Hidden in Plain Sight: Uncovering an Accessory Piriformis Muscle as the Root Cause of Piriformis Syndrome

Sade Görüşte Saklı: Piriformis Sendromunun Temel Nedeni Olarak Aksesuar Piriformis Kasının Ortaya Çıkarılması

Dayang Corieza Febriany[1], Nur Yazmin Yaacob[2], Suraya Aziz[2]

[1]Department of Radiology, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, Sabah, Malaysia
[2]Department of Radiology, Universiti Kebangsaan Malaysia Medical Center, Kuala Lumpur, Malaysia

ABSTRACT

Piriformis syndrome is an extremely uncommon condition that results in sciatic nerve entrapment at the level of the piriformis muscle, which leads to excruciating pain in the lower back, buttocks, and leg. An abnormal condition of the piriformis muscle, such as hypertrophy, inflammation, or anatomical abnormalities, is the most common root cause of this problem. We discuss the case of a 46-year-old woman with right gluteal pain and sciatic neuropathy who was diagnosed with piriformis syndrome as a result of an accessory pyriformis muscle that was discovered by magnetic resonance imaging (MRI).

Keywords: Piriformis syndrome, neuralgia, sciatic neuropathy

Received: 02.09.2023 **Accepted:** 04.14.2023

ÖZET

Piriformis sendromu, piriformis kası seviyesinde siyatik sinir sıkışmasına neden olan ve bel, kalça ve bacakta dayanılmaz ağrılara yol açan son derece nadir görülen bir durumdur. Piriformis kasında hipertrofi, enflamasyon veya anatomik anormallikler gibi anormal bir durum, bu sorunun en yaygın temel nedenidir. Sağ gluteal ağrısı ve siyatik nöropatisi olan ve manyetik rezonans görüntüleme (MRG) ile keşfedilen aksesuar piriformis kasının bir sonucu olarak piriformis sendromu teşhisi konulan 46 yaşındaki bir kadın vakayı tartışıyoruz.

Anahtar Sözcükler: Piriformis sendromu, nevralji, siyatik nöropati

Geliş Tarihi: 09.02.2023 **Kabul Tarihi:** 14.04.2023

ORCID IDs: D.C.F.0000 0002 1064 9044,N.Y.Y.0000 0003 1427 3133,S.A.0000 0002 8220 4589

Address for Correspondence / Yazışma Adresi: Dayang Corieza Febriany, MD Department of Radiology, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, Sabah, Malaysia E-mail: corieza@ums.edu.my

doi:http://dx.doi.org/10.12996/gmj.2023.91

INTRODUCTION

The piriformis muscle is a pyramid-shaped, flat muscle located in the gluteal region of the hip and the posterior pelvic wall. It arises from the anterior section of the sacrum, runs parallel to the gluteus medius through the greater sciatic foramen, and attaches to the superomedial aspect of the greater trochanter. The sciatic nerve arises from the sacral plexus at the roots of L4-S3 and travels within the larger sciatic foramen beneath the piriformis muscle. It descends to the posterior compartment of the thigh and separates into the tibia nerve and the common peroneal nerve at the popliteal fossa(1).

Piriformis syndrome is a disorder that manifests itself when the piriformis muscle compresses or irritates the sciatic nerve. This causes pain, discomfort, and muscular spasms in the area of the buttocks. Additionally, this can result in numbness, tingling, and weakness that can travel down the leg. The clinical manifestations of this condition, along with magnetic resonance imaging (MRI) findings, are typically used to establish the diagnosis(1-4). Accessory muscles of the hip region are infrequently reported and have limited representation in the literature.

The present case report aims to highlight the importance of a comprehensive understanding of the anatomy of the hip region and the significance of considering an accessory piriformis muscle as an uncommon cause of persistent gluteal pain and sciatica.

