Case Series

# Superior Hypogastric Plexus Combined with Ganglion Impar Neurolytic Blocks for Pelvic and/or Perineal Cancer Pain Relief

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Disclaimer: There was no external funding in the preparation of this manuscript. Conflict of interest: Each author certifies that he or she, or a member of his or her immediate family, has no commercial association (i.e., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted manuscript.

Manuscript received: 06-18-2014
Revised manuscript received: 08-14-2014
Accepted for publication: 09-11-2014

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**Background:** The superior hypogastric plexus (SHGP) carries afferents from the viscera of the lower abdomen and pelvis. Neurolytic block of this plexus is used for reducing pain resulting from malignancy in these organs. The ganglion impar (GI) innervats the perineum, distal rectum, anus, distal urethra, vulva, and distal third of the vagina. Different approaches to the ganglion impar neurolysis have been described in the literature.

**Objectives:** To assess the feasibility, safety, and efficacy of combining the block of the SHGP through the postero-median transdiscal approach with the GI block by the trans-sacro-coccygeal approach for relief of pelvic and/or perineal pain caused by pelvic and/or perineal malignancies or any cancer related causes.

**Methods:** Fifteen patients who had cancer-related pelvic pain, perineal pain, or both received a combined SHGP neurolytic block through the postero-median transdiscal approach using a 20-gauge Chiba needle and injection of 10 mL of 10% phenol in saline plus a GI neurolytic block by the trans-sacro-coccygeal approach using a 22-gauge 5 cm needle and injection of 4 – 6 mL of 8% phenol in saline. Pain intensity (measured using a visual analogue scale) and oral morphine consumption pre- and post-procedure were measured.

**Results:** All patients presented with cancer-related pelvic, perineal, or pelviperineal pain. Pain scores were reduced from a mean (± SD) of 7.87 ± 1.19 pre-procedurally to 2.40 ± 2.10 one week post-procedurally ($P < 0.05$). In addition, the mean consumption of morphine (delivered via 30 mg sustained-release morphine tablets) was reduced from 98.00 ± 34.89 mg to 32.00 ± 28.48 mg after one week ($P < 0.05$). No complications or serious side effects were encountered during or after the block.

**Limitations:** This study is limited by its small sample size and non-randomized study.

**Conclusion:** A combined neurolytic SHGP block with GI block is an effective and safe technique for reducing pain in cancer patients presented with pelvic and/or perineal pain. Also, a combined SHGP block through a posteromedian transdiscal approach with a GI block through a trans-sacrococcygeal approach may be considered more effective and easier to perform than the recently invented bilateral inferior hypogastric plexus neurolysis through a transsacral approach.

**Key words:** Superior hypogastric plexus block, ganglion impar block, cancer pain, pelvic pain, perineal pain

**Pain Physician 2015; 18:E49-E56**

The superior hypogastric plexus (SHGP) carries afferents from the viscera of the lower abdomen and pelvis. It lies retroperitoneally bilaterally anterior to the L5/S1 disc and vertebrae (1). Neurolytic blockade of the SHGP was first used by Plancarte et al (2) in 1990 for relief of chronic cancer related pelvic pain.

The ganglion impar (GI) is a solitary retroperitoneal structure that is located at the level of the sacro-coccygeal junction with a variable position in pre-coccygeal space which marks the end of the 2 sympathetic chains (3).

Visceral afferents innervating the perineum, distal rectum, anus, distal urethra, vulva, and distal third of the vagina converge at the GI (4).

A trans-sacrococcygeal approach to a GI block, described by Wemm and Saberski in 1995, was developed to improve the technical feasibility and overcome the associated risk for visceral injuries with a conventional technique; this approach is considered extremely quick and easy to perform (3,5,6).

This study is designed to assess the feasibility, safety, and efficacy of combining the use of SHGP through the postero-median transdiscal approach with the GI block by the trans-sacro-coccygeal approach for relief of pelvic and/or perineal pain that caused by pelvic and/or perineal malignancies or any cancer related causes.

