

Technical Report

## Inferior Hypogastric Plexus Blockade: A Transsacral Approach

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**Background:** Despite recent refinements in the technique of hypogastric plexus blockade, the lower pelvic organs and genitalia are innervated by fibers from the pre-sacral inferior hypogastric plexus and these fibers are not readily blocked using paravertebral or transdiscal approaches.

**Design:** Report of a technique to introduce a transsacral approach to blockade of the inferior hypogastric plexus.

**Methods:** A technique for performing inferior hypogastric plexus blockade by passing a spinal needle through the sacral foramen is described with 15 blocks in 11 patients.

**Results:** Fifteen inferior hypogastric plexus blocks were performed on 11 female patients who presented with chronic pelvic pain. Pelvic pain was decreased following 11 of the procedures with pre- and post-pain scores (SD) of 7.4 (2.3) and 5.0 (2.7), respectively ( $P < 0.05$ ). There were no complications or unusual occurrences.

**Conclusions:** This block can be performed safely and effectively if the interventionalist has a high degree of familiarity with sacral anatomy, refined needle steering technique, and expertise in fluoroscopy. Properly performed, transsacral blockade of the inferior hypogastric plexus is a safe technique for the diagnosis and treatment of chronic pain conditions involving the lower pelvic viscera.

**Key words:** Pelvic pain, chronic pain, inferior hypogastric plexus block, superior hypogastric plexus, transsacral approach.

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The hypogastric plexus contains efferent pre- and postganglionic sympathetic fibers, preganglionic parasympathetic fibers, and visceral afferent pain fibers. The superior and inferior hypogastric plexuses receive input from sympathetic preganglionic fibers whose cell bodies reside in the intermediolateral cell columns of the lower spinal cord. These efferent, preganglionic fibers first leave the spinal cord via the ventral roots of spinal nerves and exit the spinal nerves via the white rami communicantes into the lumbosacral sympathetic chain (1).

The superior hypogastric plexus lies anterior to the L5 vertebral body and the sacral promontory on both sides of the midline and extends caudally to become the left and right hypogastric nerves which may be single or contain various longitudinal fibers interconnected by anastomosing filaments (Fig. 1). The hypogastric nerves are sometimes called the middle hypogastric plexus and contain mostly sympathetic fibers which course through to the inferior hypogastric plexus. The bilateral inferior hypogastric plexuses are interconnected networks of nerves that lie within the bilateral presacral tissues on either side of the rec-

