Retrospective Study

Dual Site Pudendal Nerve Infiltration: More than Just a Diagnostic Test?

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Background: Pudendal neuralgia (PN) is a very painful and often disabling condition in which pudendal nerve blocks play an important role in both the diagnosis and management of PN. Some previous reports have advocated the use of pudendal nerve infiltration (PNI) as a diagnostic test only.

Objective: We aim to assess the outcomes of patients with typical refractory PN who underwent dual site computed tomography (CT)-guided pudendal nerve infiltration.

Study Design: A bicentric, retrospective cohort analysis.

Setting: An academic practice.

Methods: Between 2002 and 2016, 385 PNIs were performed in 195 patients in the 2 units. Only patients suffering from typical clinical PN were included, and only the first infiltration in each patient was considered for analysis. Therefore, 95 patients who underwent 155 procedures were assessed. Pain was assessed using a visual analog scale (0–10) and self-reported estimated improvement (SRI), expressed as a percentage. Efficacy of the procedure was assessed at 1, 3, and 6 months after procedure follow-up, and clinical success was defined as a 50% decrease of the VAS score. All procedures were performed under CT guidance and on an outpatient basis. Dual site infiltration was performed in each case at both the ischial spine and intra-Alcock's canal sites using a mixture of fast- and slow-acting anesthetic (1 mL lidocaine hydrochloride 1% and 2 mL ropivacaine chlorhydrate) along with a half dose of 1.5 mL of cortivazol (3.75 mg).

Results: Clinical success at one month post-procedure was present in 63.2% of patients (60/95) with a mean VAS score of 2.07 ($P < 0.05$) and a mean SRI of 71%. At 3 months follow-up, clinical success was still present in 50.5% of patients (48/95) with a mean VAS score of 2.90/10 ($P < 0.05$) and a mean SRI of 62.3%. At 6 months follow-up, the efficacy rate decreased to 25.2% with a mean VAS score of 3.2/10 and SRI of 60%.

Limitations: The retrospective aspect of the study is a limitation, as well as the lack of a control group.

Conclusion: Dual site PNI under CT guidance may offer significant mid-term pain relief to a majority of patients suffering from typical refractory PN.

Key words: Pudendal nerve, neuralgia, block, Alcock, CT, guidance

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Pudendal neuralgia (PN) is a very painful and often disabling condition (1,2). It is characterized by the combination of a neuropathy, defined as severe sharp pain along the course of a nerve, in the distribution of the pudendal nerve (1). The complex clinical presentation is explained by the distribution of the pudendal nerve branches leading to a variety of symptoms possibly including pelvic pain, along

with bowel, bladder, and sexual dysfunction (3). However, in some patients, the clinical presentation is less complex and diagnosis of PN is less difficult, as the following symptoms are present: neuropathic pain without sensory deficit in the pudendal territory (from the penis/clitoris to the anus) and increased pain while sitting, with mild or no night pain. These clinical criteria were described as 'essential criteria' in 2008 by Labat et al (4) who codified diagnostic criteria for PN. However, in other cases, diagnosis and treatment of PN sometimes remains a challenge. Failure of timely diagnosis and conservative management strategies, such as drugs for neuropathic pain, rehabilitation, transcutaneous electrical nerve stimulation, and psychobehavioral approaches result in uncontrolled chronic pain in many patients with PN (1). Pudendal nerve blocks play an important role in both the diagnosis and management of PN (4). They have been described as a necessary step prior to more invasive therapies (5), such as nerve stimulation (6), pulsed radiofrequency neurolysis (7), cryoneurolysis (8), or surgical nerve decompression (9). However, numerous pudendal nerve infiltration (PNI) techniques have been described in the literature with various outcomes (3,10-13), and some authors advocate the use of PNI solely as a diagnostic test due to short-term pain relief (4,14,15). The use of PNI as a therapeutic option may also be considered but has been less reported when performed at 2 distinct anatomical sites. The objective of this study is therefore to retrospectively assess the mid-term outcomes of patients presenting with typical clinical refractory PN who underwent dual site computed tomography (CT)-guided PNI.

Methods

This was a retrospective study performed at 2 institutions with data collected between 2002 and 2016. Local institutional review board approval was obtained, and written informed consent was waived.

