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Original Research

Retrospective Evaluation of Patients Underwent Ganglion Impar Pulsed Radiofrequency due to Coccydynia

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Abstract

Objectives: Although ganglion impar blockade has long been an effective procedure in the treatment of coccydynia, the pulsed radiofrequency (PRF) of the ganglion impar (GI) is a relatively new approach for the management of coccydynia. In the present study, we aimed to retrospectively evaluate patients who underwent GI PRF due to coccydynia.

Methods: Twenty-six patients diagnosed with coccydynia and treated with a PRF of the GI were included in this retrospective study. Clinical characteristics of the patients and treatment success were evaluated. Pain intensity was evaluated using a visual analog scale (VAS).

Results: The study included 19 (73.1%) female and 7 (26.9%) male patients. The median age of the patients was 45 (IQR: 24–60) years, and the etiology of pain was trauma in 21 (80.8%) of the 26 patients evaluated. There was a statistically significant decrease in VAS scores after GI PRF (Respectively; 6 [IQR: 6–7] and 2 [IQR: 0–3]). The PRF of the GI treatment success was 84.6%. Treatment success was 100% in patients with neuropathic pain and 59.1% in patients with nociceptive pain.

Conclusion: GI PRF is an effective and reliable procedure with low complication rate for pain relief in coccydynia.

Keywords: Chronic pain, coccydynia, pulsed radiofrequency treatment

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Coccydynia characterized by persistent pain in the coccygeal area and was first described by Simpson in the 19th century.[1] The most common etiology is fracture, subluxation, and abnormal mobility of the coccyx due to trauma.[2,3] Degenerative joint diseases, infectious conditions, and pelvis-anarectal cancers are among the other causes.[4] Average age of onset is shown as 40; and the prevalence is 5 times higher in women than men.[5] Coccydynia is a relatively benign condition and responds well to the use of medical therapy such as non-steroidal anti-inflammatory drugs and preventive therapy such as the use of pressure relief pillows. However, in some cases, the pain persists and requires interventional approaches.[6]

The ganglion impar (GI) (also known as Walther's ganglion) is a solitary retroperitoneal sympathetic ganglion which is formed by the midline convergence of the caudal ends of two paravertebral sympathetic chains in the retroperitoneal space behind the rectum around the sacrococcygeal joint or directly in front of the coccyx.[7,8] The ganglion supplies nociceptive and sympathetic fibers to the perineum, the lower third of the rectum, perianal region, urethra, vulva/scrotum, and vagina.[9,10] The ganglion impar blockade (GIB) can be performed with fluoroscopy, computerized tomography, or ultrasound guidance. Ganglion impar block can be used as a treatment option for chronic refractory coccygodynia and pelvic pain, including pain caused by ma-

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lignant neoplasms.[8,11-14] The most important advantage of this technique is that it can be applied at various ages from adolescents to elderly patients, improves the quality of life, offers, and provides the opportunity to apply repeated injections in patients with partial pain relief.[4,13,15,16] Unfortunately, approximately 18–25% of patients treated with GIB do not achieve an acceptable symptomatic improvement.[17] Although GIB has long been an effective procedure in the treatment of coccydynia, the PRF of the GI is a relatively new approach for the management of coccydynia.

In the present study, we aimed to retrospectively evaluate patients who underwent GI PRF due to coccydynia.

Methods

Following the approval of the Ethics Committee of Selcuk University (Approval date and number: 30.01.2019/2019/52), 7522 applications, between January 01, 2010, and May 31, 2018, were investigated in the Algology Clinic of Selçuk University Medical Faculty Hospital. Thirty-nine patients applied with the complaint of coccydynia and diagnostic ganglion impar block was applied to 26 patients who could not receive medical treatment for various reasons and did not have pain relief after medical treatment. Decrease in pain values by more than 50% according to the first evaluation was accepted as pain relief after diagnostic GIB and PRF was performed. Since all of the 26 patients who underwent diagnostic GIB had pain relief, all patients underwent PRF.