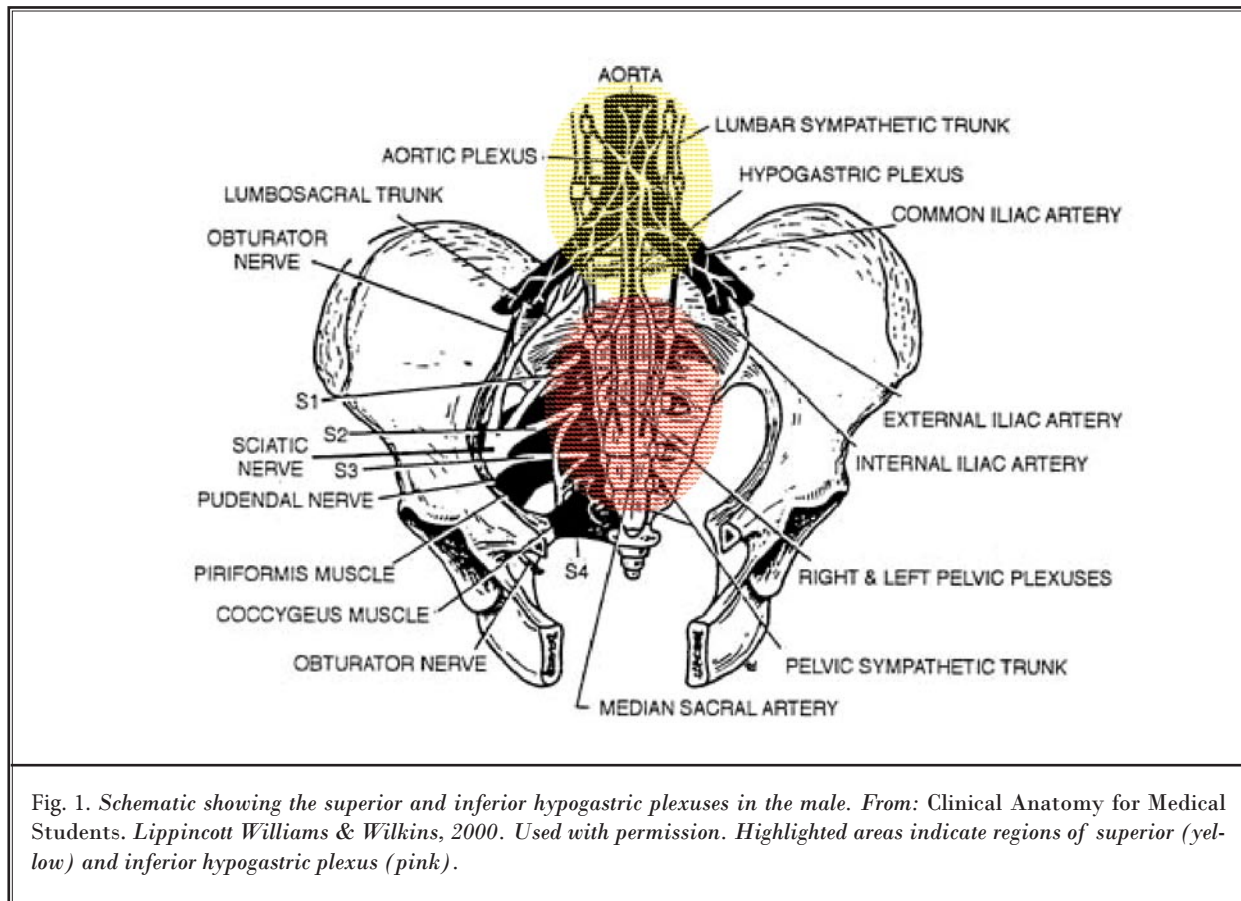


Fig. 1. Schematic showing the superior and inferior hypogastric plexuses in the male. From: Clinical Anatomy for Medical Students. Lippincott Williams & Wilkins, 2000. Used with permission. Highlighted areas indicate regions of superior (yellow) and inferior hypogastric plexus (pink).

tum ventral to the S2, S3, and S4 spinal segments. The inferior hypogastric plexuses are formed by efferent sympathetic fibers from the hypogastric nerves and from pelvic splanchnic nerves, preganglionic parasympathetic fibers from pelvic splanchnic nerves, and visceral afferent fibers from pelvic viscera (1).

Blockade of the hypogastric plexus may aid in the diagnosis and treatment of chronic pelvic pain and is a relatively common interventional pain clinic procedure. Commonly described procedures for performing hypogastric blockade focus on the superior hypogastric plexus which lies anterior to the lumbosacral junction (2-5). Current techniques include the "traditional" approach, inserting needles placed along an oblique, paravertebral track anterolateral to the L5 vertebral body (6). A more recent variation describes a trans-discal approach through the L5-S1 intervertebral disc (7,8) which is reported to be easier and safer than the older method (9).

Despite recent refinements in the technique of hypogastric plexus blockade, the lower pelvic organs

and genitalia are innervated by fibers from the pre-sacral inferior hypogastric plexus and these fibers are not readily blocked using paravertebral or trans-discal approaches.

Several benign and malignant pain syndromes involving the lower pelvic organs may be effectively managed by a local anesthetic/steroid blockade of the inferior hypogastric plexus. In particular, pain involving the bladder, penis, vagina, rectum, anus, perineum, and lower pelvis is amenable to this block. Specific pain syndromes treatable with blockade of the inferior hypogastric plexus include sympathetically maintained pelvic pain, lower pelvic endometriosis, pelvic malignancy, vulvodynia, radiation-induced tenesmus and enteritis involving the rectum or sigmoid colon, proctalgia fugax, as well as acute herpes zoster and post-herpetic neuralgia involving the sacral dermatomes (1).

The purpose of this article is to introduce a trans-sacral approach to blockade of the inferior hypogastric plexus.

