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ORIGINAL ARTICLE

The efficacy of the ganglion impar block in perineal and pelvic cancer pain

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Abstract

Background Visceral pain conducted by sympathetic fibers with pelvic and perineal origin can be treated using ganglion impar (GIB) or Walters' block in a simple and effective manner. This article aims to evaluate the effectiveness, security, and performance difficulty of GIB in patients with pelvic and perineal oncological pain.

Methods A retrospective study between January 2016 and August 2017. Patients with poorly controlled pelvic oncological pain and patients experimenting opioid side effects in which GIB was performed ambulatory were included. Prognostic GIB was performed, under echographic and fluoroscopic control, with local anesthetic and corticoid. The neurolytic block was performed under fluoroscopic guidance. The technique was performed by the same anesthetist with pain management competence. For statistical analysis, Microsoft Excel 2013® and IBM SPSS Statistics version 22.0 were used.

Results Fifteen patients were included. One patient was excluded. A statistical significant basal pain score reduction was observed ((median of the verbal numerical scale (VNS) 7 ($p25 = 7$; $p75 = 8$)) compared with 72 h median VNS 4 (($p25 = 3$; $p75 = 5.3$) $p = 0.001$, and 3 months (median VNS 4 ($p25 = 3$, $p75 = 7$)) $p = 0.003$ after the procedure. Regarding morphine consumption, a statistically significant reduction was observed 3 months after GIB performance ($p = 0.012$).

Discussion/conclusion GIB is a safe and easy-to-perform technique achieving satisfactory and statistically significant results, regarding pain control improvement and opioid consumption reduction in patients which meet selection criteria. Prospective, randomized studies with more patients are needed for further conclusions.

Keywords Ganglion impar block · Walters' block · Pelvic cancer pain · Perineal cancer pain

Introduction

Pain associated with neoplasms may be of somatic, visceral, or neuropathic origin. At diagnosis, up to 50% of patients may show a mixture of various types of pain [1]. Invaded or distended visceral structures cause diffuse pain with an inaccurate location.

Usually, these patients are medicated according to the World Health Organization analgesic ladder with non-steroidal anti-inflammatory drugs, opioids, and adjuvants [2]. Sympathetic ganglia blocks can be effective in controlling visceral pain [3]. These can help reduce pain, but rarely can eliminate it by the different components (somatic, visceral, and neuropathic) that contribute to the global perception of pain [4].

Visceral pain transmitted by sympathetic fibers of pelvic and perineal origin can be treated with ganglion impar (GIB) or Walters' block (perineum, vulva, distal vagina, distal urethra, scrotum, distal rectum) in a simple and effective manner [3]. This block was first described by "Plancarte et al" in the context of cancer patients [5].

The aims of this study are to evaluate the efficacy, safety, and simplicity of the GIB in patients with pelvic and perineal oncologic pain and the importance of adequate patient selection to improve the results.

Materials and methods

Retrospective and unicentric study was performed between January 2016 and August 2017. Patients with neoplasms

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located in the areas of ganglion impar (GI) sympathetic innervation who had uncontrolled pelvic oncologic pain with the established therapy or patients experimenting opioid side effects were included in the study. The following exclusion criteria were considered: coagulation disorders, local infection, local sacral invasion, radiotherapy, or chemotherapy in the 4 weeks prior to the procedure and refusal of the patient (Table 1). All procedures were performed on an outpatient basis, with informed consent.

In this study, two types of GIB, prognostic and neurolytic were performed by the same anesthesiologist with pain medicine equivalence.

The prognostic GIB was performed under fluoroscopic or ultrasound control, and 3 to 5 ml of 5 mg/ml ropivacaine and 40 mg of methylprednisolone were administered. This was considered useful when pain control was greater than 30%. In the presence of positive prognostic GIB, neurolytic GIB was performed after a week, in the operative room under fluoroscopic control and standard monitoring of the American Society of Anesthesiologists (Table 2).

All patients were contacted by the nursing team after the GIB in 3 moments: at 24 h, to detect possible side effects, at 72 h, and at 3 months for pain evaluation, according to the verbal numerical scale (VNS), and define a therapeutic strategy if necessary.

Statistical analysis was performed using Microsoft Excel 2013® and IBM SPSS Statistics® version 22.0.

Results

Of a total of 15 patients submitted to GIB, 1 was excluded because it was not possible to perform the neurolytic GIB, although prognostic block was possible and positive, which corresponds to a percentage of 6.7 of the total cases.

