PAIN MEDICINE CASE REPORTS

ISSN 2768-5152

Volume 9, Number 7, pp. 353-361

Fluoroscopy-Guided Transgluteal Radiofrequency Neurotomy of the Pudendal Nerve: A Retrospective Case Series

Danielle Levin, MD[1], Daniel Van Florcke, MD[2], Alopi Patel, MD[3], Lisa V Doan, MD[2], and Meera Kirpekar, MD[2]

Background: Pudendal neuralgia (PN) is a chronic condition causing persistent genital and rectal pain. While pudendal nerve blocks offer temporary relief, their effects are often short-lived. When nerve blocks fail, radiofrequency neurotomy (RFN) may be an alternative treatment. This study evaluates the outcomes of fluoroscopy-guided thermal or pulsed RFN in patients with transient relief from nerve blocks.

Methods: This retrospective cohort study included 8 patients with PN who had received a fluoroscopy-guided transgluteal pudendal nerve block but experienced < 2 weeks of relief.

Case Reports: Patients underwent fluoroscopy-guided transgluteal RFN (thermal or pulsed). Seven patients treated with pulsed RFN experienced ≥ 50% pain relief, lasting 29 to 152 days. One patient treated with thermal RFN had multiple treatments, achieving pain relief ≤ 1 months. Patients also reported significant functional improvements.

Conclusions: Fluoroscopy-guided transgluteal thermal and pulsed RFN shows promise for patients with limited relief from nerve blocks.

Key words: Pudendal neuralgia, radiofrequency ablation, fluoroscopy

BACKGROUND

Pudendal neuralgia (PN) is a rare, chronic, and debilitating neuropathic pain disorder that affects approximately 1 in 100,000. Although it predominantly impacts women, it can affect both genders. Given its significant effect on those afflicted, understanding the clinical presentation is essential for timely recognition and management. The condition causes severe, localized genital or rectal pain that can greatly impair quality of life. The nature of the pain is variable, often described as burning, numbness, tingling, itching, or a sensation of pressure. The pain is generally restricted to specific areas depending on the individual's gender. In women, the symptoms usually manifest in the vulva, vagina, clitoris, or rectum, while in men, the pain may affect the glans penis, scrotum, perineum, and/or rectum. The pain is often described as sharp, radiating, or dull, potentially extending to the anterior pelvis, perineum, rectum, inner thighs, and even the posterior thigh (1,2).

The symptoms of PN may overlap with those of various other conditions, thereby complicating early diagnosis. Such differential diagnoses include persistent genital arousal disorder, urinary tract infections (UTIs), interstitial cystitis, sacroiliitis, piriformis syndrome, lumbosacral radiculopathy, and coccydynia. As a result, individuals with PN frequently face misdiagnosis or de-

From: [1]Penn Medicine Princeton Medical Center, Plainsboro, NJ; [2]New York University Grossman School of Medicine, New York, NY; 3Rutgers Robert Wood Johnson Medical School, New Brunswick, NJ

Corresponding Author: Danielle Levin, MD, E-mail: daniellelevinmd@gmail.com
Disclaimer: There was no external funding in the preparation of this manuscript.
Conflict of interest: Each author certifies that he or she, or a member of his or her immediate family, has no commercial association (i.e., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted manuscript.
Patient consent for publication: The study was approved by the institutional IRB without direct consent from patient(s), as this is a retrospective study.
This case report adheres to CARE Guidelines and the CARE Checklist has been provided to the journal editor.
Accepted: 2025-08-08, Published: 2025-12-31

lays in receiving appropriate treatment. Understanding the clinical presentation of this disorder is essential for accurate identification, and treatment options often vary depending on the severity of the symptoms and the degree of functional impairment (1).

Diagnosis and Diagnostic Criteria

Diagnosing PN requires careful clinical evaluation, a detailed patient history, and the use of diagnostic anesthetic blocks. The 5 Nantes criteria are instrumental in diagnosing PN and distinguishing it from other potential causes of pelvic pain (4). These criteria include:

1. Pain Within the Anatomical Distribution of the Pudendal Nerve – This refers to localized pain within the areas of the vulva, vagina, clitoris, rectum, and perineum (in women) or glans penis, scrotum, perineum, and rectum (in men).
2. Pain Aggravated by Sitting – The discomfort typically worsens with pressure on the affected areas, such as prolonged sitting, and may improve when standing or lying down.
3. Pain Not Waking the Patient From Sleep – While discomfort can be severe during waking hours, it does not generally disturb sleep, which is a distinguishing feature.
4. No Objective Sensory Loss on Clinical Examination – Sensory tests generally reveal no clear deficits in the skin or nerve function during a clinical exam.
5. A Positive Response to a Pudendal Nerve Block With ≥ 50% Pain Relief but Lasting < 2 weeks – The injection of local anesthetics into the pudendal nerve distribution area provides temporary pain relief, which can confirm the diagnosis.