## Methods

We obtained approval from the hospital ethics committee and written informed consent from 15 patients who had cancer related pelvic pain, perineal pain, or both pelvic and perineal pain at the South Egypt Cancer Institute Assiut University, (Assiut, Egypt).

All patients had sympathetically maintained cancer pain. These pains arose from the bladder, prostate, penis, vagina, rectum, anus, perineum, or any other pelvic organ. Pain was no longer controlled with oral morphine sustained release (MST) tablets, 30 mg, and amitriptyline tablets, 25 mg, or there was excessive sedation or other side effects, which were unacceptable to the patient, despite adequate pain control. Patients with coagulopathies, allergy to the contrast dye or phenol; patients receiving radiation or chemotherapy within 4 weeks of the neurolytic block; and patients with moderate or major cardiac/respiratory incapacitating disease or hepatic or renal dysfunction were excluded.

The patients were admitted to the hospital ward. An 18 G intravenous catheter was inserted; they received a pre-procedural 1000 mL lactated ringer solution. All patients were then transported to the x-ray room, and received conscious sedation with midazolam 0.1 mg/kg and fentanyl 1 ug/kg. Standard ASA recommended monitors were used, including electrocardiograph, blood pressure, and pulse oximetry measurement.

## Procedure

### Superior Hypogastric Plexus Block

***The Posteromedian Transdiscal Approach as Described by Turker et al in 2005 (Fig. 1) (7).***

One gram of cefoperazone as a prophylactic antibi-

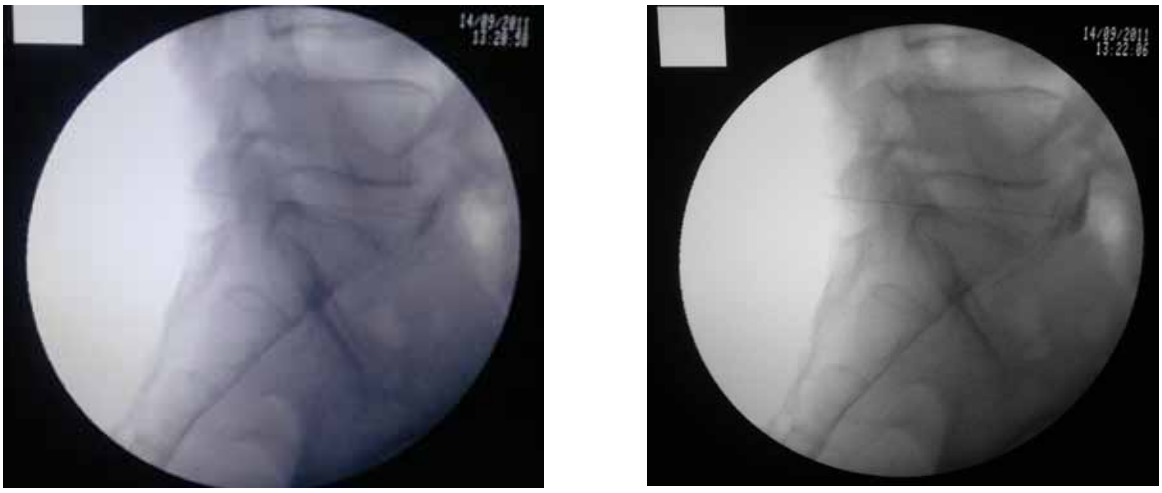

Fig. 1. *Superior hypogastric plexus block: the posteromedian transdiscal approach.*

otic was given 30 minutes before the procedure, which were all performed under sterile conditions with c-arm fluoroscopic guidance. This approach is performed with the patient in the lateral or prone position. The L5-S1 interspace was identified under fluoroscopy, the skin overlying the interspace was sterilized and infiltrated with 2 – 3 mL of local anesthetic (lidocaine 2%), a 20-gauge, 15 cm needle with a 30° short bevel (Chiba needle) was inserted perpendicular to the skin at the center of the L5-S1 intrelaminar space under antero-posterior fluoroscopic vision. Under lateral fluoroscopic control, the needle was then advanced towards the intervertebral disc so that it penetrated the thecal sac. After confirming the avoidance of nerve injury by the absence of paresthesia, the tip of the needle was advanced through the intervertebral disc until it exited at its anterior surface. Correct positioning was confirmed by administration of 4 mL of soluble contrast medium in both lateral and antero-posterior fluoroscopic views. Injection of 10 mL of 10% phenol in saline followed by 1 mL of saline was given to avoid the deposition of phenol within the intervertebral disc material. Then the patient underwent the GI block.

