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Superior Hypogastric Plexus Block for Refractory Pelvic Pain in Bertolotti's Syndrome: A Case Report

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Background: Superior hypogastric plexus (SHP) neurolysis is a well-established intervention for pelvic cancer pain; however, lumbosacral transitional vertebrae (LSTV) can present significant technical challenges during fluoroscopically guided procedures.

Case Report: A 70-year-old patient with refractory pelvic pain secondary to advanced cervical cancer and LSTV underwent successful neurolysis of the SHP and ganglion impar. A modified transdiscal approach was performed under fluoroscopic guidance, following a detailed preprocedural imaging analysis to account for the anatomical variation.

Conclusions: This case demonstrates the feasibility of transdiscal SHP neurolysis in patients with complex spinal anatomy when guided by thorough anatomical understanding, meticulous planning, and refined technique. Clinicians must recognize the full spectrum of lumbosacral variations and adapt interventional strategies accordingly in complex spine scenarios.

Key words: Nerve block, cancer pain, chronic pain

BACKGROUND

Pain remains one of the most distressing and prevalent symptoms in patients with cancer. A recent meta-analysis reported that the global prevalence of cancer-related pain is approximately 44.5%, increasing to 54.6% in individuals with advanced or metastatic disease (1). Despite this burden, undertreatment of cancer pain remains alarmingly common, with rates of inadequate management reaching ≤ 40.2% (1).

Cervical cancer is a leading cause of pelvic cancer-related pain, for which superior hypogastric plexus (SHP) neurolysis has been shown to be an effective interventional strategy (2). This procedure, however, requires detailed anatomical understanding and advanced interventional skills, particularly when anatomical variations are present.

Bertolotti's syndrome is a clinical condition associated with lumbosacral transitional vertebrae (LSTV), a congenital anomaly of the L5-S1 junction, with a reported prevalence of ≤ 35.6% (3). LSTV may present either as sacralization of the last lumbar vertebra or lumbarization of the first sacral vertebra. The Castellvi classification categorizes LSTV into 4 types based on the morphology of the transverse processes and the degree of fusion with the sacrum (3).

Here, we present the case of a patient with LSTV and severe pelvic cancer pain who required SHP neurolysis. We describe the interventional technique used to overcome the anatomical challenges associated with this variant. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

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CASE PRESENTATION

A 70-year-old patient with a history of cervical cancer diagnosed 11 years prior, treated with total hysterectomy and bilateral salpingo-oophorectomy followed by radiotherapy, developed persistent visceral pain. Colonoscopy revealed proctitis attributed to prior radiation exposure, along with a rectovaginal fistula, which required colostomy placement.

A computed tomography revealed a bladder mass with ureteral involvement and metastatic activity in the lymph nodes and liver. Histopathology confirmed moderately differentiated keratinizing squamous cell carcinoma. The patient was referred to our pain clinic with severe (10/10 Numeric Rating Scale) abdominal pain and proctalgia refractory to pharmacological treatment.

An SHP and ganglion impar neurolysis were proposed as interventional alternatives for pain control, using a transdiscal approach (4), but the preprocedural imaging identified a transitional vertebra at L5, with enlarged transverse processes at L5 (Fig. 1).

The patient was positioned supine under sedation. After standard skin preparation and sterile draping, a fluoroscopic anteroposterior (AP) view of the lumbosacral spine was obtained in a neutral position. The C-arm was then angled 18° cephalad to visualize the plane of the transitional vertebra and the articulated megatransverse process with the sacrum. A 15° right oblique projection was then used to look for the L4-L5-S1 transdiscal approach. This revealed a radiolucent "inverted drop" image (Fig. 2). This image was bisected by a horizontal radiopaque line, corresponding to the inferior endplate of the superior vertebral body. Below this line, a triangular window was visualized, bounded medially and posteriorly by the inferior articular process, and anteriorly by the radiographic silhouette of the iliac crest—representing the target intervertebral disc space. A 22G Quincke spinal needle (15 cm) was advanced in a slight cephalad-to-caudad and lateral-to-medial direction. AP fluoroscopy confirmed proper alignment, and lateral fluoroscopy guided the needle tip to the anterior third of the disc. At this point, the stylet was removed and replaced with a low-resistance plastic syringe (Perifix®, B. Braun, Bethlehem, PA). The needle was steadily advanced under direct vision while positive pressure was applied.

