

Retrospective Study



Repeated Ganglion Impar Block in a Cohort of 83 Patients with Chronic Pelvic and Perineal Pain

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Background: The ganglion impar is the first pelvic ganglion of the efferent sympathetic trunk that relays pelvic and perineal nociceptive messages and therefore constitutes a therapeutic target.

Objective: The objective of this single-center study was to evaluate the effectiveness of 3 repeated ganglion impar blocks in patients with chronic pelvic and perineal pain on intention-to-treat.

Study Design: Retrospective single-center study.

Setting: We reviewed the medical records of 83 patients with chronic refractory pelvic and perineal pain. On intention-to-treat analysis, 62 (74.7%) of the patients received 3 ganglion impar blocks.

Methods: Ganglion impar block was performed with 0.75% ropivacaine via a lateral approach over the Co1-Co2 coccygeal joint with computed tomography (CT) guidance. The effectiveness of ganglion impar blocks was evaluated by visual analogue scale (VAS) before and 30 minutes after the blocks. Evaluation at least one month after the block was also performed by Patient Global Impression of Change (PGI-C).

Results: A total of 220 blocks were performed, 193 (87.7%) of which were considered to be positive with immediate but transient improvement of pain by more than 50% and complete but transient pain relief after the procedure in 119 (54.1%) procedures. The variation of the VAS score before and after each block was statistically significant ($P < 0.001$). Similarly, the VAS score before repeated blocks was significantly improved with decreased pain intensity over time ($P = 0.001$). Analysis of the PGI-C one month after the block demonstrated improvement in 41% of cases in the overall population and in 43.6% of cases in the subgroup of 62 patients treated by 3 blocks.

Limitations: Retrospective study, short term follow-up.

Conclusions: Repeated ganglion impar blocks allowed short-term reduction of pain intensity with a moderate intermediate-term effect. Ganglion impar appears to be a useful therapeutic target to block the nociceptive message by acting on sensitization phenomena.

Key words: Pudendal neuralgia, impar block, pain, perineal, coccygodynia

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The pathophysiological mechanisms involved in pelvic and perineal pain have not been fully elucidated. Many cases of pelvic and perineal pain cannot be exclusively explained by organ

abnormalities, in which case the organ is at the “site” of the pain but is not the “cause” of the pain.

Chronic pain can be accompanied by sensitization phenomena. This pathophysiological mechanism is

common to other chronic pain syndromes, especially complex regional pain syndrome (reflex sympathetic dystrophy), which appears to be due to dysfunction of the autonomic system that is intimately involved in visceral sensitivity (1).

Suprlevator pelvic innervation is purely autonomic. Only the sympathetic system possesses sensory fibers and would therefore be able to transmit pain, while the parasympathetic system is purely motor. In contrast, the perineum has a dual, somatic, and autonomic (sympathetic) innervation, essentially mediated by the pudendal nerve (2).

Sympathetic nerve fibers arise from perineal and visceral structures to reach the pelvic fascia. These fibers converge onto the inferior hypogastric ganglion and then onto the sympathetic trunk, hypogastric nerve, and superior hypogastric plexus situated anteriorly to the sacral promontory. Most convergences between the autonomic nervous system and the somatic nervous system then occur at the thoracolumbar junction, especially at L1-L2. Sympathetic fibers leave the sympathetic trunk via white rami communicantes to reach the dorsal root before entering the spinal cord (2).

The ganglion impar (or coccygeal ganglion or ganglion of Walther) is a sympathetic ganglion situated at the convergence of the 2 sympathetic trunks and is the first pelvic ganglion of the efferent sympathetic trunk (3).

Part of pelvic and perineal pain is therefore transmitted via visceral sympathetic nerve fibers to the ganglion impar and then to the sympathetic trunk and the spinal cord via rami communicantes before finally ascending to the brain.