## Ganglion Impar block

### *Trans-sacrococcygeal approach as described by Wemm and Saberski in 1995 (Fig. 2) (5).*

The patient was placed in the prone position with a pillow beneath the lower abdomen. The site of the needle insertion was located by palpating the sacral cornu and by using a fluoroscope after sterilization of the skin overlying the interspace. Following localization, the area was infiltrated with 2 – 3 mL of local anesthetic (lidocaine 2%). Under the guidance of a fluoroscope C-arm in a lateral position, a 22-gauge type B beveled, 5 cm needle was inserted through the skin piercing the dorsal sacrococcygeal ligament at the midline. The needle was then advanced through the vertebral disc until the tip was placed anterior to the ventral sacrococcygeal ligament, felt as a loss of resistance. The position of the needle tip was confirmed by injecting 1 mL of radio-opaque dye into the retroperitoneal space. The spread of dye gives a "reverse comma" appearance when seen in a lateral view. Once the position of the needle tip was confirmed of 4 – 6 mL of 8% phenol in saline was injected followed by 1 mL of saline to avoid the deposition of phenol within the intervertebral disc material.

After performing of the blocks, the patients were taken to the post anesthesia care unit (PACU) for 24 hours.

## Parameters

The following parameters were measured and assessed:

We assessed the pain using the Visual Analogue scale (VAS) (0 = "no pain" and 10 = "worst imaginable pain"), measured pre-procedural and at 30 and 60 minutes; 2, 6, and 24 hours; one, 2, and 4 weeks;