By confirming these criteria, health care providers can narrow down the possible causes of pain and tailor treatments accordingly. However, despite these diagnostic criteria, the definitive diagnosis of PN often remains challenging due to the similarities in symptoms with other conditions (3-5).

Treatment Overview

Noninterventional treatment options for PN include cognitive-behavioral therapy, physical therapy, lifestyle modifications, medications, and alternative therapies. Medications typically involve analgesics, anticonvulsants, and antidepressants, which help manage neuropathic pain. However, these options are often not sufficient, especially in more severe cases, and can only offer partial or temporary relief. Thus, more invasive treatments, like nerve blocks, radiofrequency neurotomy (RFN), and, in some cases, surgical interventions, may be necessary (3-6).

The pudendal nerve block plays a central role in both diagnosing and treating PN. By temporarily relieving symptoms, the block not only confirms the pudendal nerve as the source of pain but also provides short-term therapeutic benefit. This dual action makes it a valuable first-line intervention. For patients who experience only partial or transient relief, the block can be followed by more durable treatments, such as RFN, which offers longer-lasting symptom control.

RFN in PN

RFN is an interventional procedure used to treat chronic pain, including conditions such as PN. The method involves the application of RF energy to targeted nerves to alter their function and provide pain relief. RFN can be performed using 2 approaches: thermal and pulsed RF (7).

Thermal RFN

Thermal RFN uses continuous RF energy to raise nerve temperature above 60°C, causing coagulative necrosis and permanent destruction of pain-transmitting fibers. This form of neurolysis offers effective, long-lasting relief but carries a risk of damaging nearby tissues and motor nerves. This is particularly concerning when treating mixed nerves, like the pudendal nerve, which has both sensory and motor components (5,8-12).

Pulsed RFN

In contrast, pulsed RFN delivers intermittent bursts of energy at lower temperatures (~ 42°C), modulating nerve activity without causing permanent structural damage. Although the precise mechanism remains unclear, it likely interferes with the nerve's ability to transmit pain signals. Because it preserves nerve integrity, pulsed RFN is often preferred in conditions like PN, where maintaining motor and sensory function is essential (5,8-12).

Study Rationale and Objectives

The aim of this study is to evaluate the efficacy of fluoroscopy-guided transgluteal RFN in treating PN, specifically comparing the effectiveness of both thermal and pulsed RFN techniques. Fluoroscopy guidance is increasingly recognized as the standard approach in interventional pain management due to its ability to ensure precise needle placement, offering improved

accuracy and reproducibility. This study retrospectively analyzes the outcomes of patients who underwent fluoroscopy-guided RFN, with a focus on success rates, duration of pain relief, and overall safety. While alternative methods, such as ultrasound (US)-guided and computed tomography (CT)-guided RFN, have been explored, each has its own limitations, including high costs and potential inaccuracies. The fluoroscopy-guided approach, performed in the prone position, presents distinct advantages by allowing better visualization and precise targeting of the pudendal nerve, reducing complications and improving treatment efficacy. This study offers valuable insights into the comparative effectiveness and safety of transgluteal thermal and pulsed RFN for the treatment of PN.

METHODS

Ethical Considerations

This study was approved by the Institutional Review Board (IRB) at NYU Langone Health (protocol #i23-01058), ensuring that it adhered to the ethical standards established by the Declaration of Helsinki. The IRB review process guarantees that the study complies with ethical principles, including the protection of patient privacy and respect for autonomy. Given that this research involved a retrospective chart review, the need for obtaining informed patient consent for participation was waived by the IRB, as it did not involve direct intervention or interaction with patients. However, all patients had previously provided informed consent for their participation in the RFN procedures themselves, which included a full explanation of the potential risks, benefits, and alternatives to treatment. In addition, the privacy and confidentiality of all patient data were safeguarded by anonymizing the records to ensure compliance with Health Insurance Portability and Accountability Act guidelines.