CASE REPORT

A 46-year-old lady presented with right gluteal pain radiating to the calf for 1-year duration. The pain worsens upon prolonged sitting. She had no history of direct trauma to the gluteal region.On examination, there is mild weakness with the power of 4+ noted during right hip flexion. The tone, reflex, and sensation of bilateral lower limbs are normal. Her motor nerve conduction study was unremarkable.She underwent magnetic resonance imaging (MRI) pelvis and lumbar spine for further evaluation. The axial and oblique coronal T1-weighted MRI images (Figure 1) showed an accessory muscle belly at the superior aspect originating at the proximal third portion of the main piriformis muscle. The accessory piriformis muscle is directed inferolaterally and merges with the main piriformis muscle bulk at its mid portion. The right S2 sacral root is seen coursing in between the right piriformis muscle bellies, before forming the sciatic nerve with other nerve roots. Axial T2 weighted fat suppression MRI images (Figure 2) at S2 and S4 levels respectively show no abnormal signal intensity within the right pyriformis muscle, the right roots of the sacral plexus, and visualized right sciatic nerve. There is also no abnormal thickening of the right sacral root plexus and right sciatic nerve. MRI lumbar spine T2-weighted images (Figures 1-3) in sagittal and axial projections show an L4/L5 posterior disc bulge with no spinal canal narrowing or nerve roots impingement.

She was treated with oral Gabapentin and underwent CT-guided Bupivacaine therapeutic injection at the right sacroiliac joint and right piriformis muscle for pain control, physiotherapy, and dry needling therapy.

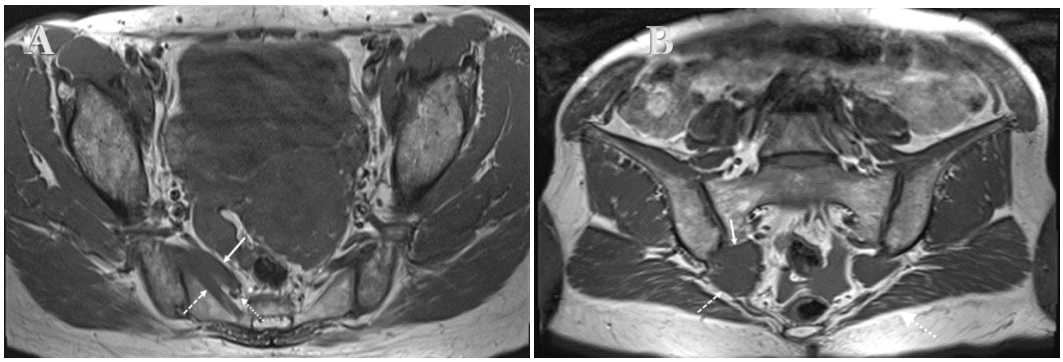

Figure 1. MRI Pelvis T1 weighted sequence. (A) Axial and (B) oblique coronal view shows an accessory piriformis muscle (solid arrow) anterior and superior to the right main piriformis muscle (dashed arrow). The right S2 nerve (dotted arrow) courses in between the belly of the main and accessory right piriformis muscles.