**METHODS**

**Procedure**

The patient is placed in the prone position on the x-ray table. Obtain an anterior-posterior scout view of the sacrum and then tilt the C-arm cephalad to view the sacral foramina "end-on" as circles or semi-circles on each side of the midline (Fig. 2). Using fluoroscopy,

mark an entrance point on the skin surface 1–2 cm lateral to the lateral edge of the S2 or S3 sacral foramen on the side to be blocked (Fig. 3). Choose the foramen that is most easily visible. This block can be performed through S1, S2, S3, or S4 although S2 is usually the preferred access level.

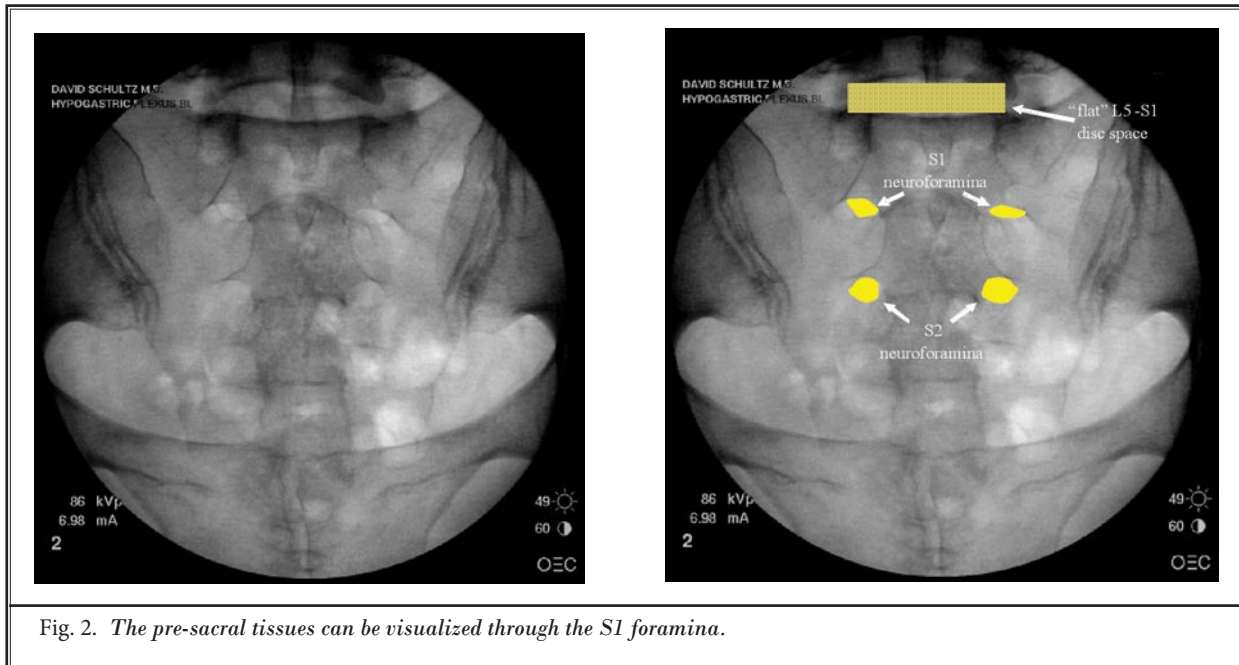


Fig. 2. The pre-sacral tissues can be visualized through the S1 foramina.

