Agri 2026;38(1):11–20
doi: 10.14744/agri.2025.76892
ORIGINAL ARTICLE

Targeting dual pathways in refractory coccydynia: A comparative study of ganglion impar block alone versus combined with pericoccygeal injection

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SUMMARY

Objectives: Coccydynia is a complex and often refractory pain condition involving both sympathetic and somatic components. While ganglion impar block (GIB) is a well-established interventional technique for cases unresponsive to conservative treatment, pericoccygeal injection may offer additional benefits by targeting peripheral sensitization and anococcygeal nerve-mediated pain. This study aimed to evaluate and compare the clinical effectiveness of GIB alone versus GIB combined with pericoccygeal injection in patients with refractory coccydynia.

Methods: This retrospective cohort study included 60 patients aged 18–65 years treated at a tertiary pain clinic between June 2022 and June 2024. Patients received either GIB alone or GIB combined with pericoccygeal injection in a single session under fluoroscopic guidance. Pain severity and functional outcomes were assessed using the Numeric Rating Scale (NRS-11), Oswestry Disability Index (ODI), and Paris Functional Coccydynia Impact Questionnaire (PFCIQ) before the procedure and at 1 and 3 months post-intervention.

Results: Both groups demonstrated significant improvements in NRS-11, ODI, and PFCIQ scores at 1 and 3 months compared to baseline ($p<0.001$). The combination therapy group showed significantly greater reductions in NRS-11 and ODI scores at 1 month ($p=0.043$ and $p=0.036$, respectively), and in ODI scores at 3 months ($p=0.04$). Analgesic use declined prominently in both groups, and no major complications were reported.

Conclusion: A single-session combination of GIB and pericoccygeal injection appears to offer superior short-term pain relief and functional improvement compared to GIB alone in refractory coccydynia. Further prospective studies are needed.

Keywords: Coccydynia; fluoroscopy; pain management; somatic pain; spinal injections; sympathetic pain.

Introduction

Coccydynia, defined as pain in the sacrococcygeal region, is a clinically challenging condition because of its complex etiology and variable response to therapy. It is often triggered by trauma, predominantly affecting women and individuals with obesity; however, neoplasms, somatoform disorders, and idiopathic reasons can also play a role. Patients complain of coccyx discomfort that worsens when they sit or stand for extended periods, indicating the area's intricate innervation that includes both somatic and sympathetic pathways.[1,2] The anococcygeal nerve provides an extensive supply to the coccyx, a vestigial structure composed of fused vertebrae, and the ganglion impar modulates this supply, thereby increasing its significance in pain perception.[3]

The current management of coccydynia follows a stepwise algorithm, beginning with lifestyle modifications and conservative therapies, such as non-

Submitted: 23.07.2025 Received: 15.09.2025 Accepted: 29.09.2025 Available online: 13.01.2026

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steroidal anti-inflammatory drugs (NSAIDs), pelvic floor exercises, and manual therapy techniques, including coccygeal massage and manipulation. Additional physical therapy options include thermal applications and extracorporeal shockwave therapy.[1,2,4] About 90% of patients respond well to conservative therapies; however, a significant portion of patients are resistant, requiring more sophisticated measures.[1,5,6] For resistant cases, interventional treatment options, particularly ganglion impar block (GIB), guided by fluoroscopy for precision, or some pericoccygeal injections using steroids or dextrose prolotherapy are preferred.[1,7] These approaches target both nociceptive and neuropathic components, offering relief where primary treatments fail. Nevertheless, optimal strategies remain under debate, with recent studies supporting multimodal interventions to address the condition's heterogeneity.[1,3,8]

