



## CASE REPORT

# Pulsed radiofrequency treatment on spinal nerve root as an alternative to total hysterectomy for sciatica caused by a large uterine fibroid: a case report and literature review

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## Abstract

**Background:** Uterine fibroids cause various symptoms, with total hysterectomy being the primary treatment. However, most patients do not prefer invasive surgery; moreover, total hysterectomy impairs fertility, underscoring the need for conservative options. **Case:** We report a case of a 50-year-old woman who experienced persistent left leg pain. Despite treatment for over a year under the suspicion of spinal stenosis, her symptoms did not improve. Magnetic resonance imaging revealed a 7.5-cm uterine fibroid, potentially compressing the sacral nerve. Subsequent left sacral nerve blocks significantly improved the radicular pain. Preferring conservative treatment over surgery, the patient opted for medication following a gynecological consultation due to her proximity to menopause. Pulsed radiofrequency treatment was then applied to the affected nerves, which maintained symptom improvement without additional interventions for 2 years. **Conclusions:** Pulsed radiofrequency treatment offers an effective alternative to total hysterectomy for managing sciatica caused by uterine fibroids, while avoiding the adverse effects associated with surgical intervention.

## Keywords

Leiomyoma; Uterus; Radiculopathy; Nerve block; Neuromodulation

## 1. Introduction

Pain is one of the common symptoms of uterine fibroids (UF), with abdominal pain being the most frequently reported [1]. However, depending on their location, they can rarely cause lower extremity pain and, in severe cases, even gait disturbances [2–4]. In previously reported cases, large UFs causing radicular pain were predominantly treated surgically. Although total hysterectomy remains the definitive treatment for symptomatic UFs, there is a growing emphasis on exploring alternative non-surgical methods to preserve fertility and minimize potential complications [5]. Herein, we present a case report on the diagnostic process and nonsurgical pain management for a patient with radiculopathy due to a large UF.

## 2. Materials and methods

We conducted a literature review on the PubMed database using the search terms “uterine fibroid”, “fibroid” or “leiomyoma”, in combination with “radiculopathy” or “sciatica”, with a specific focus on management strategies. Articles published in English between 1970 and 2024 were included. We selected case reports of patients presenting with lower limb pain associated with UFs and summarized the initial department of consultation, presenting symptoms, diagnostic findings, and

treatment approaches.

## 3. Case presentation

Written informed consent was obtained from the patient for the publication of this case report, including the use of images and data. Patient anonymity has been fully preserved. This article was prepared according to the Case Report (CARE) guidelines and the 2013 Declaration of Helsinki.

A 50-year-old woman (height: 159 cm; weight: 56 kg; body mass index: 22.1 kg/m<sup>2</sup>) visited the orthopedic outpatient clinic with a 1-year history of persistent lower back and left leg pain. The patient’s medical history was unremarkable. She reported a stabbing pain, rated 5–6 on an 11-point Numerical Rating Scale (NRS), radiating from the left buttock down to the posterolateral side of her leg. Lumbar spine magnetic resonance imaging (MRI) revealed subarticular stenosis at the left L4/5 and L5/S1 levels. Transforaminal epidural steroid injections for the left lumbar lesion proved ineffective. Further evaluations, including ultrasonography of the left lower extremity, bone single-photon emission computed tomography (SPECT)/computed tomography (CT), and hip MRI, failed to detect lesions explaining her symptoms. After 3 months, she was referred to the pain clinic. At the pain clinic, a repeat transforaminal epidural steroid injection was administered with

fluoroscopic guidance, confirming adequate contrast spread to the lesion. However, there was no improvement. Previous imaging examinations did not reveal significant spinal stenosis or other lesions that could explain the pain, which prompted consideration of other potential causes.

Reevaluation of the lumbar spine MRI identified a large UF, sized 7.5 cm, located anterior to the sacrum and suspected to be compressing the sacral or sciatic nerves (Fig. 1). A nerve conduction study of the left lower extremity was performed, but no abnormalities were detected. Consequently, sacral and sciatic nerve blocks were administered separately to assess their effects and determine the nerve responsible for the symptoms. A left sciatic nerve block using ultrasound guidance provided only brief relief. Subsequently, left sacral 1 and 2 nerve root blocks were performed under fluoroscopic guidance. At follow-up, the patient reported significant improvement, with her leg pain decreasing to an NRS score of 1–2. These results suggested that the symptoms were due to compression of the sacral nerves by the UF rather than lumbar nerve compression caused by spinal stenosis.

The patient was referred to a gynecologist and informed of the option of a total hysterectomy for symptomatic UF. However, after the initial nerve block, her leg pain improved, and she preferred conservative treatment. Given her proximity to menopause and the potential for fibroid shrinkage, the gynecologist opted to monitor the fibroid and prescribed tranexamic acid for menstrual bleeding. After two months, sacral nerve root blocks were repeated, and pulsed radiofrequency treatment (PRFT) was administered for long-term pain management (Fig. 2).

