

Ultrasound-guided Ganglion Impar Block during the COVID-19 Pandemic: Two Case Reports

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ABSTRACT

Blocks of the ganglion impar are used to treat both malignant and benign causes of visceral and sympathetic pelvic and perineal pain. While conventionally done under fluoroscopic guidance, significant improvements in transducer technology in the past decade have piqued the interest and enthusiasm of interventional pain specialists toward ultrasound-guided performance. In the setting of a pandemic, it is important to ensure the efficacy of treatment as well as the safety of both patients and health care workers. This paper presents two patients who underwent two approaches of ultrasound-guided ganglion impar blocks in a tertiary government hospital in the Philippines during the COVID-19 pandemic.

Keywords: interventional ultrasound, autonomic nerve block, COVID-19

INTRODUCTION

The ganglion impar is a solitary retroperitoneal structure that marks the end of the sympathetic chain located anterior to the sacrococcygeal junction. It was initially approached through fluoroscopic guidance – by identifying the anococcygeal ligament and inserting the needle into the anterior sacrococcygeal joint (SCJ).^{1,2} In late 2019, the COVID-19 pandemic required minimizing patient transport, healthcare worker exposure, and the use of the radiology suite's fluoroscopy machine. Irradiation is also harmful to COVID-19 patients by killing radiosensitive lymphocytes,³ as lymphopenia is a major predictor of a severe COVID-19 course.

An ultrasound-guided technique for needle placement into the SCJ for ganglion impar block was explored for managing perineal and pelvic pain. This ultrasound-guided technique offers the advantage of real-time visualization and a “lymphocyte-sparing” pain management procedure that can be done bedside.⁴

CASE 1

A 33-year-old Filipino woman who tested negative for COVID-19 described exquisite pain in the perineal and perianal area due to cervical cancer tumor progression. She had undergone chemotherapy and radiation therapy sessions regularly but was unable to follow up due to the COVID-19 pandemic restrictions. At home, her pain regimen included paracetamol, gabapentin, oxycodone controlled-release (CR) at 120 mg/day, and oxycodone immediate-release (IR) as rescue every two hours. Despite these medications, the pain continued to worsen in severity (Numeric Rating

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Score [NRS] of 9–10/10) requiring at least ten rescue doses of oxycodone IR per day. She described her pain as severe, continuous, crampy, vague in the perineal and perianal region, radiating to her pelvis and bilateral knees. She was unable to tolerate recumbent and sitting positions. Patient-controlled analgesia (PCA) using fentanyl was offered but could not be afforded due to financial constraints. She was instead started on paracetamol, high-dose morphine slow-release tablet (MST), oxycodone IR, and gabapentin. This provided the patient with mild relief (decreasing the pain score to NRS 7–8/10) requiring three to five rescue doses daily. She reported poor appetite and difficulty sleeping due to the pain. The pain was assessed to be a chronic, malignant, mixed nociceptive, and neuropathic type of pain secondary to squamous cell carcinoma of the cervix Stage IIIB with extensions to the uterine, vaginal, parametrial, vesical, and rectal areas. Considering the poor response to medications and dwindling funds, the patient was offered a ganglion impar block.



Figure 1. Bent gauge 23 Quincke spinal needle.