The sympathetic chain's last node, known as Walther's ganglion or ganglion impar, is located variably anterior to the sacrococcygeal junction or first coccygeal vertebra. It integrates sympathetic and somatic inputs, contributing to coccygeal and perineal pain. GIB involves the use of local anesthetics by transdiscal or transsacrococcygeal techniques under fluoroscopic supervision, often in combination with neurolytic drugs such as phenol or ethyl alcohol. Conventional or pulsed radiofrequency ablation increases its usefulness.[9,10] Widely applied in coccydynia and tenesmus-related anorectal cancer pain, GIB's efficacy is well-documented, yet its limitations in addressing somatic pain components prompt exploration of adjunctive techniques.[11]

The aim for pericoccygeal injection is to create somatic blocking and lessen peripheral sensitization by targeting the anococcygeal nerve and adjacent tissues. Often administered posterior and lateral to the coccyx, it complements GIB by addressing local inflammation and nerve-mediated pain. Emerging evidence, particularly in postpartum coccydynia, suggests enhanced outcomes when combined with GIB, though its standalone role remains less defined.[9] By addressing both sympathetic and somatic pathways simultaneously, the combination of these methods may maximize pain relief—a theory that has not yet been thoroughly investigated.

To the best of our current understanding, the literature lacks comprehensive studies examining the therapeutic effects of pericoccygeal injections combined with GIB for the management of refractory coccydynia. This study aims to investigate and compare these effects in a single session for refractory coccydynia. The results of this study might improve pain treatment techniques by identifying an optimal interventional approach and guiding clinical decision-making with the development of targeted treatment protocols.

Materials and Methods

Study Design and Population

This retrospective study compared the effects of GIB alone versus GIB combined with pericoccygeal injection in coccydynia patients treated at a tertiary pain clinic that receives both direct patient admissions and referrals from other specialists. The study cohort was drawn from patients with a confirmed diagnosis of coccydynia persistent for at least 3 months as determined by history, clinical examination, and radiological imaging, who had undergone either GIB or GIB with pericoccygeal injection, and had complete medical records available for review between June 2022 and June 2024. All patients had failed conservative management, which included NSAIDs for at least 4 weeks, pelvic floor exercises and physical therapy, manual therapy techniques, and lifestyle modifications such as cushions and sitting modifications. Patients who had a recent intervention (within the past 6 months), morbid obesity (BMI>35 kg/m^2), severe comorbidities, skin infections, bleeding disorders, pregnancy, or incomplete records were excluded. A total of 60 patients aged 18–65 years who underwent either GIB or GIB with pericoccygeal injection were included. The sample size was determined using a power analysis (effect size: 0.84, power: 80%, error margin: 5%), based on previously published studies reporting significant differences in pain and functional outcomes following ganglion impar block interventions.[3,12,13] Accordingly, a minimum of 30 patients per group was required, and a total of 60 patients were enrolled.

Intervention

Treatment selection was based on clinical assessment by a single experienced pain medicine specialist (>5 years of experience) using the following approach:

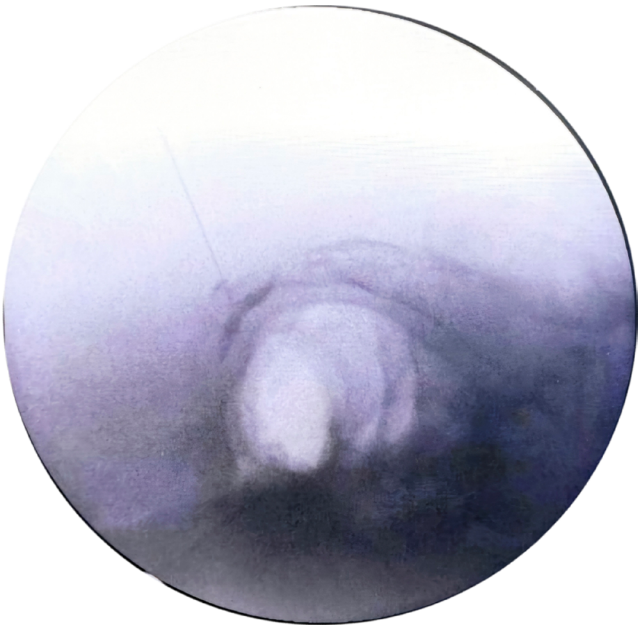

Figure 1. A ganglion impar block performed between the first and second coccygeal vertebrae (Co1–Co2).

patients with predominantly deep, aching coccygeal pain suggesting primary sympathetic involvement received GIB alone, while patients presenting with both deep pain and superficial pericoccygeal tenderness, indicating combined sympathetic and somatic involvement, received combination therapy.

