pain relief after PRF.

In the present case report, we have reported a rare case of foot drop due to PS. Acute injury-causing PS is known, but leading to foot drop is not reported earlier. Moreover, successful treatment with PRF opens up a new avenue to use PRF in PS cases with or without foot drop where injection therapies with local anesthetic



Figs 2A to C: (A) Radiofrequency cannula is directed toward the right piriformis muscle under ultrasound guidance; (B) Sonoanatomy of the right piriformis area with needle direction and spread of local anesthetic; (C) Complete recovery of muscle power in the right foot. GM, gluteus maximus muscle; PM, piriformis muscle; LA, local anesthetic; and SN, sciatic nerve

and steroids have provided relief of shorter duration and symptoms have reoccurred.

CONCLUSION

Acute foot drop due to PS is a rare condition. PRF treatment can provide prolonged relief once piriformis injection with local anesthetic with steroids have confirmed the diagnosis but resulted in short-lived relief.

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