Loss of resistance was confirmed by the presence of air in the retroperitoneal space. After verifying the correct position with a contrast injection (3 mL of iohexol, Omnipaque 300 mg/mL), 14 mL of 12% phenol was slowly injected under continuous fluoroscopy and vital sign monitoring (Fig. 3).

Subsequently, a ganglion impar block was performed. The sacrococcygeal midline was identified, and a lateral fluoroscopy-guided needle inserted into the first intercoccygeal disc. A 22G spinal needle was advanced using a loss-of-resistance technique with 3 mL of air under fluoroscopic guidance. Contrast confirmed appropriate spread, and 6 mL of 12% phenol was slowly injected, without complication.

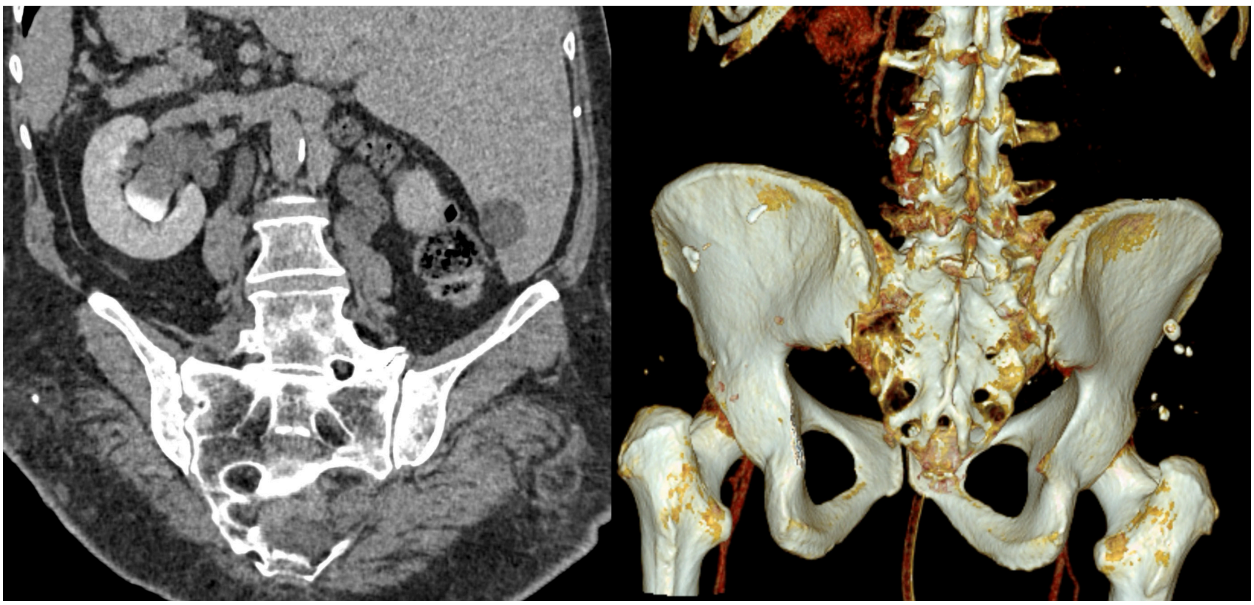

Fig. 1. Computed tomography showing a transitional vertebra at L5, with enlarged transverse processes at L5.

The patient reported immediate and significant pain relief, with a 50% reduction in the Numeric Rating Scale. The patient remained supine for 2 hours postprocedure, and a gradual opioid taper and antispasmodic therapy were subsequently initiated.

DISCUSSION

LSTV are congenital anomalies that can significantly impact the anatomy of the lumbosacral junction, potentially complicating interventional procedures, such as the SHP neurolysis, a well-established strategy for managing refractory pelvic cancer pain (3).

Chithriki et al (5) reported that the aortic bifurcation may be positioned more cephalad in the presence of lumbosacral anomalies. In their series of 87 cases, the bifurcation was located at the L3 level in 59% of patients with sacralization of L5. In cases of lumbarization of S1, the bifurcation occurred at the L4 level in 40% and at the L4-L5 junction in 33% (5).

The SHP is typically located inferior to the aortic bifurcation and cranial to the sacral promontory in 80% of cases, caudal in 18%, and directly over the promontory in 2% (6). This is relevant as the promontory is described as a safe fluoroscopic landmark for surgical and interventional access.

Cadaveric studies (6) have identified 3 SHP morphologies: a mesh-like network (64.8%), a single nerve trunk (24.4%), and a fiber-like structure (10.8%). An accessory hypogastric nerve is also found in ≤ 25% of cases, arising medially from the inferior SHP and extending into the presacral space (6). Awareness of these anatomical variants enhances procedural planning and improves outcomes.