A standard procedure was applied to all patients by the same pain medicine specialist with over 5 years of experience, in a sterile operating room under fluoroscopic guidance and monitored conditions. The patients underwent noninvasive blood pressure monitoring, pulse oximetry, and a five-lead electrocardiogram, and intravenous access was established in the forearm before positioning for the intervention. The position used during the intervention was the prone position, with a pillow placed under the belly. The procedure area was disinfected with povidone-iodine and covered with a sterile drape. Anterior-posterior (AP) imaging was first performed with a C-arm scopy device, which was then placed in the lateral position.

The ganglion impar was accessed with a Quincke spinal needle, transsacrococcygeally (from between the first and second coccygeal vertebrae if sacrococcygeal access could not be achieved). Then, 1 mL of non-ionic contrast medium was administered, and fluoroscopic anterior-posterior and lateral imaging was performed to confirm the appropriate spread of contrast (Fig. 1). After this confirmation, 2 mL of 0.5% bupivacaine, 2 mL of saline, and 40 mg of methylprednisolone acetate were injected.

In the combination therapy group who underwent pericoccygeal injection in addition to impar block, following the same procedure, 5 mL of 0.25% bupivacaine and 20 mg of methylprednisolone were injected into the posterior pericoccygeal region while the needle was withdrawn, thus also targeting blockade of the anococcygeal nerve.

After the procedure, all patients were monitored and observed for at least two hours. Patients who had no additional complaints during follow-up visits were discharged.

Data Collection

Data were extracted from patient files following ethical approval. Recorded information included demographic details (age, sex), body mass index (BMI), symptom duration, comorbidities, prior medical treatments, procedure details, coccydynia etiology, and outcome measures.

Outcome Measures

Pain Assessment with the Numeric Rating Scale (NRS-11)

Pain levels were measured using the Numeric Rating Scale (NRS-11), a widely recognized tool for quantifying pain intensity. This scale ranges from 0 to 10, where 0 represents no pain and 10 signifies the worst imaginable pain. Patients were asked to rate their pain based on their subjective experience, providing a straightforward and reliable metric for assessing pain severity.[14,15] The NRS-11 was administered before the procedure and at follow-up intervals of 1 and 3 months post-procedure to track changes in pain levels over time, allowing for a clear evaluation of the intervention's effectiveness in reducing pain.

Oswestry Disability Index (ODI)

Functional disability was assessed using the Oswestry Disability Index (ODI), a validated questionnaire designed to evaluate the impact of pain on daily functioning. The ODI consists of 10 domains—pain intensity, lifting, self-care, walking, sitting, sexual function, standing, social life, sleep quality, and travel—each scored on a 0–5 scale. The total score