Pain intensity was evaluated using a visual analog scale (VAS). According to the VAS, patients were asked to rate their pain from 0 to 10 (with 0 as the lowest, no pain, and ten as the highest, worst pain ever experienced). Treatment success of PRF was defined as 50% or greater pain relief after 3rd month after the procedure according to the first evaluation. Age, gender, application form to the algology clinic, etiology of pain, pain type, whether medication is applied, smoking, VAS scores at the time of application (VAS-0), and in the 3rd month after the procedure (VAS-3) and treatment success were evaluated. Application form to the algology clinic was classified as in-hospital and out-of-hospital. The procedure was successfully performed in all 26 patients, whose PRF procedure was planned. There were no patients who were excluded due to the procedural failure.

After the procedure is explained to the patients and their written consent is obtained, diagnostic GIB is performed with a modified technique described by Reig et al.[9] The GIB was performed in the operating room after routine surgical preparation under local anesthesia and without sedation. We performed routine noninvasive monitoring of blood pressure, pulse oximetry, and electrocardiography and established intravenous access. Sterile preparation was accomplished using 10% povidone-iodine with the patient in the prone position on a fluoroscopy table and C-arm fluoroscopic guidance. After infiltrated the skin with 2% lidocaine a 9-cm-long, 22 gauge spinal needle was introduced through the sacrococcygeal junction under fluoroscopic guidance along with anteroposterior and lateral imaging. The position of the tip of the needle was visualized by fluoroscopic guidance with 1 mL of nonionic, radiocontrast dye injected retroperitoneally. The GIB was performed with 3 mL of 0.25% bupivacaine in all patients, and pulsed radiofrequency (PRF) was performed on patients who achieved at least 50% temporary pain relief. The PRF procedure was performed with similar technique to ganglion impar block. Patients received treatment consisting of passage of PRF current at 42°C for 4 min, two cycles of 120 s each.

Statistical Analysis

Data were statistically analyzed using the Statistical Package for the Social Sciences Version 22.0 (SPSS Inc., Chicago, IL, USA). Data were tested for normality with Kolmogorov-Smirnov test. Descriptive statistics were performed in all the patient groups; numerical data were expressed as median (inter-quartil range), while categorical data were given as percentages. Patient features were compared using Chi-Square or Fisher's Exact Test for categorical variables and Kruskal–Wallis Test for numerical variables. $P<0.05$ value was accepted as statistically significant.

Results

During the study period, 39 patients were admitted to the Algology clinic with coccydynia and 26 of them who were applied GI PRF were analyzed. The general characteristics of the patients included in the study are presented in Table 1. The median age of the patients was 45 (IQR: 24–60) years, and 73.1% (n=19) of the patients were female. Seven of the 26 patients were out-hospital application. The etiology of pain was cancer in only 5 (19.2%) of the 26 patients evaluated. The proportions of pain types were as follows: Neuropathic, 50% and Nociceptive, 50%. The number of patients who could not receive medical treatment before ganglion impar block was 8 (30.8%). VAS scores at the time of application (VAS-0) and in the 3rd month after the procedure (VAS-3) were as follows, respectively: 6 (IQR: 6–7) and 2 (IQR: 0–3). Treatment success was provided in 84.6% of all patients.

Comparison of VAS scores before and after GI PRF is shown in Figure 1. The VAS scores after GI PRF were statistically significantly lower than before GI PRF ($p<0.001$).

Comparison of the clinical features of patients according to

Table 1. General characteristics of patients, n (26)

Age, year	45 (24–60)
Gender, Male/Female, n (%)	7 (26.9)/19 (73.1)
Application form to the algology clinic, n (%)	
In-hospital	19 (73.1)
Out-of-hospital	7 (26.9)
Etiology of pain, n (%)	
Trauma	21 (80.8)
Cancer	5 (19.2)
Smoking, n (%)	3 (11.5)
Pain type, n (%)	
Nociceptive	13 (50)
Neuropathic	13 (50)
Medical treatment, n (%)	18 (69.2)
VAS-0	6 (6-7)
VAS-3	2 (0-3)
Treatment Success, n (%)	22 (84.6)

VAS-0: VAS scores at the time of application; VAS-3: VAS scores in the 3rd month after the procedure. Values are median (IQR) or n (%).