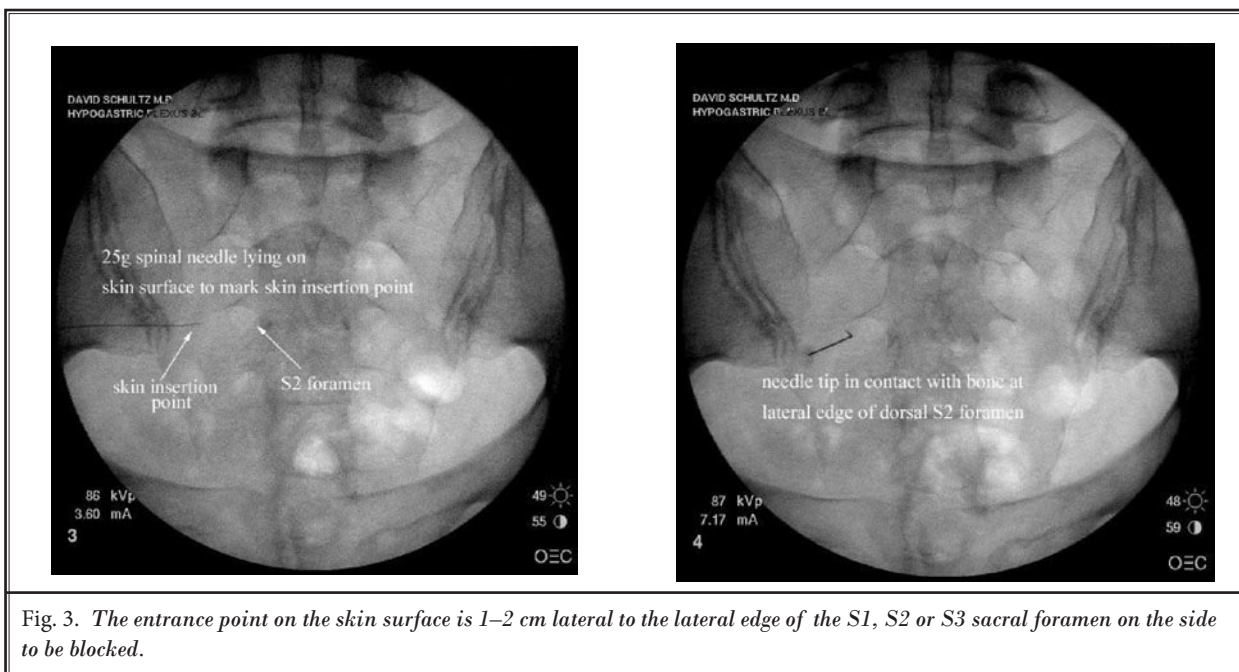


Fig. 3. The entrance point on the skin surface is 1–2 cm lateral to the lateral edge of the S1, S2 or S3 sacral foramen on the side to be blocked.

After the skin has been cleansed, raise a wheal over the skin entrance site and infiltrate a path of anesthesia toward the targeted sacral foramen. Pass an appropriately bent 3.5 inch, 25-gauge spinal needle through the anesthetized track and advance it down to the lateral aspect of the dorsal sacral foramen un-

til contact is made with bone. Advance the needle slowly and incrementally under fluoroscopic guidance through the dorsal sacral foramen toward the medial interior edge of the ventral sacral foramen (Fig. 4) until contact has been made with the medial bony edge of the ventral sacral foramen (Fig. 5). If sacral pares-