Study Population

The study included a retrospective analysis of medical records for patients who underwent fluoroscopy-guided transgluteal thermal or pulsed RFN procedures between August 2018 and August 2023. The cohort comprised individuals who were ≥ 18 years at the time of their procedures and had provided informed consent for participation in their respective RFN treatments. Patients in the study were diagnosed with PN and met the 5 Nantes diagnostic criteria, which include a combination of clinical and symptom-based assessments to ensure accurate diagnosis of pudendal nerve involvement (15). The study population was diverse, consisting of both male and female patients, and included individuals with chronic pelvic pain who had failed to respond to conservative treatments, including physical therapy, pharmacological interventions, and nerve blocks. This retrospective cohort provides a valuable overview of the long-term effects and outcomes of RFN treatment for PN in a real-world clinical setting.

Procedures and Techniques

The RFN procedures were performed under fluoroscopic guidance to ensure precise needle placement, which is essential for the effective treatment of PN. All patients were positioned in the prone position on the procedure table, optimizing access to the ischial spine region. This positioning allowed for accurate targeting and a clear view of the anatomical landmarks during the procedure.

After thorough sterile preparation, including the application of chlorhexidine antiseptic wipes to clean the skin, the fluoroscopy machine was calibrated to obtain an anteroposterior view. This view was adjusted to an approximately 15° to 20° ipsilateral oblique angle and a 0° to -10° caudad tilt to clearly visualize the ischial spine, situated behind the superior pubic ramus. Once the correct orientation was achieved, the skin was marked over the ipsilateral ischial spine and infiltrated with 1% lidocaine using a 25G needle for local anesthesia. No additional injectate (e.g., steroid or anesthetic) was administered through the RF needle during the procedure. All RFN procedures relied solely on precise needle placement, impedance testing, and stimulation to guide ablation, without adjunctive pharmacologic agents.

A 22G, 5-mm active-tip, 10-mm RF needle was then carefully inserted into the target area at the ischial spine, a well-established landmark for precisely targeting the pudendal nerve. This anatomical location ensures that the RFN procedure is both effective and accurate in treating PN (Fig. 1).

To verify correct needle placement and ensure the accuracy of the treatment, impedance testing and nerve stimulation techniques were employed. Impedance testing was used to measure the electrical resistance of surrounding tissues, ensuring that the needle was positioned within the correct tissue plane. In addition, nerve stimulation was performed at frequencies of 50 Hz and 2 Hz. This step was crucial in eliciting motor

responses and confirming the needle's proximity to the pudendal nerve, thus enhancing the likelihood of a successful procedure.

For the thermal RFN procedure, 2 lesioning protocols were used. The needle tip was heated to 80°C or 60°C and maintained at this temperature for 90 seconds to create a controlled lesion. This process disrupts the transmission of pain signals through the targeted nerve, offering long-lasting pain relief. In contrast, the pulsed RFN technique involved maintaining the needle tip at a lower temperature of 42°C. During this procedure, intermittent electrical pulses were delivered over a period of 3-6 minutes. Each pulse consisted of 20 milliseconds of on-time followed by 480 milliseconds of off-time, with a frequency of 2 Hz. This pulsed RFN technique is designed to modulate nerve activity without causing permanent nerve damage, making it particularly suitable for preserving motor function while still providing significant pain relief (Fig. 1).