Analysis of demographic data revealed a mean age of 58 years (standard deviation (SD) = 8.6) and a predominance of the male gender, 60% (Table 3). Patients had the following diagnoses: prostate carcinoma (3 patients), carcinoma of the rectum (7 patients), carcinoma of the vulva (1 patient), carcinoma of the vagina (1 patient), carcinoma of the perianal region (2 patients), and pelvic mass (1 patient) (Table 4).

Baseline pain was assessed at 72 h and 3 months after GIB, according to the VNS, in all patients. There was a decrease in the baseline pain (median of the verbal numerical scale (VNS) 7 ($p25 = 7$; $p75 = 8$)) compared with 72 h (median VNS 4 ($p25 = 3$; $p75 = 5.3$)) and 3 months (median VNS 4 ($p25 = 3$, $p75 = 7$)), with statistical significance (72 h vs baseline, $p = 0.001$ in the Wilcoxon test, 3 months vs baseline, $p = 0.003$ in the Wilcoxon test), according to Table 5.

At 72 h for baseline pain, 93% of patients had pain reduction, 36% of patients achieved an improvement ≥ 50%, 57% of patients achieved improvement between 30 and 50%, and 7% of patients achieved improvement < 30%.

At 3 months for baseline pain, 79% of patients had pain reduction, 43% of patients achieved an improvement ≥ 50%, 36% of patients achieved improvement between 30 and 50%, and 21% of patients achieved improvement < 30%.

In 3 patients, GIB was repeated before 3 months, and the analgesic result was recorded at 3 months.

In 2 patients, despite the improvement in pain (> 30%), it was also decided to perform the upper hypogastric plexus blockade (UHPB), due to the pain and tumor mass characteristics.

No complications were recorded, namely motor, sexual, bladder and intestinal dysfunction, infection, or perforation of the rectum.

Table 1 Exclusion criteria

1. Coagulation disorders
2. Local infection
3. Sacral invasion
4. Radiation therapy or chemotherapy in the 4 weeks prior to the procedure
5. Patients' refusal

Table 2 GIB protocol with sacrococcygeal approach under fluoroscopic control

1. Obtain informed consent
2. Peripheral venous access
3. In the prone position, locate the midline and its relationship with the sacrococcygeal join
4. Asepsis
5. Titrated sedation
6. Local anesthetic infiltration
7. Lateral fluoroscopic view to identify the sacrococcygeal junction
8. A 22-gauge block needle (*B Braun® quincke*) was inserted through the skin by piercing the dorsal sacrococcygeal ligament at the midline.
9. Under fluoroscopic guidance, using the loss of resistance method, the needle was advanced through the vertebral disc until the needle tip was placed anteriorly to the ventral sacrococcygeal ligament.
10. The position of the needle tip was confirmed by injecting contrast medium
11. After exclusion of intravenous or neural injection, 3–5 mL administration of local anesthetics, corticosteroids, and/or neurolytic solution (90% dehydrating alcohol).
12. When using neurolytic solutions, the needle should be washed with local anesthetic or air to prevent fistulization
13. Remove the needle and transport the patient to the recovery room.

Table 3 Demographic data

Characteristics	Results
Age (average ± SD)	58 ± 8.6
Male/female gender (%)	60/40

Table 4 Diagnostics

Localization of carcinoma	Total
Prostate with rectal involvement	3
rectum	7
Vulva	1
Vaginal	1
Perianal region	2
Pelvic region	1

Concerning the consumption of morphine, a statistically significant reduction of the mean of consumption at 3 months was observed in relation to the basal consumption ($p = 0.012$ in the T test), as shown in Table 6.

Discussion

Since its initial description in 1990 by Plancarte et al., GIB has been used as a tool for the treatment of uncontrolled pain, of benign or malignant cause, and of visceral origin or transmitted by the pelvic or perineal sympathetic nervous system [5]. It is currently considered to be a useful application, with a degree of evidence I C [6].

Initially, the technique described included the GI approach, which is located in the ventral region of the sacrococcygeal junction through the anococcygeal ligament under fluoroscopic control [5]. This technique presented a high risk of rectal injury. In 1995, Wemm et al. described a new approach—sacrococcygeal—which has a greater margin of safety and still remains the most used [7]. Another approach, the transcoccygeal, is especially useful in the presence of ossification of the sacrococcygeal joint [8–10]. According to Foyes et al., it allows a cephalic diffusion of the contrast, presenting, for this reason, superior efficacy [8, 10]. In our study, we used this approach when the sacrococcygeal approach was not possible.

The correct placement of the needle tip in the retroperitoneal space can be performed under fluoroscopic control or by computerized axial tomography (CAT). We recognize the superior efficacy of GIB under CAT control in the presence of anatomical variations and risk reduction, including injury to pelvic structures [11, 12]. However, since this is a relatively safe procedure with a low complication rate in different published studies, we favor fluoroscopy at lower cost, greater availability of use, and lower radiation overload, both for the patient and for health professionals.