PRFT was performed under local anesthesia at the injection site, with the patient remaining awake to confirm that the nerve stimulation was concordant with her symptoms. Under fluoroscopic guidance, a 22-gauge radiofrequency needle was placed at the left S1 and S2 nerve roots, with stimulation confirming the correct placement. Pulsed radiofrequency was applied in three 120-s cycles at 42 °C, followed by a 2.5-mg dexamethasone and 0.1875% ropivacaine (2 mL) injection for each nerve root. Long-term follow-up will assess the need for

additional PRFT or surgery; however, the patient's condition has remained improved over two years. Prior to PRFT, the patient had regularly taken nonsteroidal anti-inflammatory drugs (NSAIDs) and analgesics. However, following the procedure, she only required NSAIDs occasionally, and her NRS score consistently remained below 2.

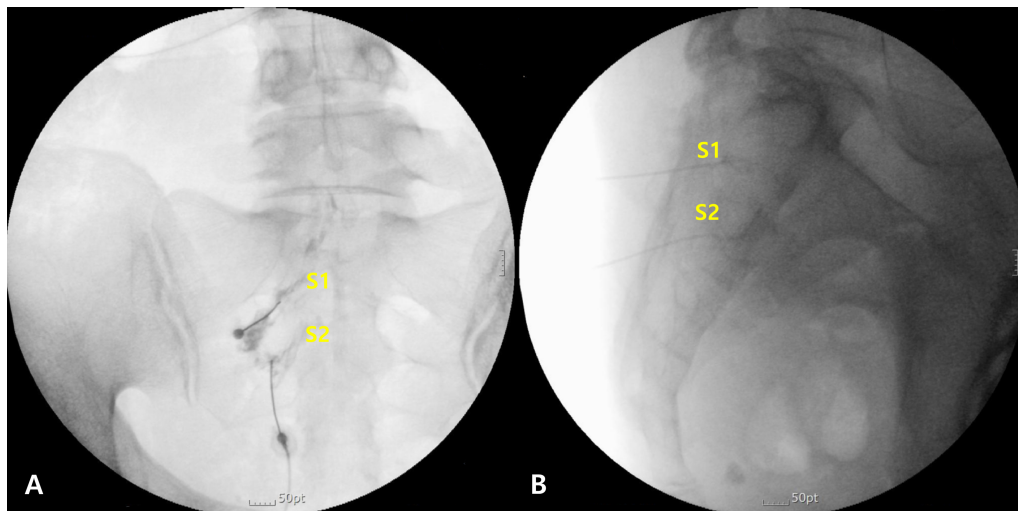
#### 4. Discussion

UFs are common benign tumors that occur in women of reproductive age and can cause various symptoms. One of the common symptoms of UF is pain [1, 6]. While abdominal or pelvic pain is the most frequently reported, radicular pain can also occur due to the uterus being located in the pelvic cavity. Fibroids can develop on the posterior uterine side, which is close to the spine. Additionally, as they enlarge, they may compress the lumbosacral or sciatic nerves, leading to back pain and radiating leg pain. However, there are few systematic studies on radicular pain caused by UF, with most being case reports. One study found that approximately 20% of patients with back and leg pain caused by UFs experienced severe or very severe pain [7]. Table 1 (Ref. [2, 4, 8–14]) summarizes the case reports on lower extremity pain caused by UFs. Among the nine reported cases, all but one were treated surgically, with most of them undergoing total hysterectomy. Typically, symptomatic UFs are surgically treated, with total hysterectomy mostly considered the first-line treatment [15]. However, 79% of patients with symptomatic UFs prefer non-invasive treatments, and 51% prioritize treatments preserving the uterus. These preferences are independent of whether pregnancy is being considered [7]. Since UFs commonly develop during reproductive years, and with the increasing age of pregnancy, conservative treatments are gaining significance [5]. Total hysterectomy can potentially cause psychiatric disorders stemming from the loss of femininity [16] and life-threatening venous thromboembolism [17]. Therefore, this case report highlights PRFT as a promising, less-invasive alternative.

The general interventional approach to treating radicular



**FIGURE 1. T2-weighted magnetic resonance images of the lumbosacral spine and uterus.** (A) Sagittal view and (B) axial view showing a uterine fibroid, approximately 7.5 cm in size, located anterior to the sacrum and along the course of the sacral or sciatic nerve. The line in (A) indicates the position of the axial plane.



**FIGURE 2. Fluoroscopic images of nerve root pulsed radiofrequency treatment with contrast medium injection.** (A) Anteroposterior and (B) lateral images showing the needle placed at the left sacral 1 (S1) and sacral 2 (S2) nerve roots. The contrast agent is well distributed along the nerve pathways. After confirming that the radiofrequency nerve stimulation is concordant with the patient's symptoms, pulsed radiofrequency treatment was performed.