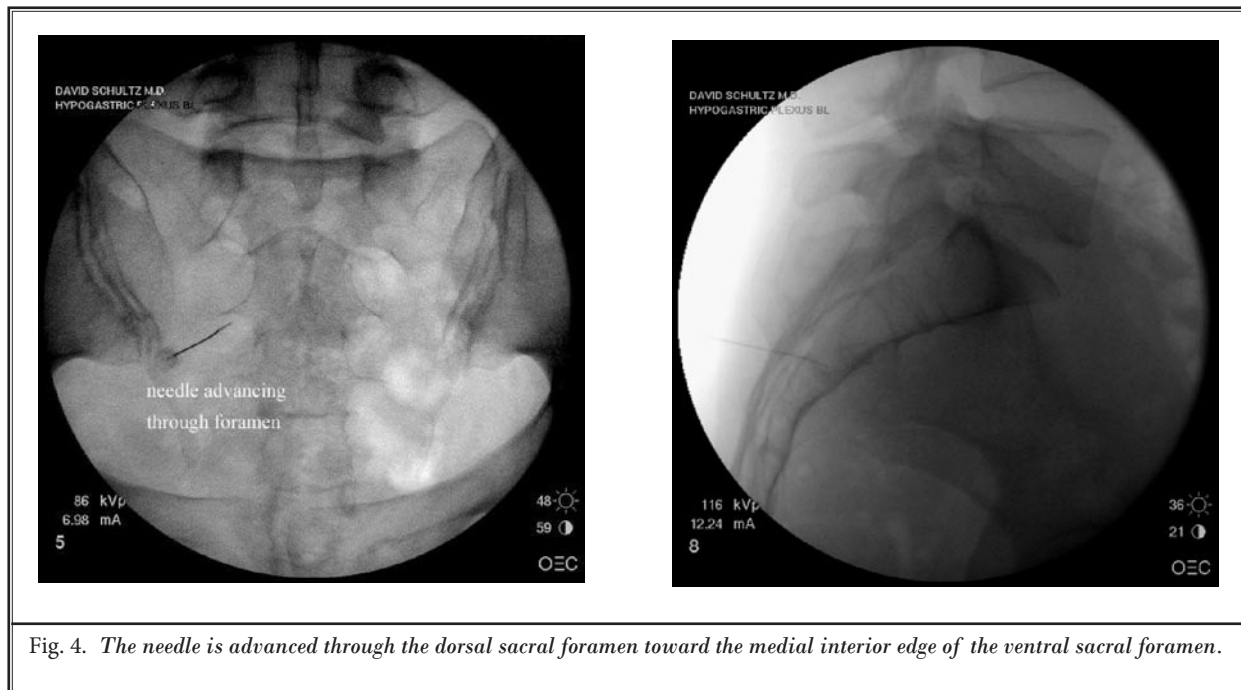


Fig. 4. The needle is advanced through the dorsal sacral foramen toward the medial interior edge of the ventral sacral foramen.

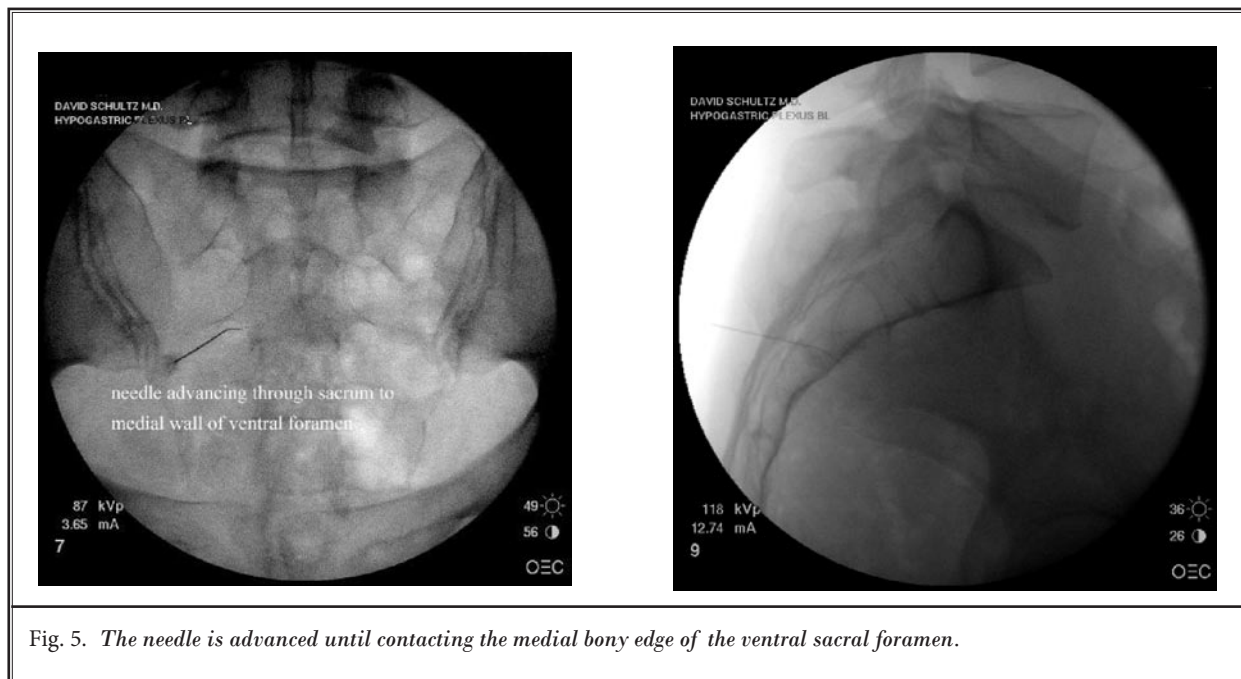


Fig. 5. The needle is advanced until contacting the medial bony edge of the ventral sacral foramen.