Table 5 Pain assessment data according to NVS

VNS assessment time	Score in VNS (median)	P (statistical significance < 0.05), the Wilcoxon test, reference: basal
Basal	7 ($p25 = 7$; $p75 = 8$)	
72 h	4 ($p25 = 3$; $p75 = 5.3$)	0.001
3 months	4 ($p25 = 3$; $p75 = 7$)	0.003

Table 6 Morphine consumption data

Evaluation time	Morphine consumption (mean)	P (statistical significance < 0.05), T test
Basal	77,14 ($p25 = 66.66$; $p75 = 87.63$)	0.012
3 months	56,43 ($p25 = 42.73$; $p75 = 70.13$)	

In our study, it is worth mentioning that ultrasound, for the performance of prognostic GIB, is an important economizer of logistic resources, since it does not imply the availability of an operating room. In the presence of positive prognostic GIB, a neurolytic block was performed in the operative room under fluoroscopic control. It is important to note that echographic control allows the identification of the sacrococcygeal space and the location of the retroperitoneal space, with loss of resistance, although the administration of a neurolytic agent implies the verification of the distribution of the contrast medium in the retroperitoneal space [13–15]. It should be noted that when we perform a neurolytic GIB, we perform them with the smallest possible volume in order to reduce the risk of neuritis, since the sacred ventral roots are located near the GI [11].

The pathology where GIB has been most studied and probably where it is shown to be most effective is in coccidinia. This pathology presents an improvement of the clinical picture after performing single GIB or series with corticosteroids, or with the use of radiofrequency [16–18]

Regarding the therapeutic application of GIB in oncologic pain, its demonstration in the literature is more limited. Plancarte et al. present an inaugural study with 16 patients presenting with advanced malignancies and significant pelvic pain with a 60% improvement in pain symptoms [1]. In 2008, Eker et al. described an improvement of more than 60% in pain after completion of GIB in 3 patients diagnosed with rectal malignant neoplasia and perineal pain [19]. The last study published in 2012, with 6 patients with pelvic or gastrointestinal carcinomas of advanced stages, presented favorable results, with a reduction of pain evaluated by visual analogue scale (VAS), and statistically significant at 2-month follow-up [15].

It is also important to mention studies published in mixed contexts of benign or malignant pathologies. In 2007 Toshniwal et al. published a prospective study that included 16 patients with chronic perineal pain, who presented a 50% reduction in VAS at 2 months of follow-up after GIB [20]. In 2009 Agarwal-Kozlowski et al. demonstrated a statistically significant reduction of the pelvic pain in 43 patients at 4 months of follow-up [21].

Our study represents an analysis of 15 oncological patients. In these patients, the present uncontrolled pain or opioid side effects, as well as the visceral structures involved in the oncological process (based on the imaging tests performed), were susceptible to respond to GIB. We demonstrated that at 3 months of follow-up, 79% of the patients had pain reduction. Of these patients, 43% achieved an improvement of ≥ 50% and 36% achieved an improvement of 30–50%. The decrease in baseline pain over 72 h and at 3 months presented statistical significance (72 h versus baseline, $p = 0.001$ in the Wilcoxon test, 3 months versus baseline, $p = 0.003$ in the Wilcoxon test). We also verified that the consumption of morphine at 3 months decreases relative to basal consumption. This reduction was also statistically significant ($p = 0.012$ in the T test).

The complexity of pelvic innervation implies a careful selection of patients taking into account the characteristics of the pain and the location of the mass that causes the pain, in order to improve the results obtained with the GIB. Despite this, careful selection pain control may not be complete. This is justified by the possible presence of somatic nociceptive pain or neuropathic component, or by the proximity of other affected viscera with afferent hypogastric plexus. In our study, due to the complexity of the assessment of pelvic pain, we included patients who performed prognostic GIB with the improvement of pain > 30% as candidates for neurolytic GIB.

The association of GIB with UHPB, by the proximity of pelvic structures, may be considered necessary to improve pain control. Ahmed et al. demonstrate this improvement in a study of 15 patients with pelvic pain, perineal pain, or both with oncologic etiology [1, 4]. In our study, despite careful selection of GIB candidates, we found that 2 patients performed a UHPB, justified by the characteristics of the pain, with the improvement of the pain.

The limitations of the study include the following: reduced sample size, retrospective analysis, and analysis of morphine use in oncological patients.

Conclusion

GIB is a safe and easy-to-perform technique with favorable, statistically significant results in improving pain and reducing opioid use in selected patients.

Randomized prospective studies with larger samples are required.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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