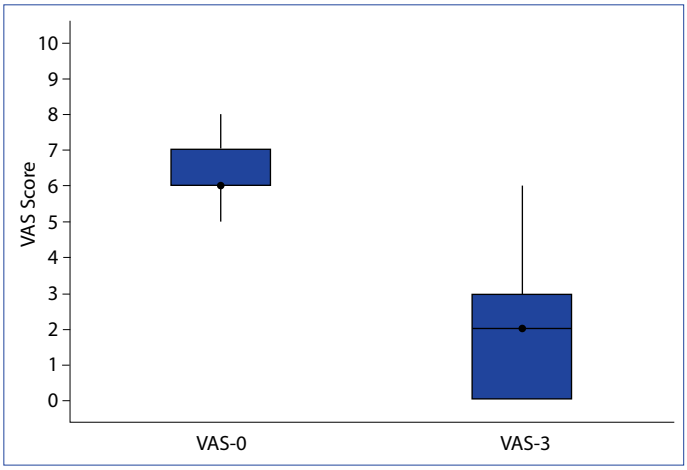

Figure 1. Comparison of VAS scores before and after ganglion impar pulsed radiofrequency. Values are in median, inter-quartile range, maximum and minimum. VAS-0: before ganglion impar pulsed radiofrequency, VAS-3: after ganglion impar pulsed radiofrequency.

treatment success is presented in Table 2. When the treatment success and non-success patients were compared, no difference was found in terms of age, gender, application form, etiology, smoking, medical treatment history, and VAS-0 scores (p=0.884, p=0.925, p=0.925, p=0.289, p=0.360, p=0.147, and p=0.068, respectively). When the treatment success and non-success patients were compared, a significant difference was found in terms of pain type (p=0.002). Treatment success was 100% in patients with neuropathic pain and 59.1% in patients with nociceptive pain.

No complications occurred in any of the patients during or after the procedures.

Discussion

In the present study, the pain type of the patients who underwent GI PRF was found to be 50% nociceptive and 50% neuropathic, and the success of PRF treatment of the ganglion impar was found to be higher in patients with neuropathic pain.

The GIB has been implemented as a relatively successful method in coccygodynia for the past 20 years. Paramedian sacrococcygeal, transdiscal sacrococcygeal, and anococcygeal approaches can be used for blockade and PRF of the ganglion impar.[18] We used the transdiscal sacrococcygeal technique both for diagnostic GIB and PRF due to its low complication rates and ease of this technic under fluoroscopy. The main advantage of PRF is that it provides long-term pain control without complications.[19] In addition, imaging techniques such as ultrasound and computerized tomograph were also used for these procedures.[9,14,20]

Although many reasons have been blamed in the etiology of coccydynia, major cause has been evaluated as trauma in many studies, with the rate varying between 40% and 70%.[8,17,21-23] In the present study, this rate was found to be 77.3%.

In the evaluation made according to the gender of the patients who applied with coccydynia, it was found that female patients were more frequent,[23] and it is noteworthy that the rate of female patients was high with 73.1% in the present study.

It has been reported that treatment success can be achieved in a high rate of up to 90% with medical treatment in patients with coccydynia.[24,25] Patients referred to our policlinic were those who were treated with multiple analgesics by other departments, but received no benefits. In the present study, in-hospital application rate was 73.1%.

Blockade of the GI is an effective procedure used for a long time for the management of coccydynia. However, PRF of the GI is a relatively novel approach for the management of coccydynia.[26] In the present study, we achieved 84.6% treatment success with PRF of the GI for the management of coccydynia. In the literature, although the management of coccydynia has achieved a treatment success of up to 82% in the early period with the GIB, it has been shown that PRF provides a superior treatment success compared to the GIB in the long-term results.[8,22,23,27] In the study of Sir et al. comparing GIB and PRF in coccydynia, they detected any difference in their evaluations up to the 3rd month after the procedure, but they found that the pain scores in the 6th month after the procedure were significantly lower in the PRP group.[27] In addition, GIB has been reported to be effective in reducing the neuropathic component of chron-

Table 2. Comparison of the clinical features of patients according to treatment success