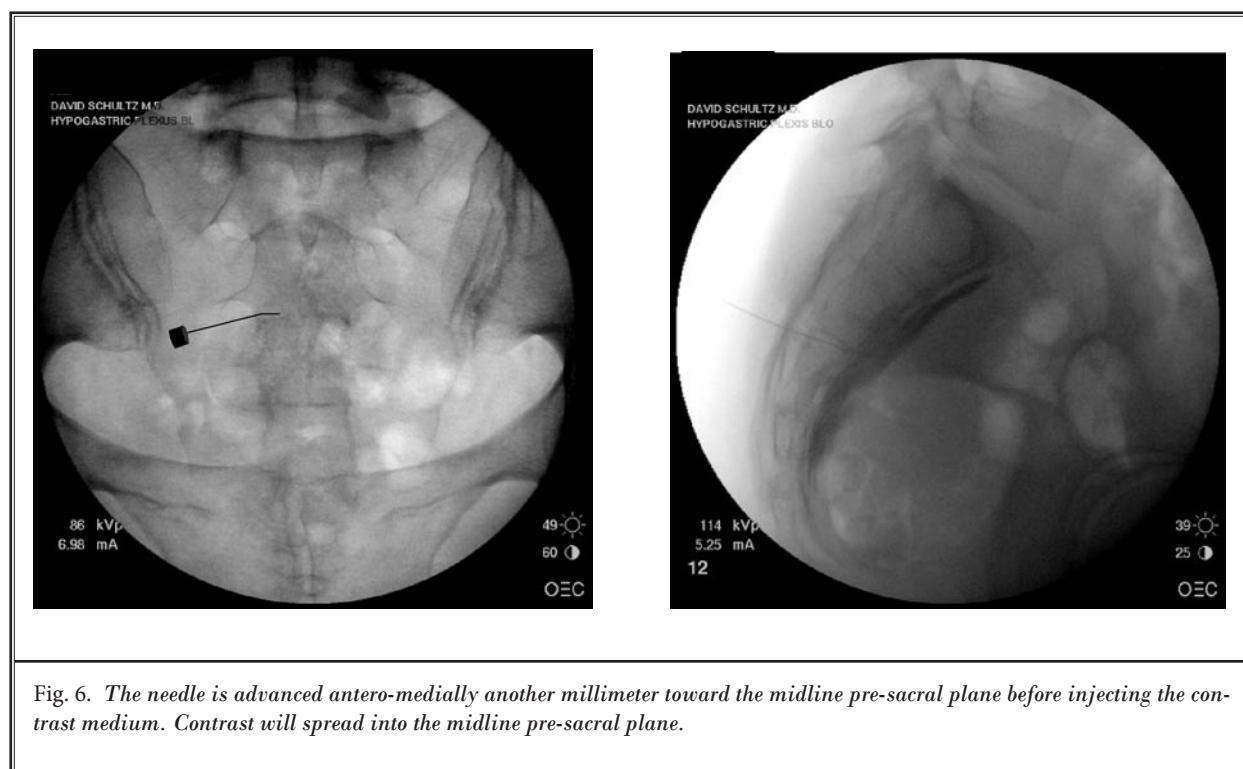


Fig. 6. The needle is advanced antero-medially another millimeter toward the midline pre-sacral plane before injecting the contrast medium. Contrast will spread into the midline pre-sacral plane.

thesia is encountered, retract and rotate the needle slightly to move past the sacral nerve root. Small, incremental doses (0.1 – 0.3 mL) of 1% lidocaine during needle advancement improves patient comfort without creating blockade of sacral nerve roots.

Maneuver the needle along the medial edge of the ventral sacral foramen to exit the ventral foramen as medial as possible. Advance the needle antero-medially another millimeter toward the midline pre-sacral plane (Fig. 6) and inject the contrast medium. If the needle is in the optimal position, the contrast should spread cephalad and caudad along the pre-sacral plane conforming to the midline, ventral surface of the sacrum. When proper needle tip position is assured, inject the active medication, such as 10–15 mL of a local anesthetic/steroid combination. If injected contrast and medication spread across the midline from the side of needle placement, then a unilateral block may be adequate. More commonly however, contrast spread is primarily unilateral, necessitating a bilateral needle placement for complete blockade of the right and left inferior hypogastric plexuses.