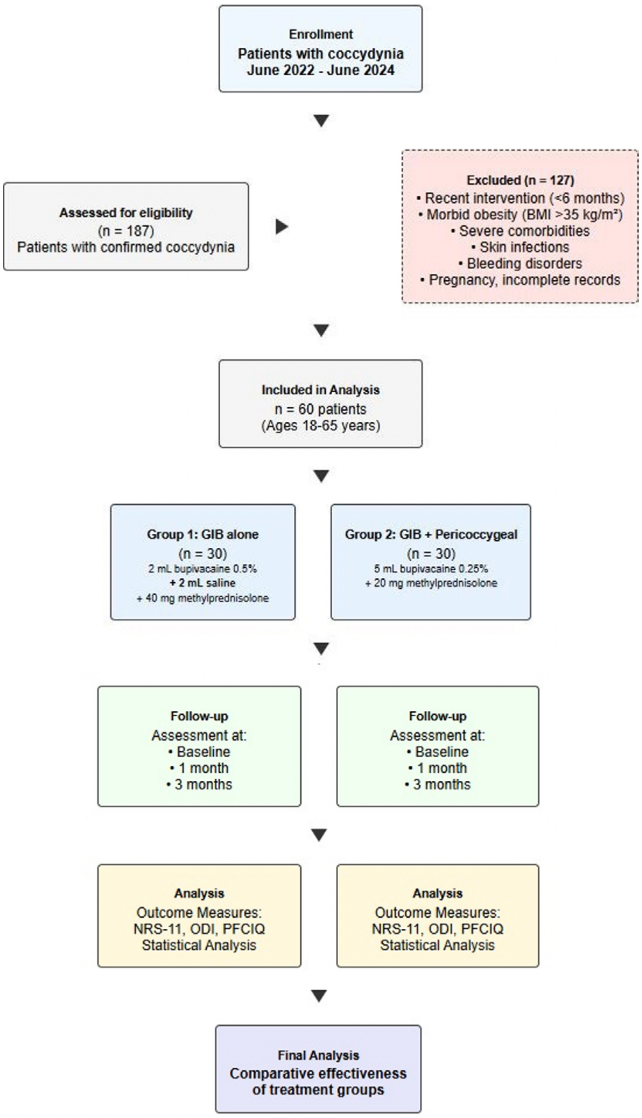

Figure 2. Study flowchart.

is expressed as a percentage (0–100%), with higher scores indicating greater disability. This comprehensive tool captures the multidimensional impact of pain on patients' lives.[16] ODI scores were collected pre-procedure and at 1 and 3 months post-procedure to monitor improvements in functional capacity following the intervention.

The Paris Functional Coccydynia Impact Questionnaire (PFCIQ)

To specifically address coccyx-related functional limitations, the Paris Functional Coccydynia Impact Questionnaire (PFCIQ) was employed. This targeted questionnaire evaluates the unique challenges associated with coccydynia, including difficulties with sitting, standing, or performing activities that exacerbate coccyx pain. The PFCIQ provides a detailed assessment of how coccyx-specific impairments affect patients' quality of life and daily activities.[17] Like the other metrics, PFCIQ scores were recorded before the procedure and at 1 and 3 months post-procedure, enabling a focused evaluation of the intervention's impact on coccyx-related functional outcomes.

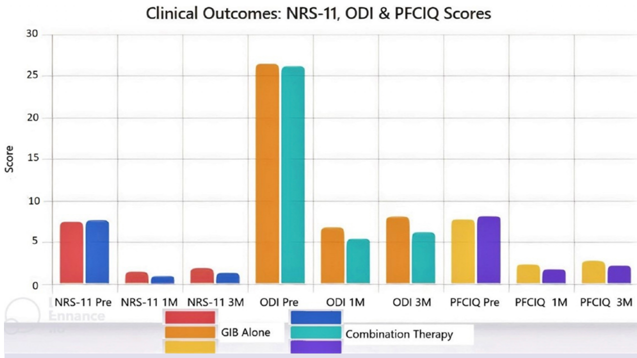

Figure 3. Comparison of clinical outcome scores between the ganglion impar block (GIB) alone group and the combination therapy group (GIB + pericoccygeal injection) at baseline, 1 month, and 3 months post-procedure. Bars represent mean scores for the Numeric Rating Scale (NRS-11), Oswestry Disability Index (ODI), and Paris Functional Coccydynia Impact Questionnaire (PFCIQ). Both groups demonstrated significant improvements in all outcome measures at follow-up. The combination therapy group showed lower NRS-11 and ODI scores at 1 month, and lower ODI scores at 3 months, compared to the GIB-alone group. PFCIQ scores improved in both groups without significant intergroup differences.