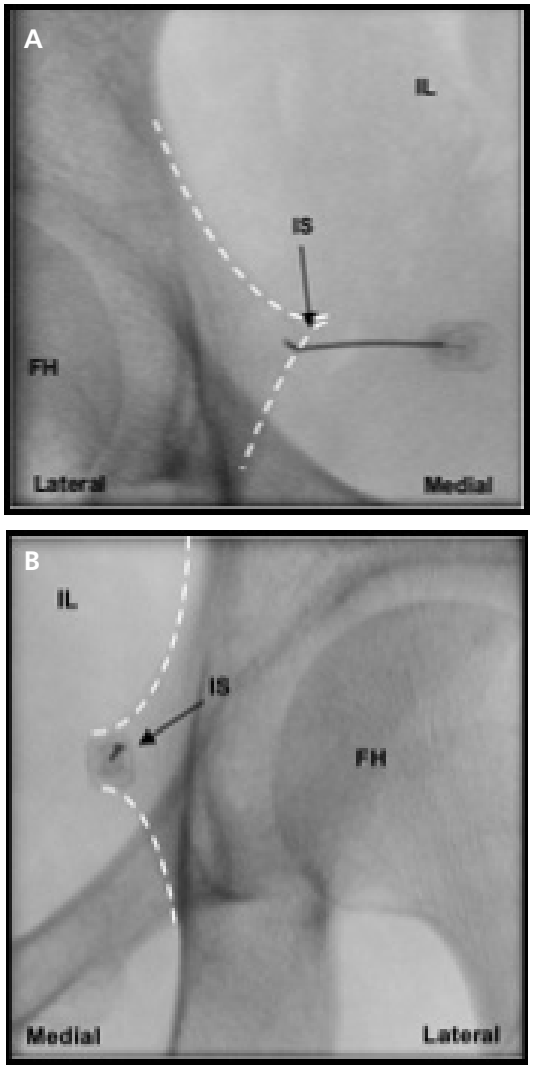

Fig. 1. (a) Left side; (b) Right side. A 22G, 5-mm active-tip, 10-mm RF needle positioned at the medial-most point of the ischium spine, using fluoroscopic guidance, in the ipsilateral oblique fluoroscopic view on each side. Contrast was administered at site to ensure needle is not in a vessel. RF: radiofrequency. IS: ischial spine. IL: ilium. FH: femoral head. Images were obtained from different patients.

Both RFN techniques were performed in an outpatient setting under local anesthesia, with the option for light sedation to ensure patient comfort throughout the procedure. These minimally invasive techniques provide a promising approach to treating PN with minimal discomfort and a quick recovery period for patients.

Outcome Measurement

The primary outcome measures for this study focused on the degree of pain relief achieved through the 2 RFN techniques (thermal and pulsed). Specifically, the primary endpoint was the percentage reduction in pain intensity as reported by patients on a standardized pain scale, the visual analog scale. In addition to pain relief, the duration of pain relief was also assessed, with patients being followed up at regular intervals to determine the duration of sustained pain alleviation. A positive responder was defined as ≥ 50% reduction of pain. This threshold was selected based on definitions of clinical benefit used in prior exploratory studies in interventional pain management. While we recognize that longer-term pain relief is the desired outcome for RFN, the ≥ 50% reduction benchmark served as a conservative yet meaningful clinical endpoint in this retrospective study, particularly given the limited literature on RFN for PN. Secondary outcomes aimed to evaluate functional improvements, including the patients' ability to perform activities of daily living, which can be significantly impacted by chronic pelvic pain. Additionally, reductions in the use of analgesic medications were documented to measure the overall impact of the procedure on the patients' reliance on pharmaceutical pain management.

Follow-up visits were scheduled after the procedure, during which patients were asked to complete assessments regarding their pain levels, functionality, and any changes in medication use. These visits were crucial for tracking the long-term effectiveness of the RFN treatment and for evaluating the sustainability of pain

relief and functional improvements. The primary metric used for evaluating success was a ≥ 50% reduction in pain, which has been widely accepted as a threshold for clinical success in pain management studies.

Statistical Analysis

Descriptive statistics were employed to summarize the baseline characteristics of the study population, including age, gender, and other demographic data, as well as clinical variables such as the duration of symptoms and prior treatments. These summary statistics were helpful for understanding the general makeup of the patient cohort and providing context for the results. To assess the success rates of the RFN procedures, both thermal and pulsed, data on pain reduction and functional improvement were collected and analyzed. Success was defined as a ≥ 50% reduction in pain intensity following the procedure, which is a commonly used threshold in pain management studies to indicate meaningful clinical benefit. Success rates for primary and secondary outcomes were calculated using percentages, and the data were presented in tabular/figure format to allow for easy comparison between the 2 RFN techniques.

Statistical analysis was carried out using Microsoft Excel (Microsoft Corporation, Redmond, WA), which was used to compute descriptive statistics. The data were analyzed for potential differences in outcomes between the thermal and pulsed RFN groups. While no formal inferential statistical tests were conducted due to the retrospective nature of the study, the results were presented in a manner that allows for an understanding of the relative effectiveness of each technique. The overall success rate for both RFN approaches was compared, and trends in pain relief and functional improvement were discussed.

CASE PRESENTATIONS

Patient Flow

Between August 2018 and August 2023, a total of 101 patients underwent fluoroscopy-guided transgluteal pudendal nerve blocks at our institution as part of their management for PN. These procedures were initially performed to assess the feasibility of using RFN in these patients. Out of these, 8 patients were selected for treatment with fluoroscopy-guided RFN, based on their diagnosis of PN and their lack of response to other conservative treatments, including no prolonged relief from nerve blocks. Among these 8 patients, 7 received pulsed RFN treatment, while one patient was treated with thermal RFN. The decision to use either thermal or pulsed RFN was based on patient-specific factors, including the patient's medical history and the extent of nerve involvement. One patient who underwent fluoroscopy-guided transgluteal pulsed RFN of the pudendal nerve had a concurrent UTI upon follow-up, which confounded an assessment of pain relief, so this patient was only included in baseline patient characteristic data (Table 1).