The sympathetic nervous system, acting as vector of the nociceptive message between the viscera and the central nervous system, constitutes a therapeutic target in the management of pelvic and perineal pain. Inhibition of nociceptive transmission by the sympathetic nervous system could therefore have an analgesic effect and an action on sensitization phenomena, possibly allowing improvement of pain by blocking nociceptive transmission in the absence of a treatable organic cause (4).

The objective of our study was to evaluate, on an intention-to-treat basis, the efficacy of 3 repeated ganglion impar blocks in chronic pelvic and perineal pain.

METHODS

Population

We conducted a single-center retrospective study by reviewing the medical records of 83 patients with

chronic refractory pelvic and perineal pain and a baseline visual analogue scale (VAS) score > 40/100, to whom 3 repeated ganglion impar blocks were proposed between September 2011 and October 2014. Patients were managed on an intention-to-treat basis and data following the blocks were collected prospectively in a database.

The population was composed of 80.7% women. The mean age at the time of diagnosis was 53.3 ± 16.08 years (range: 19 – 86 years).

Chronic pain had been present for an average of 5.7 years (range: 7 months – 30 years). Most patients reported refractory pudendal neuralgia (RPN) persisting despite pudendal nerve decompression surgery (36%), while a smaller proportion presented isolated coccydynia (29%) (Table 1).

Ganglion Impar Block Technique

Blocks were systematically performed with computed tomography (CT) guidance (Siemens Somatom® scanner). Patients were placed in the ventral decubitus position. The block was performed via a lateral approach to the ganglion impar over the Co1-Co2 coccygeal joint (5).

No patient had sedation before or during the block. Skin and subcutaneous anesthesia was performed with plain 1% lidocaine. A 22-gauge needle was introduced via a lateral transgluteal approach into the anterior aspect of the Co1-Co2 coccygeal joint. An injection of 5 mL of 0.75% ropivacaine and iodinated contrast agent (Iopamiron®) was performed (Fig. 1) to clearly identify the presacral and retrorectal compartment and to visualize the quality of the block.

Three consecutive blocks at intervals of about one month were systematically proposed to the patients. As patients were managed on an intention-to-treat basis, patients who considered that they did not obtain any response or who were markedly improved after one block did not systematically receive the following blocks.

Evaluation

All patients were evaluated before and 30 minutes after each block by means of a VAS ranging from 0 (no pain) to 100 (maximum pain).

A subjective evaluation of effectiveness by the Patient Global Impression of Change (PGI-C) was also performed immediately and at least one month after the block. This evaluation scale comprises 7 points: 1: very much improved; 2: much improved; 3: minimally

improved; 4: no change; 5: minimally worse; 6: much worse; 7: very much worse (6).

Statistical Analysis

Statistical analysis was performed with BiostaTGV® software with a Student's test and ANOVA on intention-to-treat results.

RESULTS

Intervals between Blocks

Figure 2 shows the intention-to-treat study design with the reasons for drop-out from the study. Three ganglion impar blocks were finally performed in 62 (74.7%) of the 83 patients.

The mean interval between the clinical diagnosis and the first block was 68 ± 59 months (range: 7 – 374 months). The mean interval between the first and second blocks was 45 ± 52 days (range: 7 – 401 days) and the mean interval between the second and third blocks was 26 ± 24 days (range: 7 – 184 days).

Ganglion Impar Block

A total of 220 ganglion impar blocks were performed in 83 patients; 193 (87.7%) of these 220 procedures were considered to be positive with an immediate but transient reduction of pain by more than 50%, including complete but always transient pain relief during the hour following the procedure in 119 (54.1%) procedures.

Table 2 shows the variations of the mean VAS score before and 30 minutes after blocks. The variation of the VAS score was statistically significant for each block. We observed a decrease of VAS score of 75%, 74%, and 80% after block 1, block 2, and block 3, respectively.