Patients

A total of 385 PNIs were performed in 195 patients in the previously defined study period. Because it has been shown previously that PNI is more effective in patients with typical PN (13), only patients suffering from typical clinical PN were included for analysis. Typical PN was defined as the presence of all of the following criteria: neuropathic pain without sensory deficit in the pudendal territory (from the penis/clitoris to the anus) and increased pain while sitting, with mild or no night pain. Patients presenting with the following symptoms were also included in case all of the above symptoms were present: intrarectal or intravaginal foreign body sensation and pain increase during defecation. Moreover, only the first infiltration in each patient was considered for analysis. Finally, only patients suffering from refractory chronic pain (6 months) were included. Therefore, 95 patients who underwent 155 procedures were assessed (Fig. 1). The data were collected in the patients' medical records and included information on demographics and clinical and pain management history.

Pain Evaluation

Pain was assessed using a visual analog scale (VAS) (0–10) and self-reported estimated improvement (SRI), expressed as a percentage. VAS scores were noted immediately before and at regular intervals following the procedure: 1, 3, and 6 months. SRI evaluations were also noted at these intervals.

Because PNIs were performed as therapeutic procedures, clinical success was defined as at least 50% improvement in VAS scores and was evaluated at 1, 3, and 6 months after the procedure.

Procedure

All of the procedures were accomplished by one of several authors, with CT guidance on an outpatient basis. The procedure was performed according to a standardized approach, as follows:

An initial planning CT was performed at the level of the obturator foramens, and the targets were located at both sites: ischial spine and Alcock's canal (Fig. 2) (16). At this second level, the pudendal nerve and the accompanying vessels are seen as a small bulge or linear structure within a split in the aponeurosis of the internal obturator muscle (Fig. 2). After accurate marking of the skin, a local subcutaneous injection of lidocaine hydrochloride 1% was performed at a defined skin entry-point. Advancement of the needle (spinal 22-gauge, 100 mm) was performed under CT guidance until needle-tip artifacts were located at the defined targets (Fig. 3). In case of a bilateral PNI, both sides were infiltrated at the same time (Fig. 3). Injection of contrast media was performed at both targets to confirm accurate diffusion and lack of vessel enhancement. Concerning the Alcock's canal infiltration site, careful attention was paid to needle positioning as diffusion of contrast should be seen in the canal, not in the surrounding perirectal fat (Fig.