The remaining cohort included 5 women (75%) and 2 men (25%), with a mean age of 51 ± 13.9 years and a mean body mass index of 23.8 ± 3.1 kg/m^2. The most common medical history among the patients was a history of gynecologic or urologic surgery, present in 42.9% of the cohort (Table 1).

Primary Outcomes

The primary outcome of the study was the achievement of a ≥ 50% reduction in pain for ≥ 28 days as a result of each RFN procedure, which is considered clinically significant. The success rate for the thermal RFN procedure was 4/4 (100%). The success rate for the pulsed RFN procedure was 6/8 (75%).

The study also evaluated the duration of pain relief provided by RFN treatment. For the pulsed RFN proce-

Table 1. Patient characteristics.

Baseline Characteristics	Mean ± SD[1]
Age (y)	51 ± 13.9
BMI (kg/m^2)	23.8 ± 3.1
	n (%)[1]
Gender (Women)	5 (71.4)
Gender (Men)	2 (28.6)
Past Medical History	n (%)1
Anxiety	4 (57.1)
Depression	3 (42.9)
Gynecological/Urologic Surgery	3 (42.9)
Inflammatory Bowel Disease	1 (14.3)
Traumatic Birth	1 (14.3)
Past Treatments	n (%)[1]
Acupuncture	1 (14.3)
Pelvic Floor Physical Therapy	6 (85.7)
Pharmacological Medications	4 (57.1)
Other Procedures/Surgeries	4 (57.1)

[1]Continuous variables were expressed as mean ± SD. Categorical variables were expressed as number (percentage).
Abbreviations: y, years; BMI, body mass index; n, number.

dures, 5 of 6 procedures (83.3%) reported sustained ≥ 50% pain relief at one month, and 4 of 6 (66.7%) procedures provided relief at 3 months. In the thermal RFN case, the patient reported ongoing relief for 183 days after the first procedure and 335 days after subsequent treatments.

Secondary Outcomes

In addition to pain relief, several secondary outcomes were measured, including improvements in patients' activities of daily living, quality of life, and medication usage. Several patients reported significant functional improvements following RFN treatment. These improvements included the ability to resume regular activities, such as walking, sitting, and engaging in sexual activity, which were previously limited due to severe pain. Some patients also reported a reduction in their reliance on pain medications, including oral analgesics, which was indicative of an improved overall quality of life. One patient noted a decrease in vaginal atrophy, which was an unexpected yet encouraging secondary outcome. This finding may be linked to improved blood flow and nerve function following the RFN procedure, although further research is needed to explore this relationship in greater detail.

The patient who underwent thermal RFN developed mild urinary incontinence following the second ablation. While the incontinence may be linked to the procedure, it is important to note that she also received botulinum toxin type A (Botox) therapy for the pelvic floor muscles at the same time. This additional treatment could have potentially contributed to the incontinence. Therefore, while there may be a correlation between the thermal RFN procedure and urinary incontinence, causation cannot be definitively established due to the presence of other contributing factors. Furthermore, this patient did not have incontinence after the third and fourth procedures at 60°C.

Importantly, no other complications or adverse effects were observed in any of the patients following the procedure. There were no instances of infection, bleeding, or neurological deficits, which are common concerns associated with invasive pain management interventions. The absence of adverse effects further supports the safety and viability of fluoroscopy-guided RFN for the treatment of PN.

In summary, the RFN treatment, whether thermal or pulsed, demonstrated substantial benefits for patients with PN, not only by providing significant pain relief but also by improving functional outcomes and reducing medication use. These positive results, alongside the absence of complications, suggest that RFN is a promising minimally invasive treatment option for individuals suffering from this challenging and often debilitating condition.

DISCUSSION

Overview of the Study

This study is, to the best of the authors' knowledge, the largest retrospective cohort evaluation of fluoroscopy-guided RFN targeting the pudendal nerve via the transgluteal approach. Both thermal and pulsed RFN techniques were assessed for their potential to alleviate symptoms of PN in patients with limited response to nerve blocks. In this small cohort, pulsed RFN resulted in clinically meaningful pain relief (≥ 50%) in the majority of patients, with effects lasting between one to four months. The single patient treated with thermal RFN experienced more prolonged pain relief, with durations ≤ 11 months, and without recurrence after repeat procedures. Importantly, no major complications were reported in either group.