Analysis of the various VAS scores before blocks demonstrated a significant improvement of pain as a result of repeated blocks with decreased pain intensity over time (ANOVA, $P = 0.001$) (Fig. 3).

Analysis of PGI-C

For the overall population, long-term analysis of PGI-C demonstrated improvement in 41% of patients, including 22.9% of patients who were much improved ($\text{PGI-C} \leq 2$). However, 8.4% of patients reported worse symptoms and 50.6% reported no long-term change (Fig. 4).

For the subgroup of 62 patients in whom 3 blocks were performed, long-term analysis of PGI-C demonstrated improvement in 43.6% of patients and 50% reported no long-term change (Fig. 5).

Table 1. Patient characteristics.

Clinical diagnosis	Number of patients (%)
Pudendal neuralgia refractory to surgery (RPN)	30 (36%)
Isolated coccygodynia	24 (29%)
Complex pelvic pain syndrome	13 (16%)
RPN and coccygodynia	10 (12%)
Vestibulodynia	6 (7%)



Fig. 1. CT scan of ganglion impar block.

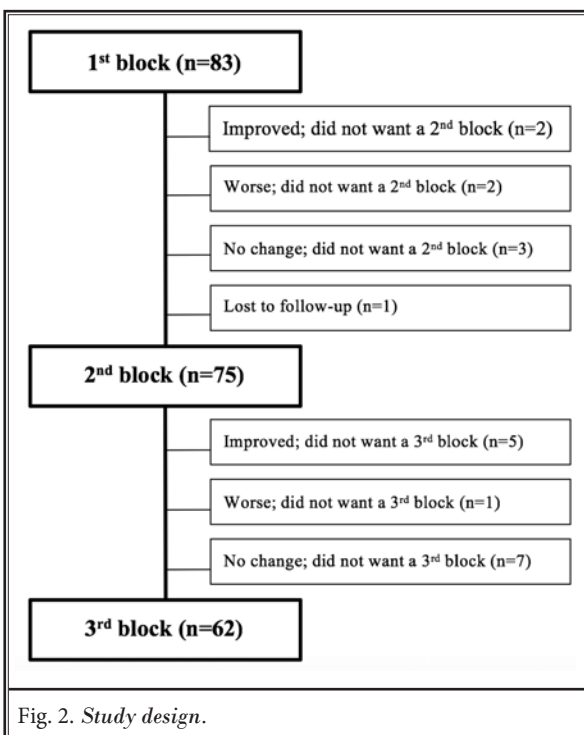


Fig. 2. Study design.

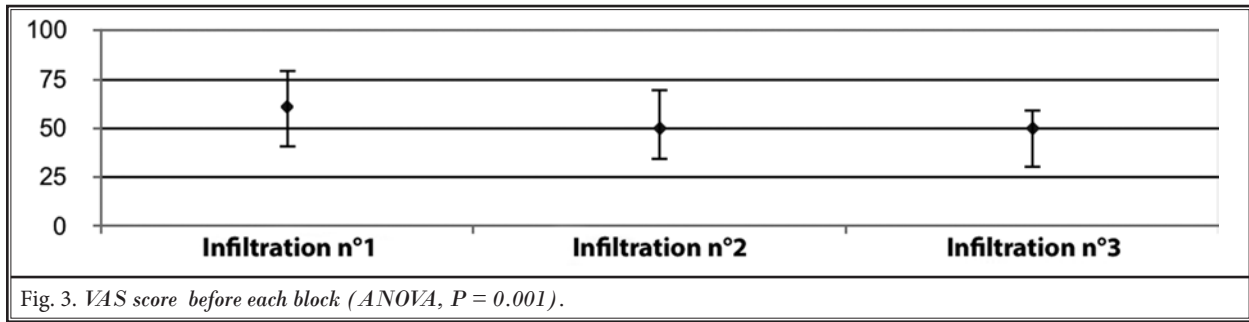


Fig. 3. VAS score before each block (ANOVA, $P = 0.001$).