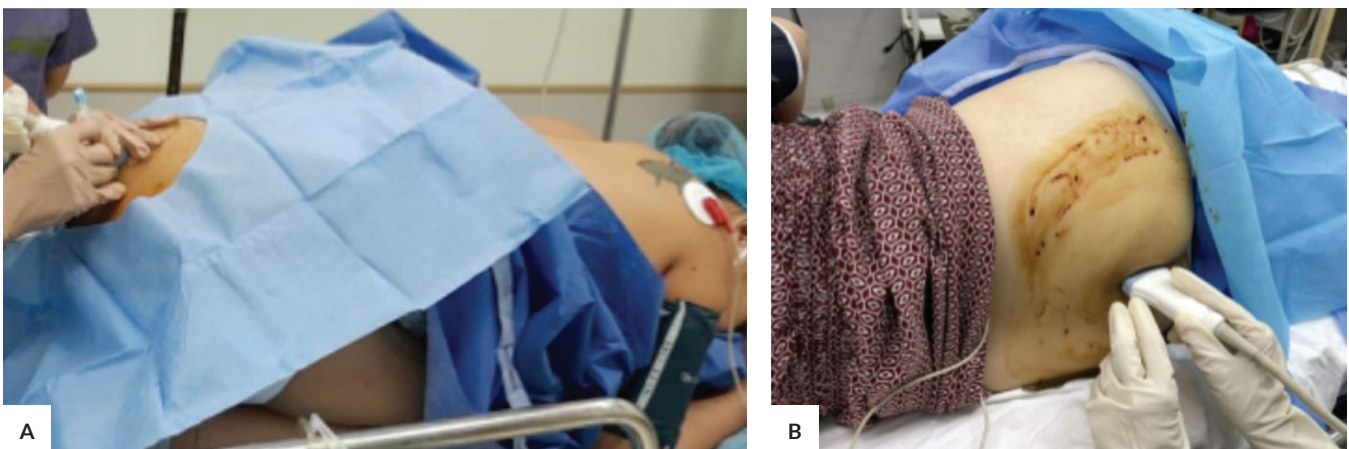


Figure 2. Positions assumed by the patients during block performance. (A) Patient 1 in a prone, knee-to-chest position. (B) Patient 2 in a left lateral decubitus position.

CASE 2

A 48-year-old Filipino woman who tested negative for COVID-19 presented in the outpatient clinic for the treatment of a chronic, malignant, mixed nociceptive and neuropathic type of pain due to endometrial cancer extension to the parametria and the rectum. The pain was described as moderate to severe in the perineal and perianal region and was aggravated by straining during defecation (increasing the NRS to 10/10). She was unable to maintain a seated position for more than five minutes due to pain. Treatment consisting of morphine slow-release tablet (MST) 30 mg every eight hours and morphine intermediate-release tablets 15 mg every two hours afforded pain relief to NRS of 6/10. Considering her constipation despite use of stool softeners and laxatives and her daily commute for 28 cycles of radiation therapy, an ultrasound-guided ganglion impar block was performed prior to scheduled radiation treatment.

Informed consent was obtained from both patients. The procedure, expected outcomes, possible untoward effects, and management of such were explained and accepted.

METHODS

Both patients observed standard NPO guidelines prior to the procedure. Standard ASA monitors were attached, and intravenous access was secured. Pre-procedure vital signs of the patients were within normal range. Midazolam 1 mg was given intravenously for anxiolysis.

GE Logiq E BT09 Portable Imaging System and a linear array transducer, model 9L-RS (3.33–10.0 MHz) and a Quincke gauge 23 spinal needle bent at 90 degrees in the middle were prepared for the procedure (Figure 1). Patients assumed their position of comfort during the procedure (Figure 2).

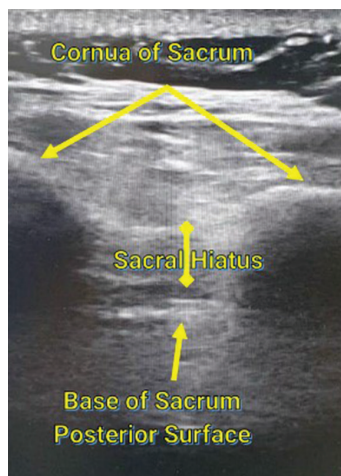


Figure 3. Transverse view of the sacral hiatus.

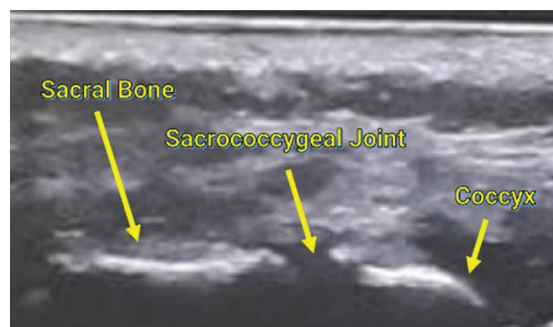


Figure 4. Midline longitudinal scan at the level of the sacrococcygeal junction.

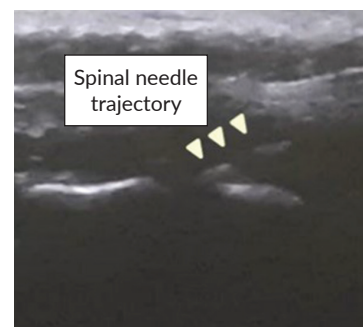


Figure 5. Needle placement in the sacrococcygeal junction.

The area of the sacral hiatus was palpated and prepped with povidone iodine 10%. The ultrasound transducer was initially placed axially across the sacrum and moved inferiorly until the sacral cornua and sacral hiatus were identified (Figure 3).

The probe was then shifted to the sagittal plane which visualized the sacrum, the sacrococcygeal joint and the vertebral components of the coccyx in one ultrasound image (Figure 4).

The cleft caudal to the sacral hiatus was identified as the sacrococcygeal joint (SCJ). The intervertebral disc between the sacrum and the coccyx located at the SCJ was targeted (Figure 5).