Ethical Considerations

The study was approved by the Institutional Review Board (IRB) on 26/09/2024 (ID: KAEK/2024.09.200). As it is a retrospective cohort study, no additional patient consent beyond routine clinical consent was required. Data collection occurred between October 1, 2024, and December 1, 2024. This study is registered at clinicaltrials.gov with the identifier NCT07060313. All procedures were conducted in compliance with the Declaration of Helsinki's ethical guidelines and any subsequent revisions.

The study flowchart is shown in Figure 2.

Statistical Analysis

Data were analyzed using IBM SPSS Statistics Standard Concurrent User Version 26 (IBM Corp., Armonk, New York, USA) statistical software package. Descriptive statistics are presented as numbers (n), percentages (%), mean±standard deviation, median, minimum, and maximum. The normality of the distribution of data for the numerical variables was assessed using the Kolmogorov-Smirnov normality

Table 1. Demographic features

	Performed procedure		Test statistics	
	Ganglion impar block	**Combination therapy**	**Test value**	**p**
Gender, n (%)			0.085	0.771†
Female	21 (47.7)	23 (52.3)		
Male	9 (56.3)	7 (43.7)		
Side of pelvic pain, n (%)			0.476	0.788†
Bilateral	25 (50)	25 (50)		
Right	3 (42.9)	4 (57.1)		
Left	2 (66.7)	1 (33.3)		
Etiology, n (%)			2.715	0.257†
Trauma	22 (48.9)	23 (51.1)		
Idiopathic	8 (61.5)	5 (38.5)		
Others	0 (0)	2 (100)		
Age, (years)	46.6±12.49	43.43±15.57	0.878	0.384‡
	45 (24–78)	42 (19–78)		
BMI, (kg/m^2)	28.89±3,38	27.87±3.29	1.18	0.243‡
	29.25 (22–34.5)	27.55 (19.2–34.4)		
Duration of pain, (month)	2 (1–10)	2 (1–6)	418.5	0.621&
	2.63±2.29	2.13±1.25		

n: Number of patients, Numerical variables are presented as mean±standard deviation or median (minimum–maximum) values. †: Chi-Square test; ‡: Independent samples t test; &: Mann-Whitney U test.

test, and the homogeneity of variances was evaluated using Levene's test. The impar ganglion block and impar ganglion block + pericoccygeal injection groups were compared based on numerical variables using an independent samples t-test in cases of normal distribution, and a Mann-Whitney U test when the distribution was not normal. Chi-square tests were used to compare groups based on categorical variables, and the Friedman test was applied to analyze the median NRS-11, ODI, and PFCIQ scores during the follow-up period. Significance values have been adjusted by the Bonferroni correction for multiple tests. Statistical significance was set at $p<0.05$, and values were considered statistically significant.

Results

The study included data from 60 patients, comprising 44 females (73.3%) and 16 males (26.7%). The mean age of the participants was 45.03±14.09 years. Demographic characteristics are summarized in Table 1. No statistically significant differences were observed between the groups in terms of age, gender, BMI, duration of pain, etiology, or the side of pelvic pain (Table 1).

Both groups showed a significant improvement in NRS-11, ODI, and PFCIQ scores at the 1st and 3rd months compared to baseline values ($p<0.001$) (Table 2, 3).

Subgroup analysis revealed that while both groups experienced significant improvements from baseline at 1 and 3 months, the magnitude of change between the 1st and 3rd months within each group was not statistically significant. However, when comparing between groups, the combination therapy group demonstrated significantly greater improvement in NRS-11 and ODI scores at 1 month ($p=0.043$ and $p=0.036$, respectively), and in ODI scores at 3 months ($p=0.04$). No statistically significant differences were observed between the groups concerning the other variables ($p>0.05$) (Table 4).

No statistically significant difference was found between the two groups regarding analgesic use. However, while 58 patients (96.6%) required analgesic treatment before the procedure, only 9 patients (15%) continued to require analgesics at the third month post-procedure, indicating a substantial reduction in analgesic consumption (Table 5).