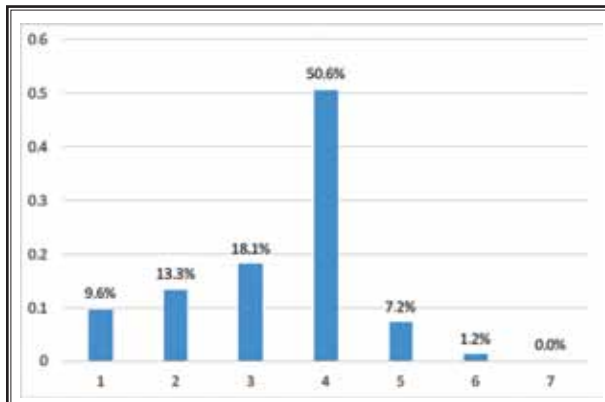


Fig. 4. PGI-C score for the overall population ($n = 83$) (1: very much improved; 2: much improved; 3: minimally improved; 4: no change; 5: minimally worse; 6: much worse; 7: very much worse).

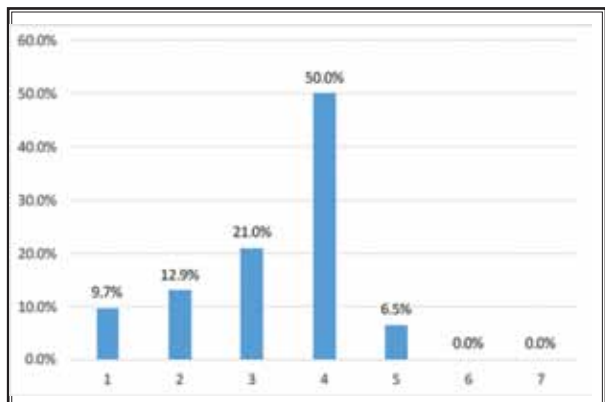


Fig. 5. PGI-C score for the subgroup of patients in whom 3 blocks were performed ($n = 62$) (1: very much improved; 2: much improved; 3: minimally improved; 4: no change; 5: minimally worse; 6: much worse; 7: very much worse).

Predictive Factor of Response

No predictive factor of response to blocks was demonstrated, in particular no correlation was observed according to the type of the pain ($P = 0.22$).

Table 2. Variation of the mean VAS score before and 30 minutes after each block.

	Mean VAS before	Mean VAS after	P-value	95%CI
Block 1	61/100	15/100	< 0.001	[41.0477; 55.9354]
Block 2	55/100	14/100	< 0.001	[35.5863; 50.3803]
Block 3	46/100	9/100	< 0.001	[30.9156; 43.8177]

Complications and Morbidity of Ganglion Impar Block

No cases of infection, anal incontinence, or unscheduled hospitalization were observed after the blocks. The estimated mean radiation dose delivered by CT for each block was 44.48 mGy/cm. Patients who had 3 blocks received a mean radiation dose of 132.44 mGy/cm.

DISCUSSION

In this study, repeated ganglion impar block was shown to be beneficial in almost one-half of patients with refractory pelvic and perineal pain, with no associated complications. To our knowledge, this is the largest cohort study to evaluate the effects of 3 consecutive ganglion impar blocks.

This study demonstrates that the ganglion impar is a therapeutic target for patients with refractory pelvic and perineal pain. Isolated local anesthetic block of the ganglion impar provided a marked benefit in more than 85% of patients, but with only a transient effect. Repeated blocks also induced progressive reduction of the VAS score over time before each block. However, evaluation of the PGI-C one month after the block did not reveal any marked long-term improvement of repeated blocks compared to isolated blocks.