For patient 1, an in-plane approach was used (Figure 6A) while an out-of-plane approach was done for patient 2 (Figure 6B).

Local infiltration with lidocaine 2% was done in the superior aspect of the intergluteal crease. The spinal needle was advanced until the coccyx was reached and walked transversely until the tip of the needle was observed to have reached the SCJ. As the needle was gripped in the cartilage, a loss of resistance technique which can be described as piercing through a ligament was utilized to identify the potential space deep to the joint. Careful aspiration was performed to rule out intravascular placement. For both patients, 10 ml of 0.2% isobaric bupivacaine + 40 mg methylprednisolone were administered in divided doses of 2 ml at a time to ensure proper needle placement and solution delivery.

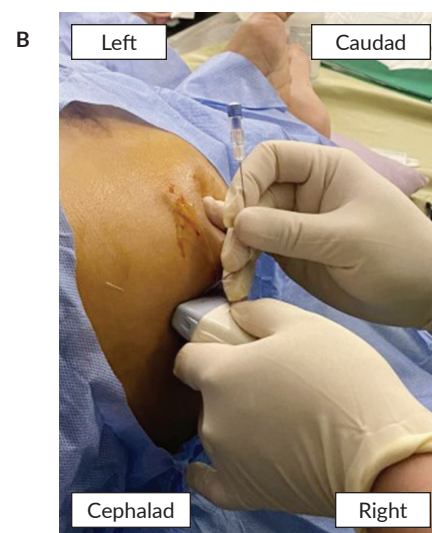
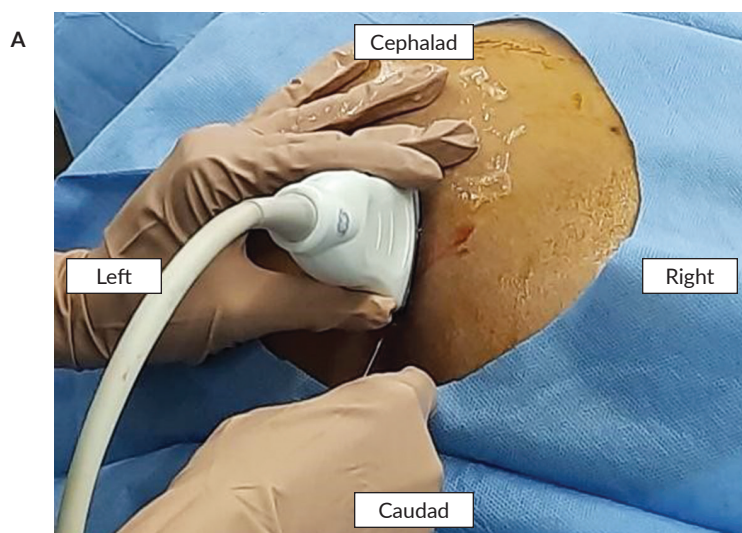


Figure 6. Needle insertion technique. (A) In-plane approach. (B) Out-of-plane approach.

RESULTS

The first patient experienced pain relief from NRS 10/10 to NRS 1–2/10 immediately after the procedure. Opioids were down-titrated and she reported adequate and excellent pain relief at home. She passed away peacefully one month after the procedure due to complications of her disease.

The second patient experienced pain relief from NRS 7/10 to NRS 2/10, 20 minutes after the procedure. The full benefit of the ganglion impar block was experienced after one week and she has been commuting comfortably to her daily radiation therapy sessions. Her opioid doses have been down-titrated as well and she reported having a better disposition due to relief of the previously felt pain.

Both patients experienced better quality of life as measured by the Karnofsky Performance status scale. Patient 1 had a pre-procedure Karnofsky score of 30 corresponding to being severely disabled and was admitted. Post-procedure, she was able to care for most of her personal needs with occasional assistance (Karnofsky score 60). Patient 2 had a pre-procedure Karnofsky score of 50 which corresponds to requiring considerable assistance and a post-procedure Karnofsky score of 80 (able to perform normal activity with effort).

DISCUSSION

The ganglion impar is the midline caudal termination of the paravertebral sympathetic chains. It supplies nociceptive and sympathetic fibers to the perineum, distal rectum, perianal region, distal urethra, vulva/scrotum, and the distal third of the vagina.¹⁻³ Ganglion impar block is indicated for sympathetically mediated pain originating from these regions. The block is also useful for chronic nonmalignant causes such as coccydynia.