Although multiple SHP approaches have been described, including the anterior and the classic paravertebral techniques (2,7), we considered the transdiscal approach the most suitable for this case due to anterior pelvic metastases and prior surgical interventions, along with a rectovaginal fistula. Notably, in this case, the fusion between the transitional vertebra and the sacrum was broad and accessible, likely related to altered biomechanical load distribution across the lumbosacral junction, leading to contralateral inclination and angular pelvic tilt (8). In addition, other osteodegenerative changes, such as marginal osteophyte formation and posterior intervertebral osteophytes, may have further shaped this anatomy.

Previous studies have tried to define the optimal approach for an SHP block. Choi et al (9) have shown that

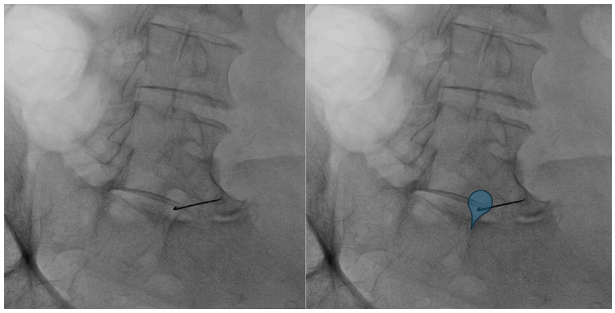

Fig 2. Fluoroscopic oblique view of the lumbosacral spine showing the "inverted drop" image for access.

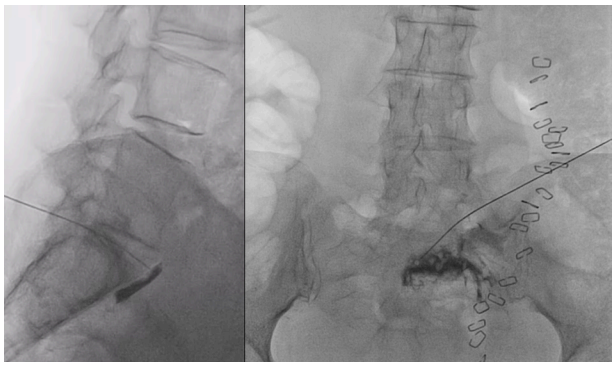

Fig. 3. Fluoroscopic lateral and AP view with air and contrast injection confirming adequate position. AP, anteroposterior.

the transdiscal approach is favored over the posterior approach in cases of narrow bony pelvises. While LSTV is often seen as a technical limitation, our experience demonstrates that a transdiscal route remains feasible even in patients with L5 sacralization.

Both imaging analysis and clinical evaluation were essential in this case, allowing for simultaneous planning of a safe ganglion impar approach, with particular attention to the soft tissue alterations resulting from the rectovaginal fistula (10). This multidisciplinary, anatomy-informed strategy was essential to ensuring procedural safety and effectiveness.

This case emphasizes several key learning points. First, when facing an LSTV, accurate vertebral counting is crucial to prevent errors. Up to 50% of spine surgeons have been reported to misidentify the correct vertebral level in such cases (11); the gold standard remains full-spine imaging and counting from C2 downward (3). In our case, preprocedural imaging review allowed us to identify the transitional vertebra and select the most appropriate technique.

Second, although the rationale indicates that LSTV

may pose important challenges, this vertebral variant should not be considered an absolute contraindication for an SHP block, as it is possible to overcome this obstacle following our approach. In fact, a transdiscal approach represents the best option as it allows direct anterior access even when degenerative changes or metastatic lesions are present in the pelvic area.

Lastly, needle selection matters. Given the oncologic context, we opted for a curved-tip spinal needle, which allowed precise navigation through degenerative tissue planes to apply a neurolytic agent. In contrast, bulkier radiofrequency or cryoablation (12) cannulas may be more difficult to maneuver in such anatomical settings due to their larger diameter and position requirements.

CONCLUSIONS

SHP neurolytic block remains a cornerstone in the treatment of refractory pelvic cancer pain. This case illustrates that, with thorough anatomical understanding, careful planning, and refined technique, SHP neurolysis via a transdiscal approach can be safely and effectively performed even in patients with significant lumbosacral variation. Clinicians should remain aware of the full spectrum of anatomical variations and available interventional techniques to tailor treatment strategies in complex pelvic cancer presentations.

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