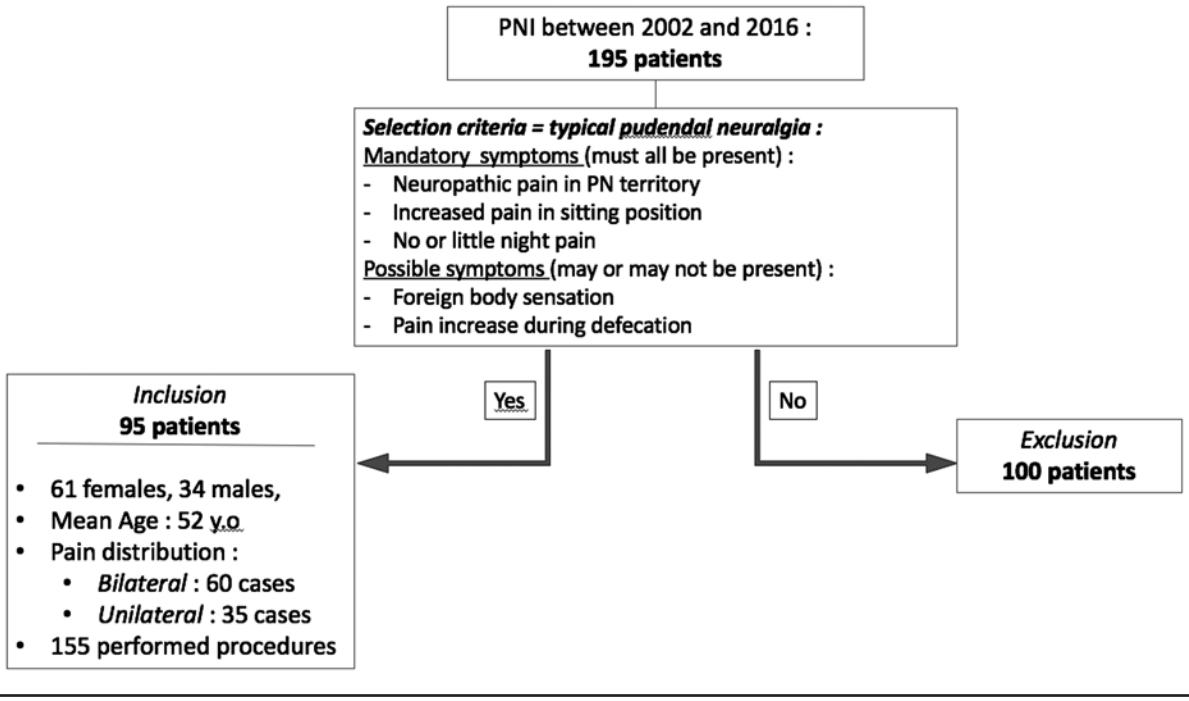

Fig. 1. *Flow chart representing patient selection and demographic data.*

4). In case of inaccurate contrast diffusion, the needle was relocated until satisfying diffusion was obtained. After confirming satisfactory needle positioning with contrast injection, a mixture of a fast- and slow-acting anesthetic (1 mL lidocaine hydrochloride 1% and 2 mL ropivacaine chlorhydrate were injected along with a half dose of 1.5 mL of cortivazol (3.75 mg) at each site.

Ability to inject the anesthetics and corticosteroids in the correct target at both sites was considered as a technical success. After needle retrieval, a control axial CT-scan was performed, and the patient was supervised 30 minutes at the CT unit.

Statistical Analysis

A statistician was not involved with the assessment of the data. Statistical analysis was performed through an Excel® data sheet (Microsoft, Redmond, WA) and by using paired samples t-test. The mean VAS scores and SRI evaluations of each follow-up were compared with the baseline; the values were given as means.

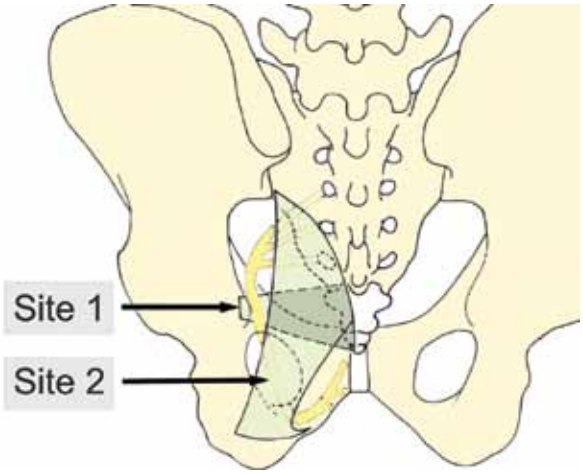

Fig. 2. *Pudendal nerve anatomical representation.*
This anatomical drawing represents the 2 potential conflicting pudendal nerve entrapment sites (black arrow head): site 1 corresponds to the segment of the pudendal nerve passing between the sacrotuberous and sacrospinous ligaments (image A); site 2 corresponds to the pudendal nerve segment passing in the Alcock's canal alongside the internal obturator muscle (image B).