The ganglion impar can be accessed using both conventional and modified approaches. The gold standard in accessing the ganglion impar is under fluoroscopy or computed tomography guidance.⁵

As transducer technology improved in the past decade, ultrasound-guided procedures became more popular. In 2008, ganglion impar blocks done under ultrasound guidance have been described by Gupta et al. and by Lin et al.⁴ A prospective cohort study by Ghai et al. showed that 15 patients who underwent ultrasound-guided ganglion impar blocks had no adverse events and showed statistically significant improved post-block pain scores.⁶ A case report in 2012 narrated the use of ultrasound as the primary imaging modality to guide the placement of a “bedside” local anesthetic ganglion impar block when combined with a loss of resistance technique.⁷

When employing an ultrasound-guided technique, the authors had a limited view of the needle insertion depth as well the spread of the administered drug due to sacral and coccygeal bony artifacts. A spinal needle bent 5–7 cm

manually from the tip into a curved needle was used as described by Plancarte in 1990 to facilitate positioning near the ganglion.⁴ Needle depth varies depending on the subject’s anatomy. To avoid injuring surrounding structures, contact with bone is maintained by walking the needle transversely from the coccyx. During this step, one can feel a loss of resistance indicating placement of the needle tip anterior to the ventral sacrococcygeal ligament.

In performing ultrasound-guided blocks, the provider must know the anatomy and sono-anatomy to facilitate a single puncture needling technique which decreases the chances of infection from multiple punctures and inadvertent puncture of the rectum. Other complications may include sexual, bladder and bowel dysfunction, and hemorrhage.²

In an in-plane or transdiscal approach, a Quincke-type spinal needle is directed from the caudad to the anterior part of the coccygeal vertebral body. The tip of the needle may not be visualized clearly beneath the coccyx due to the acoustic shadow from the rectal gas. An out-of-plane technique through the trans-anococcygeal or paracoccygeal approaches provides a smaller trajectory, but poorer needle visualization.⁸ An in-plane approach was chosen for patient 1 since a prone, knee-to-chest position was her position of comfort, and the ultrasound probe and needle were ergonomically handled. An in-plane approach was attempted initially for patient 2 who was comfortable in the left lateral decubitus position. However, there was difficulty placing the needle through the calcified joint space. Thus, an out-of-plane approach was done which allowed ease in performing the ultrasound-guided block. The disadvantage of the trans-anococcygeal ligament technique is the risk of infection posed by adjacency to the rectum.

Many conditions associated with chronic pain have no detectable anatomical correlate. In these cases, the source of the pain can be established using diagnostic blocks.⁹ For the 2 cases, a sympathetic block of the ganglion impar using 0.2% isobaric bupivacaine was done. The pain scores were recorded before and after the block. A steroid in the form of methylprednisolone was added to prolong block duration for both patients.

During the COVID-19 pandemic, a lymphocyte count $<1.5 \times 10^9/L$ has been associated with a three-fold increased risk of severe COVID-19.² Indeed, the lymphocyte is the most radiosensitive cell of the hematopoietic system and is frequently depleted by RT using a 50% lethal dose of 1–2 Gy.^{3,10} While both subjects in this study were not infected with COVID-19, the authors viewed this as an unprecedented opportunity to explore “lymphocyte-sparing” pain management strategies.

Variations of ganglion impar blocks that rely on ultrasound also minimize exposure of other patients and health care workers to COVID-19 as this quick procedure can be done bedside. The ultrasound-guided procedure can be recorded and referenced. It costs less than fluoroscopy with comparable safety and effectivity rates. More studies

comparing the safety and cost-to-benefit ratio will help assess if an ultrasound-guided ganglion impar block can be adopted by low-resource centers like our setting.

CONCLUSION

Based on these cases, two approaches to performing an ultrasound-guided ganglion impar block are safe and effective in the relief of perineal and perianal pain. Patient acceptance and comfort during the procedure are maximized since there is no need to palpate the rectum during needle placement unlike conventional methods utilizing fluoroscopy. The addition of methylprednisolone allows excellent pain relief for two to three months.

Recommendations

Larger studies can be done to confirm the consistency of outcomes from these two subjects. During the COVID-19 pandemic, the use of portable ultrasound for some interventional pain procedures to comply with physical distancing/isolation measures is advantageous. Future efforts can be directed to implementing this technique in specific situations, such as a low-resource medical facility.

Declaration of Patient Consent

Both authors certify that they have obtained appropriate patient consent forms granting the use of the patient's images and clinical information for publication. The patients understand that their name and initials will not be published, and due efforts will be made to conceal their identity but anonymity cannot be guaranteed.

Statement of Authorship

CYBD participated in recruiting the participants and in writing both the original and final manuscript while EQV edited and approved the final manuscript.

Author Disclosure

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