	Treatment Success		P
	Succes (n=22)	Non-Succes (n=4)	
Age, year	45 (28–57)	40 (19–69)	0.881
Gender, (M/F) n (%)	6 (27.3)/16 (72.7)	1 (25)/3 (75)	0.925
Application form to the algology clinic, n (%)			
In-hospital	16 (72.7)/6 (27.3)	3 (75)/1 (25)	0.925
Out-of-hospital			
Etiology of pain, n (%)			
Trauma/Cancer	17 (77.3)/5 (22.7)	4 (100)/0 (0)	0.289
Smoking, n (%)	2 (9.1)	1 (25)	0.360
Pain type, n (%)			
Nociceptive	9 (69.2)	4 (30.8)	0.030
Neuropathic	13 (100)	-	
Medical treatment, n (%)	14 (63.6)	4 (100)	0.147
VAS-0	6 (6–7)	5.50 (4–6)	0.068
VAS-3	1 (0–3)	4.0 (2–5)	0.002

VAS-0: VAS scores at the time of application; VAS-3: VAS scores in the 3rd month after the procedure. Values are median (IQR) or n (%). M: Male; F: Female.

ic coccydynia.[21] In the present study, it was observed that the type of pain was effective in treatment success.

Complications of GIB such as hemorrhage, infection, and rectal perforation have been reported.[28] However, there is a directly proportional decrease in the risk of complications with the advancement of technology and the increase in the equipment used in interventional procedures. No complications developed in any of the patients in the present study.

The present study has limitations. The first limitation of our study is the retrospective review and the small sample size. As the second limitation, the follow-up period was only 3 months. More information could be obtained if the follow-up period was 6 months. However, we believe that our achievement of meaningful results even in 3-month follow-up should not be overlooked.

Conclusion

GI PRF is an effective and reliable procedure with low complication rate for pain relief in coccydynia. We can conclude that this activity is even higher in patients with neuropathic pain.

Disclosures

Ethics Committee Approval: The study was approved by the Selcuk University Faculty of Medicine Ethics Committee (Date: 19/12/2018, no: 2019/52).

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

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References

1. Lirette LS, Chaiban G, Tolba R, Eissa H. Coccydynia: an overview of the anatomy, etiology, and treatment of coccyx pain. Ochsner J 2014;14:84–7.
2. Patel R, Appannagari A, Whang PG. Coccydynia. Curr Rev Musculoskelet Med 2008;1:223–6. [CrossRef]
3. Maigne JY, Doursounian L, Chatellier G. Causes and mechanisms of common coccydynia: role of body mass index and coccygeal trauma. Spine (Phila Pa 1976) 2000;25:3072–9. [CrossRef]
4. Ellinas H, Sethna NF. Ganglion impar block for management of chronic coccydynia in an adolescent. Paediatr Anaesth 2009;19:1137–8. [CrossRef]
5. Fogel GR, Cunningham PY 3rd, Esses SI. Coccygodynia: evaluation and management. J Am Acad Orthop Surg 2004;12:49–54. [CrossRef]
6. Traub S, Glaser J, Manino B. Coccygectomy for the treatment of therapy-resistant coccygodynia. J Surg Orthop Adv 2009;18:147–9.
7. Raj PP, Erdine S. Interventional pain procedures in the pelvic and sacral regions. In: Raj PP, Erdine S, editors. Pain-Relieving Procedures: The Illustrated Guide. 1st ed. Hoboken, NY, USA: Wiley-Blackwell; 2012. p. 337–83. [CrossRef]
8. Gunduz OH, Sencan S, Kenis-Coskun O. Pain relief due to transsacrococcygeal ganglion impar block in chronic coccygodynia: a pilot study. Pain Med 2015;16:1278–81. [CrossRef]
9. Reig E, Abejón D, del Pozo C, Insausti J, Contreras R. Thermocoagulation of the ganglion impar or ganglion of Walther: description