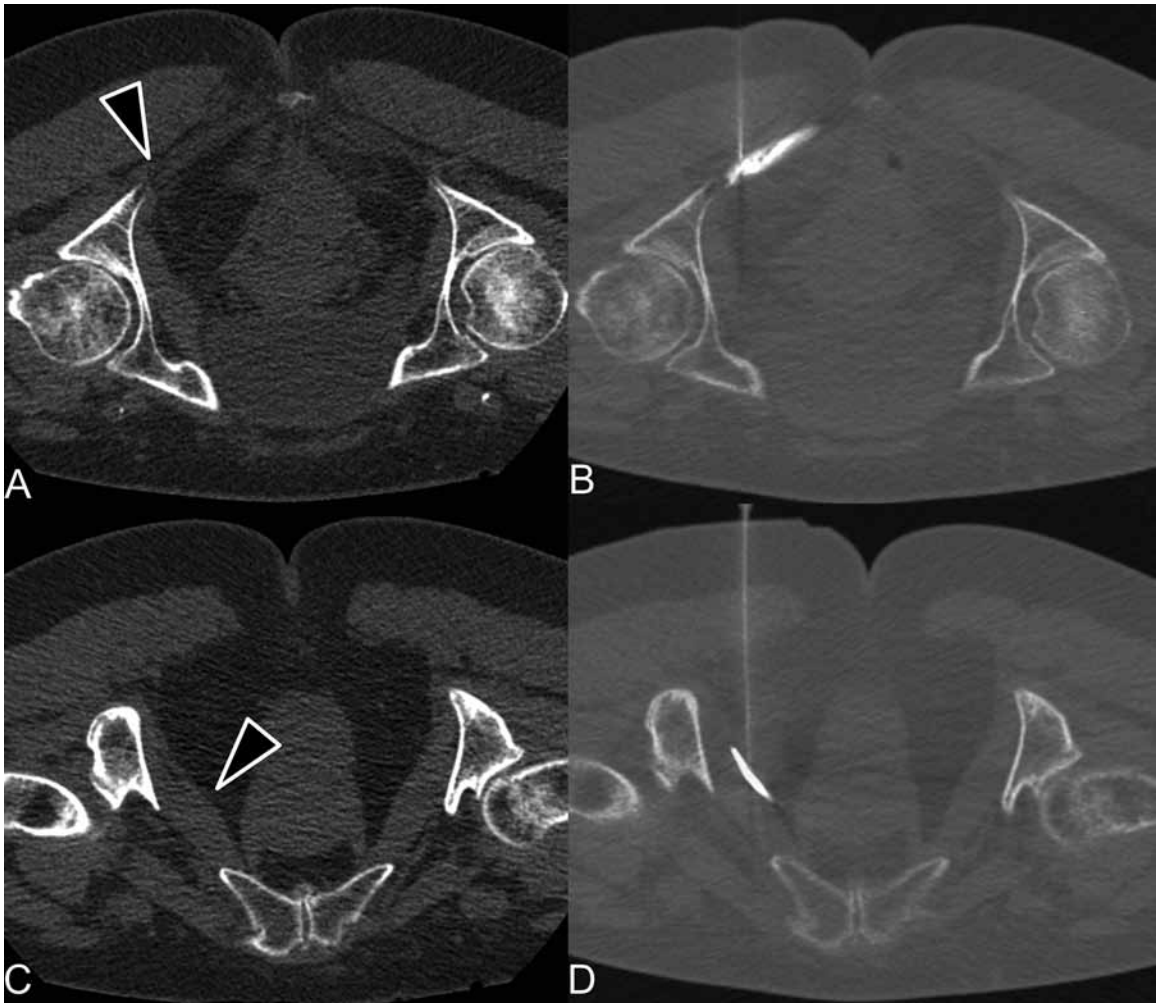

Fig. 3. *Intraoperative CT images of dual-site PNI.*
Images A and C represent a planning CT slice at site 1 (Image A) and site 2 (Image C). Images B and D show accurate needle positioning with satisfactory contrast media diffusion at both targets.

Results

Patients

Our cohort consisted of 95 patients (61 women [64.2%] and 34 men [35.8%]) with a mean age of 52 years old (range 24–86 years). Mean pain prior to the procedure was 8.06/10 (range 6–++10). Patients suffered from bilateral pain in 60 cases and unilateral pain in 35 cases.

Pain Evaluation

Clinical success at one month post-procedure as previously defined was present in 63.2% of patients with a mean VAS score of 2.07 ($P < 0.05$) and a mean SRI of 71%. At 3 months follow-up, clinical success was still present in 50.5% of patients (48/95) with a mean VAS score of 2.90/10 ($P < 0.05$) and a mean SRI of 62.3%. At 6 months follow-up, the efficacy rate decreased to 25.2% with a mean VAS score of 3.29/10 and SRI of 60%. The main results are summarized in Table 1.

Procedure

Technical success of the procedure was 100%. Mean procedure time was 11.9 ± 2.2 minutes in case of unilateral infiltration and 22.3 ± 1.9 minutes in case of bilateral infiltration.

Complications

After the procedure, transient pain increase was noted in 8 cases, and transient sciatic nerve block occurred in 2 cases.

Discussion

Our study showed that double-site CT-guided PNI is a safe and effective technique in cases of clinically suspected PN. Indeed, our results showed a 63% efficacy rate at 1 month post-procedure and 50% at 3 months, decreasing to 25% at 6 months with no major complications. These results are not negligible in patients suffering from intractable refractory perineal pain. Further, although PNI is commonly used in the diagnosis of PN, these results suggest that it may also be performed as a therapeutic procedure in the difficult task of alleviating pelvi-perineal pain in refractory patients. Other previous studies have reported the efficacy of PNI with variable results and with various image-guided modalities (14,15). The duration of pain alleviation of PNI is reported to be relatively short, whatever the technique used. PNI is widely used as a diagnostic test. Our results are however in accordance with recently published evidence (3) recommending that PNI should be performed as a therapeutic procedure and not only as a diagnostic tool (4,14,15). When compared to previously reported results with PNI, our study shows a higher efficacy rate with a longer efficacy period. However, our results are discordant with those reported recently by Labat et al (17) using the same double site technique. The differences in the ouctomes are confusing, but may be explained by differences in the technique performed (type of steroid and local anesthetics injected, experience of operators, etc.).