While the sample size was limited and the study design retrospective, these results provide preliminary support for the use of fluoroscopy-guided RFN in carefully selected patients. However, the findings should be interpreted with caution. The outcomes, though encouraging, do not establish superiority of one technique over the other and may be influenced by patient selection, anatomical variability, or technical factors. Future prospective studies with standardized pain and function metrics, longer follow-up, and larger patient populations will be necessary to confirm these observations.

RF Ablation and Its Application

When nerve blocks provide only temporary relief, RF ablation (RFA) is often considered as a means to extend pain relief. RFA is typically performed on an outpatient basis under local anesthesia, often with optional sedation, and involves the use of a specialized insulated needle directed toward the target nerve. The thermal energy delivered through the needle coagulates tissue, disrupting the transmission of pain signals from afferent nerve fibers and providing longer-lasting pain relief. Fluoroscopy guidance is commonly employed to ensure accurate needle placement, which is crucial for the success of the procedure (6-8) (Fig. 2).

Efficacy and Safety Considerations

The efficacy and safety of neurolytic procedures, including RFN, rely heavily on the regenerative capacity of the nerve and the potential for complications, such as acute neuritis or chronic sensory abnormalities. Absolute contraindications include infection at the injection site or active systemic infection, while relative contraindications include the presence of overlying tumors, radiculopathy, and coagulopathy (5). These considerations must be taken into account when evaluating patients for RFN treatment, as the risk of adverse effects can vary depending on the patient's specific medical history and the technique used.

For instance, one patient who received thermal RFN experienced mild urinary incontinence following the second ablation. While the incontinence may be linked to the procedure, it is important to note that the patient also underwent Botox therapy to the pelvic floor muscles at the same time. This additional therapy could have contributed to the incontinence, suggesting a possible correlation between the RFN procedure and urinary leakage, though causation cannot be definitively established due to other potential contributing factors. This highlights the importance of considering all aspects of a patient's treatment regimen when evaluating the safety and outcomes of RFN procedures.

Comparison Between Pulsed and Thermal RFN

A comparison between pulsed RFN and conventional (thermal) RFN reveals several key differences in their mechanisms of action and outcomes. Conventional thermal RFN involves heating the needle to temperatures ≥ ~60°C to create an ablative lesion, which effectively disrupts nerve fibers and provides long-lasting pain relief. This method is widely utilized for treating sensory nerves, as the targeted tissue is permanently destroyed, making it a more definitive treatment option. However, the high temperatures associated with thermal RFN carry the risk of damaging surrounding tissues and motor nerves, particularly when targeting nerves, such as the pudendal nerve, which contains both sensory and motor components (9-11). This risk is a significant consideration when choosing between thermal and pulsed RFN, especially in areas where motor function is vital.

In contrast, pulsed RFN operates at significantly lower temperatures—~42°C—and delivers electrical bursts