Table 2. Comparative analysis of the pre-procedure, post-procedure 1st and 3rd month NRS-11, ODI and PFCIQ in ganglion impar block group

	Mean (SD)	Median (min–max)	Test value*	p
NRS-11			2.971	**<0.001**
Pre-procedure	7.5 (0.82)	8 (6–9)[a]		
1st-month	1.47 (0.97)	2 (0–3)[b]		
3rd-month	1.9 (1.47)	2 (0–6)[bc]		
ODI			49.034	**<0.001**
Pre-procedure	26.5 (3.14)	26 (20–32)[a]		
1st-month	6.8 (2.52)	6 (3–12)[b]		
3rd-month	8.1 (3.54)	7.5 (4–17)[bc]		
PFCIQ			52.362	**<0.001**
Pre-procedure	7.8 (0.96)	8 (6–10)[a]		
1st-month	2.37 (1.03)	2 (0–4)[b]		
3rd-month	2.77 (1.63)	3 (0–8)[bc]		

*: Friedman test statistic; a–c: Values sharing the same letter within each column do not different significantly; NRS-11: Numeric Rating Scale -11; ODI: Oswestry Disability Index; PFCIQ: Paris Functional Coccydynia Impact Questionnaire; SD: Standard deviation; Min: Minimum; Max: Maximum.

Table 3. Comparative analysis of the pre-procedure, post-procedure 1st and 3rd month NRS-11, ODI and PFCIQ in combination therapy group

	Mean (SD)	Median (min–max)	Test value*	p
NRS-11			49.532	**<0.001**
Pre-procedure	7.67 (0.96)	8 (6–9)[a]		
1st-month	0.96 (0.92)	1 (0–3)[b]		
3rd-month	1.37 (0.99)	1 (0–4)[bc]		
ODI			46.991	**<0.001**
Pre-procedure	26.2 (2.96)	26 (20–32)[a]		
1st-month	5.47 (2.01)	5 (2–9)[b]		
3rd-month	6.23 (2.34)	6 (2–12)[bc]		
PFCIQ			50.296	**<0.001**
Pre-procedure	8.2 (0.96)	8 (6–10)[a]		
1st-month	1.8 (1.16)	2 (0–4)[b]		
3rd-month	2.23 (1.13)	2 (0–4)[bc]		

*: Friedman test statistic; a-c: Values sharing the same letter within each column do not different significantly; NRS-11: Numeric Rating Scale -11; ODI: Oswestry Disability Index; PFCIQ: Paris Functional Coccydynia Impact Questionnaire; SD: Standard deviation; Min: Minimum; Max: Maximum.

Throughout the study period, no major complications were reported or observed in either group. Key findings are presented in Figure 3.

Discussion

This study investigated the therapeutic efficacy of ganglion impar block (GIB) alone versus GIB combined with pericoccygeal injection for refractory coccydynia, demonstrating significant pain relief and functional improvement in both groups. The combination therapy group exhibited statistically significant improvements in pain and disability scores at 1 month and disability scores at 3 months compared to the GIB-alone group. These findings suggest that combining pericoccygeal injection with GIB may enhance short-term pain relief and functional outcomes, potentially by addressing both sympathetic and somatic pain pathways.[18]

Table 4. Pre-procedure, post-procedure 1st and 3rd-month NRS-11, ODI and PFCIQ scores on the procedures