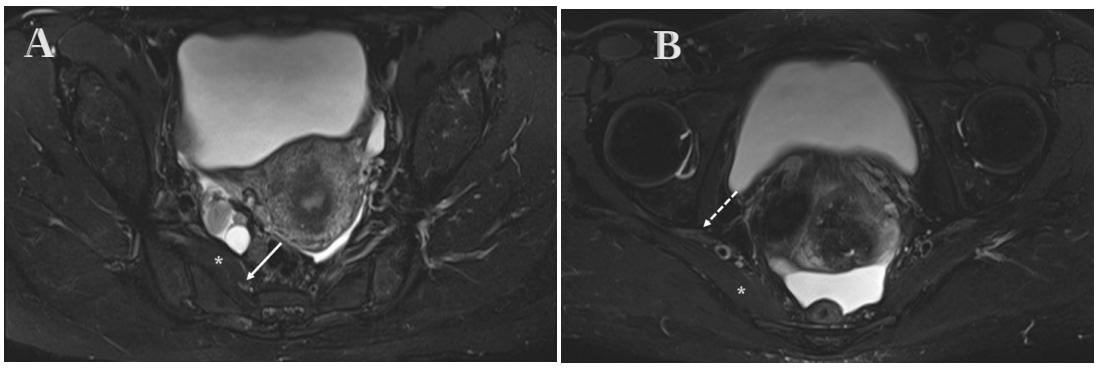

Figure 2. MRI pelvis T2 weighted fat suppression images at (A) S2 level and (B) S4 level in axial view showing no abnormal signal of the right S2 nerve (solid arrow), right sciatic nerve (dashed arrow), and right piriformis muscle (*).

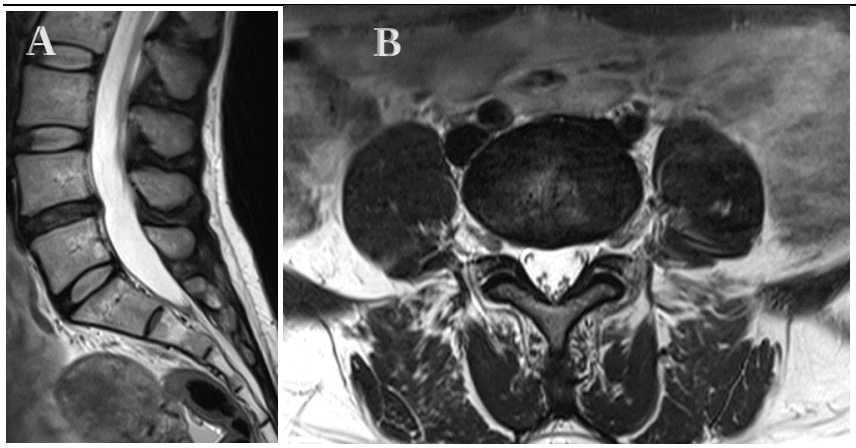

Figure 3. (A) Sagittal and (B) axial T2 weighted MRI image of the lumbosacral spine showing disc desiccation and posterior disc bulge at L4/L5 level.

DISCUSSION

Yoeman originally documented the relationship between piriformis muscle and sciatic nerve discomfort in 1928(5). Piriformis syndrome is an uncommon entrapment neuropathy in which the sciatic nerve is compressed, causing gluteal, hip, and/or posterior thigh pain, as a result of an abnormal condition of the piriformis muscle (PM) such as hypertrophy, inflammation, contractures, or anatomical changes. An aberrant course of the sciatic nerve through this muscle may potentially contribute to the condition(1,2). It is also one of the underdiagnosed causes of non-discogenic sciatica, accounting for 6-8% of cases. Risk factors associated with this syndrome include a narrowed sciatic foramen, leg length discrepancy caused by altered biomechanics resulting in increased tension and shortening of the piriformis muscle, and excessive workout, particularly in athletes(3,4).

The role of MRI is to look for possible causes of piriformis syndrome such as accessory or enlarged piriformis muscle. The increased signal may be seen on T2 fat suppression or STIR sequence if there is injury or inflammation of the piriformis muscle or sciatic nerve. In order to rule out other potential causes of low back pain and sciatica, such as lumbar disc herniation, spinal canal stenosis, and lesions close to the piriformis, a magnetic resonance imaging (MRI) of the lumbosacral spine is typically conducted(6-9).

There are several variations of the piriformis described in previous literatures including cleavage of muscle bellies, accessory or absence of muscle. However, proximal sciatic nerve-related muscle changes are the most significant. Six primary types of piriformis-sciatic nerve variations are described by Benton and Anson classification. However, there are reported cases which do not comply with this classification(3,4).

We presented a case of piriformis syndrome caused by an accessory piriformis muscle and S2 sacral nerve root compression, both of which are not included in the Beaton and Anson classification. In our case, the right S2 sacral root courses between the right piriformis muscle bellies, before forming the sciatic nerve with other nerve roots distally.

