

FAST FACTS AND CONCEPTS #97
BLOCKS OF THE SYMPATHETIC AXIS FOR VISCERAL PAIN
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Background The sympathetic nervous system spans the length of the axial skeleton. Most of the plexi and ganglia are readily accessible to percutaneous interruption. In the palliative care setting, the most common indication for interrupting the sympathetic axis via a “nerve block” is to control visceral pain arising from malignancies of the abdominal and pelvic viscera. Visceral pain is often described as a deep, squeezing pain that is difficult to localize and characterize. When it is recalcitrant to meticulous pharmacologic and behavioral therapy, or if the patient is intolerant to pharmacotherapy, consultation should be sought to either a pain specialist or interventional radiologist for consideration of neurolytic procedures. Potential advantages of a neurolytic procedure, compared to spinal and epidural anesthetic techniques (see *Fast Fact #98*), include cost savings and avoidance of hardware (e.g., catheters, tubes, pump), which can be cumbersome, are subject to malfunction, and pose an infection risk.

Types of Nerve Blocks The following have an established record in well-selected patients:

- *Celiac plexus block (CPB)*. Used for upper abdominal pain – most commonly from pancreatic cancer. It is also appropriate for pain involving the GI tract from the distal third of the esophagus to the transverse colon, the liver and biliary tract, the adrenals, and mesentery. There have been over 25 controlled studies assessing the utility of a CPB. The data suggest CPB can improve analgesia, decrease opioid consumption, and decrease opioid-induced adverse effects compared with conventional analgesic treatments.
- *Splanchnic nerve block*: The splanchnic nerves are formed by sympathetic pre-ganglionic fibers from T5 to T12 of the thoracic spine. Visceral pain from structures innervated by the celiac plexus can be treated with a splanchnic nerve block as well. Hence, a splanchnic nerve block can be a viable alternative to CPB when there are regional distortions of the celiac plexus anatomy (e.g., tumor burden, adenopathy, or prior surgery).
- *Superior hypogastric plexus block (SHPB)*. Applicable to malignant pain of the gastrointestinal tract from the descending colon to the rectum, as well as the urogenital system. There is less robust data evaluating SHPB for visceral pain, with one study showing a decrease in pain intensity and less morphine consumption when SHPB was utilized.
- *Ganglion impar block (GIB)*. The ganglion impar innervates distal structures of pelvis including the vulva, rectum, anus, sacrum, perineum, and coccyx. A study of 15 patients found a 3-point reduction in visual analogue pain scales lasting 3 months with a reduction in opioid dose consumption.
- *Inferior hypogastric plexus block*: the inferior hypogastric plexus innervates the pelvis, perineum, and genitals. Because it is more difficult to access and prone to complications due to its presacral location, it is utilized less frequently than a GIB. Several small studies have shown a short-term benefit in select patients with pelvic or genital pain.

Procedure Most sympathetic plexus blocks are performed with the patient in the supine or prone position. They are intravenously hydrated and sedated in a sterile, closely monitored setting such as an operating room. Prior to insertion of a fluoroscopic needle, local anesthetic is infiltrated for patient comfort. The procedure needle is then positioned properly utilizing fluoroscopy, CT (Computed Tomographic), or endoscopic ultrasonic guidance. Once in place, a local anesthetic solution is first injected to “test” the block. If the small dose of local anesthetic provides adequate pain relief in the absence of motor or sensory deficits, it is indicative of a successful block. A subsequent “neurolysis” procedure usually can be performed days later with 50-100% ethyl alcohol, 6-10% phenol, or radiofrequency ablation. Pain improvement from neurolysis typically lasts 3 to 6 months, at which point the procedure can be repeated if indicated.

Complications & Side Effects Side effects – referable to loss of sympathetic tone – include transient hypotension (30-60% of cases) and increased intestinal motility leading to diarrhea which is usually temporary. However, often the diarrhea is preferred over opioid induced constipation. Complications include needle injury to visceral, neural, and vascular structures; pain at the injection site; and failure to obtain an analgesic response. Contraindications to these procedures include bleeding diathesis and local infection.

Post-Procedural Management Crucial to the success of sympatholysis is proper patient selection and technical skill. Sympathetic blocks are not a panacea and generally do not obviate the need for ongoing pharmacological management of residual pain. However, in select patients they can substantially improve analgesia and quality of life and may allow for opioid dosage reduction. Note: attempts at post-block opioid reduction should be done with care to avoid unmasking existing nociceptive/neuropathic pain and precipitating opioid withdrawal.

References

1. Waldman SD, ed. *Interventional Pain Management*. 2nd Edition. Philadelphia, PA: WB Saunders Company; 2001.
2. De Leon-Casasola OA. Critical evaluation of chemical neurolysis of the sympathetic axis for cancer pain. *Cancer Control*. 2000; 7(2):142-148.
3. Mercadante S, Nicosia F. Celiac plexus block: a reappraisal. *Reg Anesth Pain Med*. 1998; 23:37-48.
4. Trans QHN, et al. Endoscopic ultrasound-guided celiac plexus neurolysis for pancreatic cancer pain: a single-institution experience and review of the literature. *J Supportive Oncol*. 2006; 4(9):460-464.
5. Wang PJ, et al. CT-guided percutaneous neurolytic celiac plexus block technique. *Abdominal Imaging*. 2006; 31(6):710-718.
6. Mercadante S, Klepstad P, et al. Sympathetic blocks for visceral cancer pain management: a systematic review and EAPC recommendations. *Critical Reviews in Oncology/Hematology*. 2015; 96:577-83.
7. Koyyalagunta D, Engle MP, Yu J, Feng L, Novy DM. The Effectiveness of Alcohol Versus Phenol Based Splanchnic Nerve Neurolysis for the Treatment of Intra-Abdominal Cancer Pain. *Pain Physician*. 2016 May;19(4):281-92.
8. De Cicco M, Matovic M, Bortolussi R, Coran F, Fantin D, Fabiani F, Caserta M, Santantonio C, Fracasso A. Celiac plexus block: injectate spread and pain relief in patients with regional anatomic distortions. *Anesthesiology*. 2001 Apr;94(4):561-5.
9. Rocha A, Plancarte R, Nataren RGR, Carrera IHS, Pacheco VALR, Hernandez-Porras BC. Effectiveness of Superior Hypogastric Plexus Neurolysis for Pelvic Cancer Pain. *Pain Physician*. 2020 Mar;23(2):203-208. PMID: 32214302.
10. Sousa Correia J, Silva M, Castro C, Miranda L, Agrelo A. The efficacy of the ganglion impar block in perineal and pelvic cancer pain. *Support Care Cancer*. 2019 Nov;27(11):4327-4330. doi: 10.1007/s00520-019-04738-9. Epub 2019 Mar 18. PMID: 30880371.
11. Doroshenko M, Turkot O, Horn DB. Sympathetic Nerve Block. [Updated 2021 Aug 16]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK557637/>
12. Mohamed SA, Ahmed DG, Mohamad MF. Chemical neurolysis of the inferior hypogastric plexus for the treatment of cancer-related pelvic and perineal pain. *Pain Res Manag*. 2013;18(5):249-252. doi:10.1155/2013/196561

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