	Ganglion impar block (n=30)		Combination therapy (n=30)		Test statistics	
	Mean (SD)	**Median (min–max)**	**Mean (SD)**	**Median (min–max)**	**Test value***	**p**
NRS-11 pre-procedure	7.5 (0.82)	8 (6–9)	7.67 (0.96)	8 (6–9)	408	0.512
NRS-11 1st-month	1.47 (0.97)	2 (0–3)	0.96 (0.92)	1 (0–3)	319	**0.043**
NRS-11 3rd-month	1.9 (1.47)	2 (0–6)	1.37 (0.99)	1 (0–4)	366	0.197
ODI pre-procedure	26.5 (3.14)	26 (20–32)	26.2 (2.96)	26 (20–32)	438.5	0.864
ODI 1st-month	6.8 (2.52)	6 (3–12)	5.47 (2.01)	5 (2–9)	309.5	**0.036**
ODI 3rd-month	8.1 (3.54)	7.5 (4–17)	6.23 (2.34)	6 (2–12)	312.5	**0.041**
PFCIQ pre-procedure	7.8 (0.96)	8 (6–10)	8.2 (0.96)	8 (6–10)	348.5	0.114
PFCIQ 1st-month	2.37 (1.03)	2 (0–4)	1.8 (1.16)	2 (0–4)	334	0.075
PFCIQ 3rd-month	2.77 (1.63)	3 (0–8)	2.23 (1.13)	2 (0–4)	376.5	0.259

*: Mann Whitney U Test; NRS-11: Numeric Rating Scale -11; ODI: Oswestry Disability Index; PFCIQ: Paris Functional Coccydynia Impact Questionnaire; SD: Standard deviation; Min: Minimum; Max: Maximum.

Table 5. Comparative analysis of the pre-procedure, post-procedure 1st and 3rd month analgesic treatments on the procedures

	Ganglion impar block n (%)	Combination therapy n (%	Test value*	p
Pre-procedure			2.285	0.515
None	2 (100)	0 (0)		
Paracetamol	16 (47.1)	18 (52.9)		
NSAID	6 (54.5)	5 (45.5)		
Others	6 (46.2)	7 (53.8)		
1st-month			0.218	0.642
None	27 (49.1)	28 (50.9)		
Paracetamol	3 (60)	2 (40)		
NSAID	0	0		
Others	0	0		
3rd-month			0.353	0.838
None	25 (49)	26 (51)		
Paracetamol	3 (50)	3 (50)		
NSAID	2 (66.7)	1 (33.3)		
Others	0	0		

*: Chi-Square test; NSAID: Non-steroidal anti-inflammatory drugs.

These results align with recent literature supporting interventional approaches for coccydynia. A 2022 prospective randomized study by Sencan et al.[12] compared GIB with caudal epidural steroid injection, finding that while both methods initially improved pain, the effects of GIB seemed more pronounced at the six-month follow-up. A 2024 randomized trial by Genc Perdecioglu et al.[3] compared coccygeal nerve blockade to GIB, reporting significant pain reduction with both methods, though GIB showed slightly superior outcomes at 3 months. Our study extends these findings by demonstrating that the addition of pericoccygeal injection may further improve early outcomes, likely due to its targeting of the anococcygeal nerve, which modulates somatic pain. Similarly, a 2023 case series by Esmaeeli et al.[9] explored combined caudal epidural and paracoccygeal injections for postpartum coccydynia, noting significant pain relief at 1 month. The consistency of our findings with Esmaeeli et al.[9] supports the role of multimodal injections in addressing complex pain etiologies; however, our study's larger sample and standardized protocol support the reliability of these observations.

In contrast, a 2023 study by Swain et al.[10] reported that GIB alone achieved adequate pain control in idiopathic coccydynia, with no additional benefit from adjunctive techniques. The GIB's ability to block the sympathetic ganglionic pathways is reported to offer a systematic method of pain management, utilizing local anesthetics and steroids to address underlying inflammation.[19] Our results point to a discrepancy that may stem from differences in patient populations, as our cohort included diverse etiologies (traumatic, idiopathic, somatoform diseases, and others), potentially necessitating broader pain pathway targeting following recent reviews emphasizing the heterogeneity of coccydynia responses, advocating for tailored multimodal treatment strategies.[1,8]