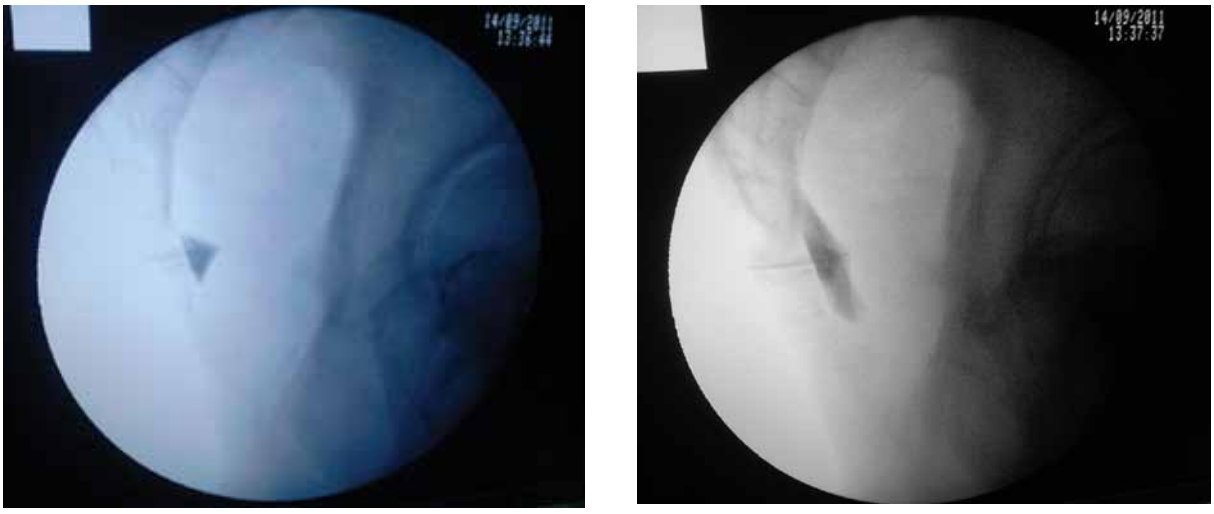

Fig. 2. *Ganglion Impar block: trans-sacrococcygeal approach.*

and 2 months after the procedure. A failed block was defined as failure to lower the VAS by 50% of the pre-procedural measured VAS. Total MST consumption was assessed pre-procedural and post-procedural at the first 24 hours in the PACU, then at one, 2, and 4 weeks, and 2 months after the procedure. Any complications during or after the procedure, especially transient paresthesia; pain on injection; puncture of the small bowel, bladder, or rectum; vascular penetration of one of the pelvic vessels (common iliac artery); hematoma; infection; dural puncture or post spinal headache; damage to nerve roots; periosteal injection; failure of injection spread to the GI because of local tumor spread; needle breakage; bowel/bladder dysfunction; discitis; disc rupture; disc herniation; or any other complication, were also assessed.

The hemodynamic parameters (blood pressure, heart rate, SpO2) before, during, and after the procedure were assessed for 24 hours in the PACU.

The patient was discharged after 24 hours, to be followed up for the next 2 months at the first, second, and fourth weeks, then at the end of the second month.

### Statistical analysis

Data were analyzed using Statistical Package for Social Science (SPSS version 16). Values are shown as mean ± SD, range, percentage, and number. Statistical analysis was performed with the use of the Mann-Whitney test and Wilcoxon Signed Ranks test for the VAS and morphine consumption changed from the baseline. Statistical significance was assigned as *P* value less than 0.05.

## Results

A total of 15 patients, following up in the pain clinic in the South Egypt Cancer Institute, underwent combined SHGP block and GI block. Demographic data, clinical data, and the mean duration of the procedure are presented in Table 1.

The SHGP block through a posteromedian transdiscal approach and GI block through a trans-sacrococcygeal approach took a mean duration time (± SD) of 31.3 ± 6.7 minutes with a minimum and maximum duration of 20 and 45 minutes, respectively.

A successful needle placement for SHGP blocks occurred with the first attempt in 12 (80.0%) of the blocks, while it required another trial in 3 (20.0%) of the blocks. For the GI block, it required only one trial to introduce the needle successfully in the 15 (100%) blocks performed.

The mean (± SD) VAS score of the patients was 7.87 ± 1.19 before the block was performed. VAS score decreased significantly (*P* = 0.001) immediately after injection compared with the pre-procedural period and was sustained during all follow-up measurements (Table 2, Fig. 3) with maximum reduction by 69.5% of the baseline VAS score (*P* = 0.001) observed after one week.

As regarding the MST consumption, the baseline consumption was 98.00 ± 34.89 mg/day that significantly reduced after the first 24 hours post procedure (*P* = 0.001). Maximum reduction was observed after

Table 1. *Patients' characteristics, clinical data, and duration of procedure (data are presented as mean ± SD, unless otherwise indicated).*

| Characteristics | mean ± SD |
|---|---|
| **Age** (years) | 54.3 ± 13.3 |
| **Gender** Male/Female N/N | 9/6 |
| **Body Weight** (kg) | 62.5 ± 9.8 |
| **Height** (cm) | 161.7 ± 6.8 |
| **Pain site (n %)** | |
| Pelviperineal | 6 (40.0%) |
| Perineal | 4 (26.7%) |
| Pelvic | 5 (33.3%) |
| **Diagnosis (n %)** | |
| Bladder<br>Cervix<br>Ovary<br>Prostate<br>Rectum<br>Vulva | 8 (53.3%)<br>1 (6.7 %)<br>2 (13.3%)<br>0 (0.0 %)<br>4 (26.7%)<br>0 (0.0 %) |
| **Duration of procedure** (min) | 31.3 ± 6.7 |