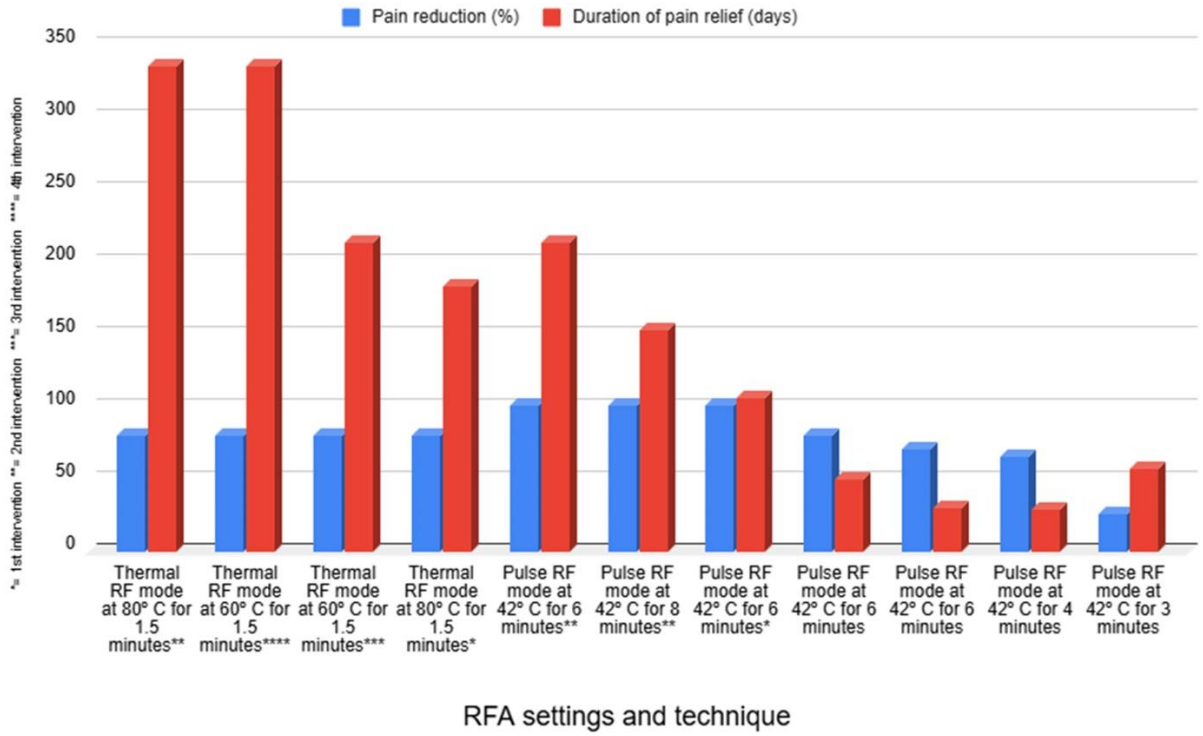

Fig. 2. Percentage of pain reduction and duration of pain relief in days based on RFA settings and technique.
RFA: radiofrequency ablation.

in short, timed intervals (e.g., 20 milliseconds on, 480 milliseconds off). This nonablative technique provides pain relief without causing permanent nerve damage, as the nerve fibers are not thermally destroyed. The exact mechanisms underlying the pain relief observed with pulsed RFN remain incompletely understood, but it is believed that the short bursts of energy modulate nerve activity, offering a less invasive approach with fewer risks to motor function. This is especially beneficial when treating nerves with a higher proportion of motor fibers, such as the pudendal nerve, where the preservation of motor function is crucial (9-11). As such, pulsed RFN has become increasingly favored when the risk of motor nerve degeneration needs to be minimized.

In our study, we selected a ≥ 50% reduction in pain sustained for ≥ 28 days as the primary threshold for success. This definition was based on prior observational studies in pain medicine and reflects a conservative, clinically meaningful marker of improvement. While we recognize that more durable relief is typically expected with RFN procedures, especially thermal RFN, our study aimed to document early treatment response as a signal for potential benefit. The durability of pain relief > 3 months varied between patients, and our results underscore the importance of longer-term follow-up and refined outcome metrics in future studies.

Review of Literature on RFN for PN

Despite limited evidence supporting RFN for PN, head-to-head comparisons between pulsed and thermal techniques remain scarce. In the limited literature on RFN for PN, studies have often utilized CT (12) or US (13,14) guidance to perform the procedure. One study (12) that used CT-guided pulsed RFN at 42°C for 120 seconds found that 3 out of 10 patients did not achieve therapeutic benefit. However, 6 patients reported complete and indefinite pain resolution, although these patients were lost to follow-up after 6 months (12). Another report (13) demonstrated significant pain reduction in patients who underwent pulsed RFN, with one patient's pain score dropping from 8/10 to 2/10 for ≥ 3 weeks. Additionally, a study (14) involving 34 patients treated with US-guided pulsed RFN showed an effective rate of 92.1%, compared to only 35.9% in the nerve block group at 3 months. The US-guided pulsed RFN group also showed further reductions in Patient Health Questionnaire-9 scores and oral analgesic use. These studies suggest that RFN is a potentially effective intervention for PN.

Fluoroscopy as a Guidance Technique

Fluoroscopy, being widely used in pain management procedures, was the guidance technique of choice for this study. Compared to nerve blocks and RFN, pudendal nerve release surgery is another potential treatment for some patients with PN. Various surgical approaches, including transperineal, transgluteal, laparoscopic, and endoscopic techniques, have been proposed. However, no single approach has proven superior in terms of efficacy or patient outcomes. Additionally, surgical expertise is often limited, and the associated costs, particularly with regard to insurance coverage, can be prohibitive. Despite these challenges, surgical treatments for PN have shown success rates ranging from 60% to 80%, especially when patients meet all 5 of the Nantes criteria (7,15).