Corticosteroid injections into the pericoccygeal region can reportedly provide temporary relief but often lack the comprehensive, consistent effectiveness seen with nerve blocks like GIB, particularly in patients with chronic pain mechanisms.[20,21] Additionally, pericoccygeal injections may involve more complications related to repeated interventions due to temporary relief, including risks of infection and variations in pain management outcomes.[22] By combining GIB and pericoccygeal injection in a single session, our intervention minimizes these concerns and may eliminate the need for recurrent treatments while increasing efficacy by simultaneously addressing the sympathetic and somatic pain pathways. The combination group's notable gains in NRS-11 and ODI scores at one month and three months indicate that this strategy might provide a stronger early response than GIB alone, potentially by more successfully addressing peripheral sensitization and local inflammation.[9,18]

The significant reduction in analgesic use (from 96.6% to 15% at 3 months) in both groups highlights the clinical relevance of these interventions. However, the lack of significant differences in PFCIQ scores between groups suggests that coccyx-specific functional limitations may be less responsive to the additional pericoccygeal injection, possibly due to the PFCIQ's focus on sitting and standing difficulties, which may be influenced by factors beyond pain intensity, such as pelvic floor dysfunction or biomechanical issues.[13,17]

Limitations

It is important to recognize a number of limitations in spite of these encouraging results. First, because treatment allocation was not randomized, the retrospective approach introduces potential selection bias and restricts conclusions about causality. Although the groups' baseline characteristics were similar, results could have been affected by unmeasured confounders such as psychological issues or previous treatment adherence. Second, the three-month follow-up period is quite brief, making it difficult to draw conclusions regarding long-term efficacy. According to earlier research, the effects of GIB may wear off after six months, requiring additional interventions.[12,21] In order to determine whether the combination therapy maintains its advantages over time, future research should extend the follow-up. Third, although the sample size was sufficient according to power analysis, it might not have been sufficiently large to identify variations in secondary outcomes such as analgesic use or PFCIQ scores. To validate these results and investigate subgroup effects, larger, prospective trials are required, especially in individuals with particular etiologies such as traumatic coccydynia or postpartum coccydynia.

When administered by qualified professionals, fluoroscopy-guided GIB and pericoccygeal injections are safe, as demonstrated by the lack of major complications in either group. However, the use of corticosteroids in both interventions raises concerns about potential side effects, including tissue atrophy or systemic absorption.[23] Alternative injectates for combination therapy that may provide regeneration advantages with less risk, including platelet-rich plasma or dextrose prolotherapy, could be the subject of future research.[7,24]

Clinically, our findings support the integration of pericoccygeal injection with GIB as a viable option for refractory coccydynia; however, the decision to pursue combination therapy should be individualized, considering factors such as pain chronicity, etiology, and patient preferences. The development of standardized protocols for combined interventions, including optimal injectate volumes and concentrations, could further improve efficacy.

Conclusion

This study provides preliminary evidence that combining GIB with pericoccygeal injection offers superior short-term pain relief and functional improvement compared to GIB alone in refractory coccydynia. These results demonstrate the need to address the complexity of the problem by focusing on both the sympathetic and somatic pain pathways. Longer follow-up periods in future randomized controlled trials are necessary to confirm these findings, clarify the processes behind the advantages of the combination therapy, and determine its place in the treatment algorithm for coccydynia.

Ethics Committee Approval: The İstanbul Kanuni Sultan Süleyman Training and Research Hospital Ethics Committee granted approval for this study (date: 26.09.2024, number: KAEK/2024.09.200).

Informed Consent: As it is a retrospective cohort study, no additional patient consent beyond routine clinical consent was required.

Conflict of Interest: The authors declare that there is no conflict of interest.

Financial Disclosure: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Use of AI for Writing Assistance: None declared.

Authorship Contributions: Concept – HİA, FAE; Design – HİA, FAE; Supervision – HİA, MZ; Resources – MZ, FAE; Materials – HİA, FAE; Data collection and/or processing – HİA, FAE; Analysis and/or interpretation – MZ, HİA, FAE; Literature search – MZ; Writing – MZ; Critical review – MZ, HİA.

Acknowledgments: The authors thank the staff of the Pain Clinic for their everyday hardwork and help in collecting the data.

Peer-rewiew: Externally peer-reviewed.

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