## RESULTS

Using the procedure described above, 15 inferior hypogastric plexus blockade procedures have been performed by the author on 11 female patients over the past 3 years.

Using an 11-point (0–10) visual analog pain scale, patients rated their pelvic pain before and approximately 30–60 minutes after the procedure. For 11 procedures, pain was decreased following the procedure with pre- and post-pain scores (SD) of 7.4 (2.3) and 5.0 (2.7), respectively ( $P < 0.05$ ). For one procedure, pre- and post-pain scores of 6 and 8, respectively, indicated a worsening of pain while for 3 procedures with a mean pain score of 6.3 (range 2–10) prior to the procedure there were no changes in pain severity. The inferior hypogastric plexus block was deemed satisfactory with good immediate results in 11 of 15 procedures (73%).

There were no complications or unusual occurrences and all patients were discharged to home following the procedure.

## **DISCUSSION**

Using a transsacral approach, inferior hypogastric plexus blocks were performed in 11 patients, with chronic pelvic pain with a satisfactory result in 11 of 15 procedures, a 73% success rate based on immediate pain relief and no evidence of complications. Consequently, the results are similar to the results of superior hypogastric plexus blockade utilizing either a classic approach or transdiscal approach. This study shows that the short-term results of a transsacral inferior hypogastric plexus blockade are similar to short-term results for classic or transdiscal superior hypogastric plexus blocks.

Multiple techniques have been described to perform superior hypogastric plexus block, which lies anterior to the lumbosacral junction (2-5). However, there are several technical difficulties in spite of the modifications. While successful results have been reported with superior hypogastric plexus blockade with an anterior approach, the technique risks injury to structures overlying the plexus such as the bowel, bladder, and common iliac artery. The transdiscal approach requires elaborate preparation and is associated with risks of discitis and damage to the integrity of the disc, specifically if the procedure is performed from both sides. Thus, since it appears that an inferior hypogastric plexus block may provide similar results, this procedure may be considered as a safer and easier to perform alternative to superior hypogastric plexus block.

Transient paresthesia is the most common adverse event during transsacral blockade of the inferior hypogastric plexus, occurring in approximately 5% of the procedures performed. The sacral spinal nerves, with their dorsal and ventral rami, course in close proximity to the advancing needle and may be occasionally contacted by the needle tip. Although briefly uncomfortable, paresthesia can be minimized with slow and careful advancement of the needle using frequent injections of small volumes of diluted local anesthetic as the needle advances. If paresthesia begins to occur, steer around the path of the traversing nerve before advancing further by rotating the bent needle tip

slightly. To date, persistent paresthesia and/or permanent nerve injury has not been reported.

The rectum lies in close proximity to the ventral sacrum and although it is not adherent to the sacral periosteum, rectal puncture is possible if the needle tip is advanced too deeply into the pre-sacral tissues. This should be easily avoided by visualizing the needle depth using lateral fluoroscopy as the needle tip emerges from the ventral sacral foramen. The space between the ventral surface of the sacrum and the rectum is typically greater than 1 mm and the needle tip need only be advanced slightly past the ventral edge of the sacrum.

Other possible adverse events include vascular penetration of one of the numerous pelvic vessels, hematoma, and infection. Dural puncture is extremely unlikely since the properly placed needle should course well lateral to the dura sac at S1 and lateral to the tapering tip of the dural sac at S2.

Although neurolytic superior hypogastric plexus blockade has been described (10), there are no reports of neurolytic inferior hypogastric block. The newly described transsacral approach to the inferior hypogastric plexus could conceivably be used for neurolysis with alcohol or phenol to treat refractory pelvic pain from terminal malignancy although, to this author's knowledge, this has not been attempted. Risks of transsacral inferior hypogastric neurolysis may be significantly increased due to the proximity of important neural structures including the lumbosacral plexus.

While the results of this technical report indicate successful blockade and relief in patients who were treated on a short-term basis, further controlled studies should be conducted comparing the results of superior and inferior hypogastric plexus blocks, and long-term results of inferior hypogastric plexus blocks.

## **CONCLUSION**

Transsacral blockade of the inferior hypogastric plexus is a useful technique for the diagnosis and treatment of chronic pain conditions involving the lower pelvic viscera.

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