Study Limitations

There are several important limitations to consider in this study. One major limitation is the small sample size and the retrospective design, which may limit the generalizability of the findings. Additionally, our study included only one patient who underwent thermal RFN, compared to 7 patients who received pulsed RFN. While the single thermal RFN patient showed excellent results, the small number of cases makes it difficult to draw broad conclusions. In contrast, the pulsed RFN group had more varied outcomes, with some patients experiencing significant pain relief, while others had less favorable responses. These differences may be due to the larger number of patients in the pulsed RFN group or could reflect variations in technique, as we did not specifically account for potential differences in procedural details. Furthermore, our study did not control for the use of concurrent medications, which could have influenced the outcomes. As a result, the findings from this study may not be fully applicable to other patient populations or settings where different approaches or medications are used. To comprehensively evaluate the safety, efficacy, and long-term benefits of this novel technique for PN, further research, ideally through large-scale, randomized controlled trials, would be beneficial.

CONCLUSIONS

Both pulsed and conventional RFN offer distinct advantages in the treatment of PN. Thermal RFN provides longer-lasting and more definitive pain relief but comes with a higher risk of motor nerve damage. Pulsed RFN, on the other hand, offers a less invasive treatment with

fewer risks to motor function, but the relief it provides may be less durable. Further studies comparing these 2 approaches in a larger cohort of patients are warranted to refine treatment strategies, improve clinical outcomes, and identify the ideal patient population for each technique.

REFERENCES

1. Hibner M, Desai N, Robertson LJ, Nour M. Pudendal neuralgia. *J Minim Invasive Gynecol* 2010; 17:148-153.
2. Krijnen EA, Schweitzer KJ, van Wijck AJM, Withagen MIJ. Pulsed radiofrequency of pudendal nerve for treatment in patients with pudendal neuralgia. A case series with long-term follow-up. Pain *Pract* 2021; 21:703-707.
3. [Amarenco G, Lanoe Y, Perrigot M, Goudal H. A new canal syndrome: Compression of the pudendal nerve in Alcock's canal or perinal paralysis of cyclists. *Presse Med* 1987; 16:399].
4. Labat JJ, Riant T, Robert R, Amarenco G, Lefaucheur JP, Rigaud J. Diagnostic criteria for pudendal neuralgia by pudendal nerve entrapment (Nantes criteria). *Neurourol Urodyn* 2008; 27:306-310.
5. Seale C, Connolly BR, Hulk K, Yu GG, Nagpal AS. The use of radiofrequency in the treatment of pelvic pain. *Phys Med Rehabil Clin N Am* 2021; 32:683-701.
6. Levin D, Van Florcke D, Schmitt M, et al. Fluoroscopy-Guided transgluteal pudendal nerve block for pudendal neuralgia: A retrospective case series. *J Clin Med* 2024; 13:2636.
7. Elkins N, Hunt J, Scott KM. Neurogenic pelvic pain. *Phys Med Rehabil Clin N Am* 2017; 28:551-569.
8. Biel E, Pivarunas A, Prentice T, Rowe N, Zhang SJ. The application of radiofrequency ablation in acute and chronic pain management. *AANA J* 2024; 92:220-231.
9. Usmani H, Dureja GP, Andleeb R, Tauheed N, Asif N. Conventional radiofrequency thermocoagulation vs pulsed radiofrequency neuromodulation of ganglion impar in chronic perineal pain of non-oncological origin. *Pain Med* 2018; 19:2348-2356.
10. Li SJ, Zhang SL, Feng D. A comparison of pulsed radiofrequency and radiofrequency denervation for lumbar facet joint pain. *J Orthop Surg Res* 2023; 18:331.
11. Turagam MK, Neuzil P, Schmidt B, et al. Clinical outcomes by sex after pulsed field ablation of atrial fibrillation. *JAMA Cardiol* 2023; 8:1142-1151.
12. Collard MD, Xi Y, Patel AA, Scott KM, Jones S, Chhabra A. Initial experience of CT-guided pulsed radiofrequency ablation of the pudendal nerve for chronic recalcitrant pelvic pain. *Clin Radiol* 2019; 74:897.e17-897.e23.
13. Hong MJ, Kim YD, Park JK, Hong HJ. Management of pudendal neuralgia using ultrasound-guided pulsed radiofrequency: A report of two cases and discussion of pudendal nerve block techniques. *J Anesth* 2016; 30:356-359.
14. Fang H, Zhang J, Yang Y, Ye L, Wang X. Clinical effect and safety of pulsed radiofrequency treatment for pudendal neuralgia: A prospective, randomized controlled clinical trial. *J Pain Res* 2018; 11:2367-2374.
15. Waxweiler C, Dobos S, Thill V, Bruyninx L. Selection criteria for surgical treatment of pudendal neuralgia. *Neurourol Urodyn* 2017; 36:663-666.