*Table 2. Pain intensity, measured using a VAS (data are presented as mean ± SD). (*P < 0.05 versus the preprocedural value.)*

| Time of administration of VAS | Score |
|---|---|
| Base line | 7.87 ± 1.19 |
| 30 minutes | 5.87 ± 1.69* |
| 1 hour | 4.80 ± 1.86* |
| 2 hours | 4.00 ± 1.96* |
| 6 hours | 3.40 ± 1.92* |
| 24 hours | 3.00 ± 2.00* |
| One week | 2.40 ± 2.10* |
| 2 weeks | 2.53 ± 2.36* |
| 4 weeks | 2.87 ± 2.62* |
| 2 months | 3.47 ± 2.42* |

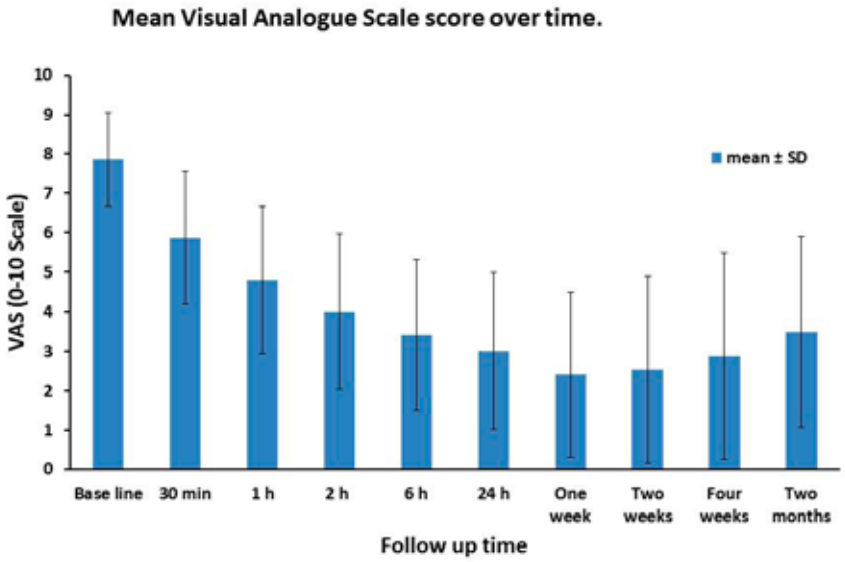


Fig. 3. *Mean pain intensity score measured using a VAS (cm), columns represent mean ± SD.*

one week post procedure by 67.34% of the baseline MST consumption (Table 3, Fig. 4), continuous up to 2 months after the block was performed.

A successful block was defined as lowering of the pre-procedural VAS by 50%. This occurred in 10 (66.6%) of 15 patients involved in the study, as follows: 4 patients with pelviperineal pain, 3 patients with perineal pain only, and 3 patients with pelvic pain only.

Six out of those 10 patients showed complete pain

Table 3. *Morphine consumption (data presented as mean ± SD). (*P < 0.05 versus the pre-procedural value.)*

| Time | Morphine consumption, mg/day |
|---|---|
| Base line | 98.00 ± 34.89 |
| 24 hours | 56.00 ± 25.01* |
| One week | 32.00 ± 28.48* |
| 2 weeks | 34.00 ± 25.01* |
| 4 weeks | 36.00 ± 36.21* |
| 2 months | 42.00 ± 38.95* |