In our study, we had different etiologies of pain defined by the European Association of Urology (uroweb.org): Vestibulodynia is defined as a chronic vestibulo-vulvar discomfort that patients suffer with that is characterized by complaints of burning, stinging,

irritation, and/or rawness, and this generally needs to be differentiated from problems of itching or pruritus vulvae; coccygodynia is the occurrence of chronic or recurrent episodic pain perceived in the region of the coccyx, in the absence of proven infection or other obvious local pathology; pudendal neuralgia is defined as a pain in the anatomical territory of the pudendal nerve, worsened by sitting, no loss of sleep at night by the pain, no objective sensory loss on clinical examination, and with positive anesthetic pudendal nerve block (7); and complex pelvic pain syndrome is the occurrence of chronic pelvic pain when there is no proven infection or other obvious local pathology that may account for the pain, and with diffuse pain or dysfunction on several pelvic organs. Pelvic and perineal pain is very disabling and, by definition, cannot be objectively measured and cannot be attributed to a known and treatable cause. These patients have often tried various forms of treatment and it is sometimes difficult to provide a therapeutic response adapted to their painful symptoms. But we demonstrated that there is no correlation between the etiology of pain and the effectiveness of the block.

The ganglion impar appears to be a zone of convergence of nociceptive messages derived from the pelvic and peroneal zone. Ganglion impar blocks were initially performed to treat perineal cancer pain (rectum, vulva, prostate), but also chronic non-cancer pain: coccygodynia (8), vestibulodynia (9), chronic pelvic pain syndrome, etc.

The first ganglion impar blocks were described in 1990 by Plancarte et al (10). They were performed via a trans-sacrococcygeal approach with fluoroscopic guidance (11). In the presence of a calcified ligament, Huang (12) proposed inserting the needle underneath the transverse process of the coccyx, which is an easily identifiable landmark. Other techniques have been described to limit the risk of rectal injury, such as insertion of a finger in the rectum to prevent perforation, but this technique is associated with a risk of sepsis. Although the risk of rectal perforation appears obvious due to the intimate anatomical relations between the ganglion impar and the rectum, no rectal injuries were observed in our series or none have been reported in the literature. CT guidance appears to reliably prevent this risk with a very low radiation dose in our study

(44.48 mGy/cm/block) by deliberately limiting the number of sections to a strict minimum.

Various substances have been proposed for ganglion impar blocks: local anaesthetics, corticosteroids, clonidine (13), or even botulinum toxin (14). Other authors have performed alcohol or radiofrequency ablation or cryoablation of the ganglion impar (15). Agarwal-Kozlowski et al et al (16) performed ganglion impar blocks in 76 patients and reported efficacy in 26.3% of patients and a benefit of the anaesthetic procedure lasting up to 4 months. Another prospective study conducted in 16 patients reported improvement of pain in 50% of patients 2 months after a single block (17). More recently, Gundunz et al (8) tried to perform ganglion impar block in 22 patients, but reported 3 failures; 82% of patients obtained significant 50% improvement of their pain on the pain scale. Malec-Milewska et al (13) performed ganglion impar blocks in 9 women with chronic pelvic and perineal pain after failure of conservative treatment, with permanent pain relief in 4 patients.

This leaves us with the problem of the long-term effectiveness of this technique. The various published studies have reported mixed results, possibly due to poor patient selection, with systematic absence of a ganglion impar test block as a possible predictive factor. The objective of repeated blocks is to try to "desensitize" patients. A significant reduction of the VAS score over time was observed following repeated ganglion impar blocks, despite the absence of a long-term effect. Neuromodulation of this ganglion could be proposed in an attempt to achieve a longer-lasting effect, while continuing to perform an initial local anaesthetic test block to select good responders.

CONCLUSION

Ganglion impar block is safe and effective in the short term in patients with refractory pelvic and perineal pain. Repeated ganglion impar blocks were effective in the intermediate term, probably by acting on sensitization phenomena. The ganglion impar appears to be a valuable therapeutic target to block the nociceptive message, but other longer-acting mechanisms, such as neuromodulation, must be studied.

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