of a modified approach. Preliminary results in chronic, nononcological pain. Pain Pract 2005;5:103–10. [CrossRef]
10. Green IC, Cohen SL, Finkenzeller D, Christo PJ. Interventional therapies for controlling pelvic pain: what is the evidence? Curr Pain Headache Rep 2010;14:22–32. [CrossRef]
11. Gonnade N, Mehta N, Khera PS, Kumar D, Rajagopal R, Sharma PK. Ganglion impar block in patients with chronic coccydynia. Indian J Radiol Imaging 2017;27:324–8. [CrossRef]
12. Toshniwal GR, Dureja GP, Prashanth SM. Transsacrococcygeal approach to ganglion impar block for management of chronic perineal pain: a prospective observational study. Pain Physician 2007;10:661–6. [CrossRef]
13. Le Clerc QC, Riant T, Levesque A, Labat JJ, Ploteau S, Robert R, et al. Repeated ganglion impar block in a cohort of 83 patients with chronic pelvic and perineal pain. Pain Physician 2017;20:E823–8.
14. Agarwal-Kozlowski K, Lorke DE, Habermann CR, Am Esch JS, Beck H. CT-guided blocks and neuroablation of the ganglion impar (Walther) in perineal pain: anatomy, technique, safety, and efficacy. Clin J Pain 2009;25:570–6. [CrossRef]
15. Datir A, Connell D. CT-guided injection for ganglion impar blockade: a radiological approach to the management of coccydynia. Clin Radiol 2010;65:21–5. [CrossRef]
16. Foye PM, Buttaci CJ, Stitik TP, Yonclas PP. Successful injection for coccyx pain. Am J Phys Med Rehabil 2006;85:783–4. [CrossRef]
17. Sencan S, Cuce I, Karabiyik O, Demir FU, Ercalik T, Gunduz OH. The influence of coccygeal dynamic patterns on ganglion impar block treatment results in chronic coccygodynia. Interv Neuroradiol 2018;24:580–5. [CrossRef]
18. Gritsenko K, Lubrano M, Patel VB. Ganglion impar blockade. In: Manchikanti L, editor. Essentials of Interventional Techniques in Managing Chronic Pain. 12th ed. Cham, Switzerland: Springer International Publishing; 2018. p. 581–94. [CrossRef]
19. Erdem Y, Sir E. The efficacy of ultrasound-guided pulsed radiofrequency of genicular nerves in the treatment of chronic knee pain due to severe degenerative disease or previous total knee arthroplasty. Med Sci Monit 2019;25:1857–63. [CrossRef]
20. Lin CS, Cheng JK, Hsu YW, Chen CC, Lao HC, Huang CJ, et al. Ultrasound-guided ganglion impar block: a technical report. Pain Med 2010;11:390–4. [CrossRef]
21. Sencan S, Kenis-Coskun O, Demir FGU, Cuce I, Ercalık T, Gunduz OH. Ganglion Impar block improves neuropathic pain in coccygodynia: A preliminary report. Neurol Neurochir Pol 2018;52:612–7.
22. Kırcelli A, Demirçay E, Özel Ö, Çöven I, Işık S, Civelek E, et al. Radiofrequency thermocoagulation of the ganglion impar for coccydynia management: long-term effects. Pain Pract 2019;19:9–15.
23. Sagir O, Demir HF, Ugun F, Atik B. Retrospective evaluation of pain in patients with coccydynia who underwent impar ganglion block. BMC Anesthesiol 2020;20:110. [CrossRef]
24. Capar B, Akpinar N, Kutluay E, Müjde S, Turan A. Coccygectomy in patients with coccydynia. Acta Orthop Traumatol Turc 2007;41:277–80.
25. Trollegaard AM, Aarby NS, Hellberg S. Coccygectomy: an effective treatment option for chronic coccydynia: retrospective results in 41 consecutive patients. J Bone Joint Surg Br 2010;92:242–5.
26. 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 nononcological origin. Pain Med 2018;19:2348–56. [CrossRef]
27. Sir E, Eksert S. Comparison of block and pulsed radiofrequency of the ganglion impar in coccygodynia. Turk J Med Sci 2019;49:1555–9. [CrossRef]
28. Elkhashab Y, Ng A. A Review of current treatment options for coccygodynia. Curr Pain Headache Rep 2018;22:28. [CrossRef]