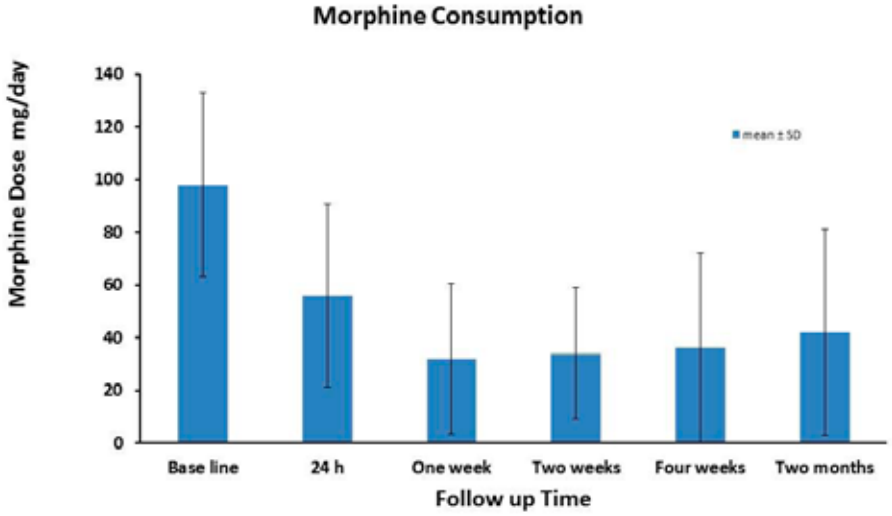


Fig. 4. *Morphine consumption measured in mg/day presented by columns representing mean ± SD.*

Table 4. *Frequency of adverse effects.*

| Variable | N (%) |
|---|---|
| Transient paresthesia | 5 (33.3%) |
| Pain on injection | 3 (20%) |
| Vascular penetration | 0 (0%) |
| Hematoma | 0 (0%) |
| Infection | 0 (0%) |
| CSF leakage | 0 (0%) |
| Bowel/bladder dysfunction | 0 (0%) |
| Rectal puncture | 0 (0%) |
| Hypotension | 0 (0%) |
| Discitis | 0 (0%) |

relief (VAS = 0 – 1). They stopped MST and shifted to NSAIDs on demand.

No significant changes were observed in hemodynamic variables (blood pressure, heart rate, and oxygen saturation) measured during the procedure or in the following 24 hours. The complications that occurred or were expected in the study are listed in Table 4.

## Discussion

There has been a paradigm shift away from the "three- step analgesic ladder" proposed by the World Health Organization (WHO) in 1986 for management of cancer pain (8), to the use of interventional modalities early in the treatment of cancer (9).

The neurolytic SHGP block was first described by Plancarte and his coworkers in 1990 (2) guided by fluoroscopy using 2 needles. Later, 6 studies (10-15) have described alternative techniques to approach the SHGP, such as an anterior approach with a single needle guided by computed tomographic (CT) scan or fluoroscopy, a coaxial technique, and a technique guided by microlaparoscopy.

Since the first description of the neurolytic blockade technique of GI was in 1990 (16) using fluoroscopic guidance and a manually bent 22 G spinal needle directed cephalad through the anococcygeal ligaments, many other approaches to the GI have been described in the literature (17-19) including the use of CT guidance (20) and ultrasonography (3).

In the current study, we performed the SHGP block through a posteromedian transdiscal approach under fluoroscopy using a single 15 cm (Chiba) needle with injection of 10 mL of 10% phenol in saline. This approach was first described by Turker and his colleagues (7) to overcome the technical difficulties encountered in the classic approach to SHGP block, such as a large transverse process or high arch of the iliac crest. We then performed the GI block through a trans-sacrococcygeal approach under fluoroscopy using a single 5 cm needle with injection of 4 – 6 mL of 8% phenol in saline as described by Wemm and Saberski (5). Advantages to the posterior transdiscal approach also include the ability to perform the technique in the lateral position and in patients with anatomic factors (transverse process of L5/iliac crest) that hinder placement.

There is only one published article studying the effect of the combination of SHGP with the GI neurolysis. This was performed for a female patient with intractable anal pain from metastatic carcinoma of cervix (21). They reported a marked reduction of the patient's pain and opioid usage.

The neurolytic inferior hypogastric plexus (IHGP) block is another neurolytic block invented for the treatment of pelvic and/or perineal pain (22) using phenol 10% for neurolysis. The IHGP blockade was first described by Schultz in 2007 (23) through the transsacral approach under fluoroscopy, using a local anesthetics/steroid combination for the diagnosis and treatment of chronic pain conditions involving the lower pelvic viscera. Then the neurolytic IHGP block using phenol was performed by Mohamed and her colleagues (22) for treatment of low pelvic and perineal pain.