Dual site infiltration has been shown to be more effective when applied to other indications (18), which may be explained by either a dose-related effect or by the fact that 2 potential conflicting sites have been described for PN (16). The concept of 'double crush,' which was described by Upton and McComas in 1973 in carpel tunnel syndrome (19), may also apply in PN. This concept is based on the hypothesis that compression of an axon at one location makes it more sensitive to effects of compression in another location. Therefore, 2 lesions of a nervous structure, when combined, may lead to appearance or magnification of symptoms. Infiltrating the 2 possible sites of pathology may result in enhancing the chances of targeting the origin of the nerve conflict.

Moreover, as it has been shown in other fields of interventional pain management (20), the precision of the needle-tip placement in the exact anatomical target is mandatory for a successful outcome both in terms of efficacy on pain and especially in terms of diagnostic value. Thus, detection of Alcock's canal and accurate iodine diffusion alongside the canal must be thoroughly assessed before infiltration. It is indeed mandatory to infiltrate the canal itself and not the pararectal fatty space, as shown in Fig. 4. This very important technical aspect has been reported previously (16,21). However, some studies assessing CT-guided infiltrations or other interventional technique using pudendal nerve block as a selective criteria, show inaccurate contrast diffusion in the pararectal space and not the canal itself (10-12). In our study, the exact needle position in the canal was carefully assessed for all patients and may explain the higher efficacy rate in our patients. Indeed, because the Alcock's canal has been shown to be a potential cause of nerve entrapment (2,22), intracanalar infiltration may induce both an anti-inflammatory effect due to the steroids and a mechanical dilatation of the Alcock's canal, thereby possibly helping to reduce nerve entrapment. When compared to fluoroscopy, CT guidance allows a higher precision of needle placement due to a higher image resolution both for bone and soft tissues. The use of CT guidance in this study, when compared to previously published data with fluoroscopy, may partly explain the higher mid-term efficacy rate.

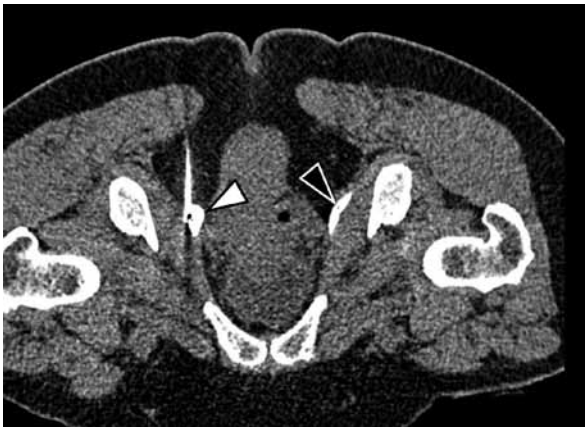

Fig. 4. *Intraprocedural CT image after Alcock's canal infiltration.*
This image depicts an accurate intra-Alcock's canal contrast media injection on the right side (black arrowhead) and inadequate contrast media injection on the left side (white arrowhead). Note how the product diffusion is contained in the canal on the right side creating a bi-concave lentil as opposed to a round shaped product diffusion on the left, in favor of pararectal fat location.

Table 1. *Pain evaluation results at 1, 3, and 6 months follow-up.*

	Baseline	1 Month	3 Months	6 Months
Clinical Success		63.2% (60/95)	50.5% (48/95)	25.2% (24/95)
Mean VAS Score	8.06 (± 1.38)	2.07 (± 1.24)	2.90 (± 0.85)	3.29 (± 0.6)
SRI Score		71%	62.3%	60.4%

VAS = visual analog scale
SRI = self-reported improvement

When compared with the data of Puget et al (13), our study showed a higher efficacy rate. This difference may be explained by a careful selection of patients. Indeed, in their study, Puget et al (13) reported a higher rate of efficacy in patients with typical clinical symptoms. This is why we chose to include patients with a high clinical suspicion of PN.

Limitations of this study include the retrospective nature of the assessment and the lack of control group. Moreover, because pelvic pain is of a very complex nature, assessing the efficacy of the procedure may appear as a difficult task. Finally, pain evaluation was made using simple scoring methods (VAS and SRI scores), which are subjective outcome measures depending on personal interpretation and variations, as opposed to other more complex pain indexes dedicated to pelvic pain. The effectiveness of all the procedures performed in both units since 2002 were evaluated with VAS and SRI scores, as we find it is a relatively simple, reliable, and sufficient way to ascertain patients' pain response to a procedure.

Conclusion

This study showed that dual site PNI under CT guidance may offer satisfying mid-term pain relief to a majority of patients suffering from typical refractory PN. Careful attention should be paid to perform an accurate intra-Alcock's canal injection, in order to allow the highest possible pain relief.

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