**TABLE 1. Literature review of lower extremity radicular pain due to uterine fibroids and its management.**

Author. Year	Age (yr)	1st visit Department	Main symptoms	Nerve Conduction Studies findings	Size of the Uterine fibroid	Treatment
Laman <i>et al.</i> [8] 1985	71	NR	Lt. groin and lateral thigh pain	Chronic neuropathy of the lumbosacral plexus	10 cm	Total hysterectomy
Murata <i>et al.</i> [9] 2001	47	OS	Rt. calf pain and numbness	Abnormal voluntary action potential in the ventral root of L5 and S1	Not specified	Total hysterectomy
Lee <i>et al.</i> [4] 2018	54	RH	Rt. foot drop and pain	Proximal sciatic nerve injury or lumbosacral plexopathy	11 cm	Total hysterectomy
Chung <i>et al.</i> [2] 2019	55	NS	Rt. leg weakness and gait disturbance	Lumbosacral poly-radiculopathy	870 g	Total hysterectomy
Donald <i>et al.</i> [10] 2010	44	OS	Lt. buttock and anterolateral thigh pain	Not specified	5.9 cm	Total hysterectomy
Bodack <i>et al.</i> [11] 1999	55	RH	Rt. buttock and posterolateral leg pain	Not specified	6 cm	Total hysterectomy
Vyas <i>et al.</i> [12] 2023	32	EM	Rt. groin pain, and gait disturbance	Not specified	13.9 cm	Myomectomy
Thanasa <i>et al.</i> [13] 2023	45	OS	Low back pain and Lt. leg radicular pain	Not specified	11 cm	Total hysterectomy
Kang <i>et al.</i> [14] 2024	66	ANE	Rt hip pain and limping gait	No abnormal findings	Not specified	Sciatic nerve block

Abbreviations: ANE, anesthesia and pain medicine; EM, emergency department; Lt., left; NR, neurology; NS, neurosurgery; OS, orthopedics; RH, rehabilitation medicine; Rt., right.

pain begins with nerve blocks. A case report has described using a sciatic nerve block to manage neuropathy caused by UFs [17]. However, simple nerve blocks typically provide only temporary relief, necessitating frequent repetitions and making long-term pain management challenging. Contrastingly, PRFT offers a relatively more durable solution. It involves electrical sensory nerve stimulation to verify the target nerve root followed by the application of controlled electrical pulses to modulate nerve function without significant tissue damage. PRFT alters nerve activity to modify pain signal transmission, providing relief for 6–12 months [18]. Given its long-term effects and rare complications, this minimally invasive procedure has been commonly used to treat radiculopathy caused by disc herniation or failed back surgery syndrome, demonstrating significant efficacy [18, 19]. Additionally, it can be applied to manage symptoms related to various peripheral nerve disorders [20]. However, this is the first reported case of PRFT being used to manage UF-related radicular pain.

Alternative interventions for symptomatic UFs, including laser myolysis [21], radiofrequency ablation [22], and MR-guided focused surgery [23], seek to reduce the fibroid size and bleeding. Similar to PRFT, these gynecological treatments are minimally invasive and involve relatively few complications. However, PRFT does not directly reduce the size of UFs. Instead, it specifically targets UF-related radicular pain for immediate relief. Further, it is a relatively simple procedure, typically taking around 30 minutes, without requiring pre-procedure tests or preparations.

As shown in Table 1, patients with lower-extremity radicular pain often visit orthopedic or neurosurgery clinics rather than gynecology clinics, to undergo various examinations, including bone SPECT/CT as in the present case, as well as CT myelography [15] and even brain CT [2]. Additionally, as in the present case, Kang *et al.* [17] described a case where nerve conduction studies may not reveal any abnormalities. Such challenges can lead to delayed diagnosis, resulting in significant time and cost burdens. Distinguishing between symptoms of spinal origin and those caused by other conditions can be challenging. However, when treatment responses are minimal or imaging findings do not correlate with the symptoms, physicians should consider the possibility of UFs in female patients. An interdisciplinary approach, involving gynecology and pain management, as demonstrated in the present case, can be beneficial. If surgery can be deferred, interventional procedures combined with medications offer a viable alternative.

To the best of our knowledge, this is the first reported case of long-term radicular pain management caused by a large UF using PRFT. Nerve blocks serve both diagnostic and therapeutic roles in managing nerve compression from UF. If these blocks are effective, PRFT can serve as a viable alternative to surgery, offering pain relief and preserving fertility when used alongside gynecological treatments. In this case, PRFT effectively controlled the symptoms for approximately two years without the need for additional interventions.

## AVAILABILITY OF DATA AND MATERIALS

The data presented in this study are available on reasonable request from the corresponding author.

## AUTHOR CONTRIBUTIONS

HJ—designed the study and contributed to manuscript writing and data collection. HYS—contributed to editing and supervision of this work. Both authors have read and approved the final manuscript.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study has been approved by the Institutional Review Board of Gwang-Myung Chung-Ang University Hospital (IRB number: 2407-171-084). Written informed consent was obtained from the patient for the publication of this case report, including the use of images and data. Patient anonymity has been fully preserved.

## ACKNOWLEDGMENT

Not applicable.

## FUNDING

This research was supported by the Chung-Ang University Research Grants in 2022.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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**How to cite this article:** Haesun Jung, Hwa Yong Shin. Pulsed radiofrequency treatment on spinal nerve root as an alternative to total hysterectomy for sciatica caused by a large uterine fibroid: a case report and literature review. *European Journal of Gynaecological Oncology*. 2025; 46(2): 116–120. doi: 10.22514/ejgo.2025.029.