Mohamed and her colleagues (22) performed the neurolytic IHGP block in 38.3 ± 6.6 minutes which is longer than the duration required to perform the combined block in our study which was 31.3 ± 6.7 minutes.

In this study we reported a success rate of 66.6% (10 patients out of 15) as follows: 4 patients with pelviperineal pain, 3 patients with perineal pain only, and 3 patients with pelvic pain only with mean VAS (± SD) reduced from 7.87 ± 1.19 pre-procedure to 2.40 ± 2.10 one week post-procedure (i.e., 69.5% reduction). While Mohamed and her colleagues (22) reported a success rate of 44.4% (8 patients of 18), 4 patients with perineal pain and 4 patients with pelvic or pelviperineal pain, with a mean VAS (± SD) reduced from 7.22 ± 1.31 pre-procedure to 4.06 ± 1.73 one week post-procedure (i.e., 43.76% reduction).

A significant reduction in MST consumption was observed after the first 24 hours post procedure ($P$ = 0.001). That reduction is more significant than that reported in the study by Mohamed et al (22) ($P$ = 0.006). Also, in this study the MST consumption has continued to be significantly reduced until the end of 2 month period of the study ($P$ = 0.003) while in Mohamed et

al's study (22) by the end of the 2 months the MST dose reduction became insignificant ($P = 0.080$).

The higher total success rate in this study than in Mohamed et al's study (22) may be explained by more optimal needle positioning at the target site allowing better spread of the neurolytic agent at the SHGP and GI.

The complications of a transdiscal approach to the hypogastric plexus were evaluated in a small study by Erdine and coworkers (24). They reported no episodes of discitis or disc rupture with a technique that included administration of intradiscal antibiotics. Multiple studies have suggested the use of preoperative intravenous or injection of antibiotics into the disc during transdiscal approaches may prevent post procedural discitis (25-30). Klessig and coworkers (29) have reported that common antibiotics injected in the disc remain effective in the presence of isohexol. Also it was reported that placement of the bilateral superior hypogastric block may impair sexual function in men (4).

Later studies that performed the SHGP block through a transdiscal approach (31-33) did not report any disc related complications. The posteromedian transdiscal technique proved to be a reliable and safe technique for a SHGP block in a study by Nabil and Eissa (33) as well as our study, as no organ or other anatomic structures impede needle placement, save the cauda equina, subarachnoid space, and intervertebral disc. In addition, needle placement requires less time and only a single needle.

The only complications recorded were transient paresthesia in 33.3% of patients and pain on injection in 20% of patients. We didn't record any other complications such as vascular penetration, hematoma, infection, CSF leakage, bowel/bladder dysfunction, rectal puncture, or discitis. These results are not different from those recorded in Mohamed et al's (22) study, as they recorded transient paresthesia in 38.8% of patients, pain on injection in 22.2% of patients, and single case of vascular penetration (5.5%).

According to Mohamed et al (22), cancer patients presenting with low pelvic pain combined with perineal pain (anal, or pain arising from the genitalia) may get benefits from performing an inferior hypogastric plexus block alone, rather than performing a combined SHGP block and GI block to overcome it. This area is innervated by fibers from the pre-sacral inferior hypogastric plexus that will not be blocked using the SHGP block even with the refinement of its techniques either paravertebral or transdiscal (23).

But it seems that combined neurolytic SHGP blocks with GI blocks are safe techniques and may be considered more effective and easier to perform than the newly introduced neurolytic inferior hypogastric plexus block in reducing the pain measured by VAS and the oral morphine consumption in cancer patients presenting with pelvic and/or perineal pain. Further investigations to assess the effect of both the combined SHGP with GI block and IHGP block on pelvic and perineal pain in cancer patients are recommended.

## Conclusion

Combined neurolytic SHGP blocks with GI blocks are effective and safe techniques for reducing pain in cancer patients presenting with pelvic and/or perineal pain. Also, the combined SHGP block through a posteromedian transdiscal approach with GI block through a trans-sacrococcygeal approach may be considered more effective and easier to perform than the recently invented bilateral inferior hypogastric plexus neurolysis through a transsacral approach.

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