Contrary to the patients described by Lee et al, our patient had a normal size piriformis muscle with the accessory muscle crossing over the S2 nerve near the sciatic foramen(1). Although the patient is symptomatic, there is no significant impingement on the nerve by the accessory piriformis muscle at the time of the MRI. The size and signal intensity of the right piriformis muscle, S2 sacral nerve root, and sciatic nerve were normal. This could be because piriformis syndrome is a functional disorder in which the nerve may only have impinged during physical activity. While the patient was laying on the MRI table, it is possible that the sciatic nerve was not affected by the piriformis muscle. In addition, our patient claimed that she had limited her physical activities prior to the MRI due to ongoing pain, and this may also mask and prevent signal change in both the piriformis muscle and sciatic nerve. The chronic nature of this illness may further contribute to the sciatic nerve's lack of signal change(1).

We postulated that the patient's symptom is likely caused by the accessory right piriformis muscle causing possible impingement of the right S2 sacral nerve root and in dynamic movement of the hip may worsen the nerve impingement.

Conservative treatment should be the initial option for piriformis syndrome, however minimally invasive procedures are available if conservative treatment fails. Endoscopic sciatic nerve decompression with or without piriformis muscle release has been found to have a high success rate and a low complication rate. Physical therapy, steroid injections, botulinum toxin injections, and dry needling all have the potential to be successful treatments with minimal side effects(3,10).

Our patient was advised for conservative treatment with oral analgesia and physiotherapy and further proceeded with dry needling therapy and CT-guided Bupivacaine injection for better pain control.

CONCLUSION

Due to its nonspecific clinical symptoms and rarity, piriformis syndrome may be overlooked or misdiagnosed. Magnetic resonance imaging (MRI) can be utilized to obtain an accurate diagnosis to distinguish piriformis syndrome from more frequent causes of lower back pain and sciatica.

Conflict of interest

No conflict of interest was declared by the authors.

REFERENCES

1. Lee EY, Margherita AJ, Gierada DS, Narra VR.MRI of Piriformis Syndrome. AJR Am J Roentgenol. 2004;183:63-4.

2. Kosukegawa I, Yoshimoto M, Isogai S, Nonaka S, Yamashita T. Piriformis syndrome resulting from a rare anatomic variation. Spine. 2006;31:E664–6.

3. Cassidy L, Walters A, Bubb K, Shoja MM, Tubbs RS, Loukas M. Piriformis syndrome: implications of anatomical variations, diagnostic techniques, and treatment options. Surg Radiol Anat. 2012;34(6):479-486.

4. Smoll NR. Variations of the piriformis and sciatic nerve with clinical consequence: a review. Clin Anat. 2010;23(1):8-17

5. Yeoman W. The relation of arthritis of the sacro-iliac joint to sciatica, with an analysis of 100 cases. Lancet. 1928;212: 1119-23.

6. Jankiewicz JJ, Hennrikus WL, Houkom JA. The appearance of the piriformis muscle syndrome in computed tomography and magnetic resonance imaging. A case report and review of the literature. Clin Orthop Relat Res. 1991;262:205-9.

7. Filler AG, Haynes J, Jordan SE, 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. 2005;2(2):99-115.

8. Kim, Hae-Jung, So-Yeon Lee, Hee-Jin Park, Kun-Woo Kim, and Young-Tak Lee. Accessory Belly of the Piriformis Muscle as a Cause of Piriformis Syndrome: A Case Report with Magnetic Resonance Imaging and Magnetic Resonance Neurography Imaging Findings. Investigative Magnetic Resonance Imaging. Korean Society of Magnetic Resonance in Medicine. 2019;142

9. Sen A, Rajesh S. Accessory piriformis muscle: An easily identifiable cause of piriformis syndrome on magnetic resonance imaging. Neurol India. 2011;59:769-7.

10. Vassalou EE, Fotiadou A, Ziaka D, Natsiopoulos N, Karantanas AH. Piriformis muscle syndrome: MR imaging findings and treatment outcome in 23 patients. Hell J Radiol. 2017;2(4): 38-44.