PAIN
MEDICINE
CASE
REPORTS

ISSN 2768-5152

Volume 5, Number 3, pp. 89-91

# Celiac Plexus Block with Centralized Aorta: Single Needle Transdiscal, Transaortic Approach

Michael McKenna, MD, and Ky Raymond, DO

**Background:** Neurolytic celiac plexus blocks can effectively ameliorate intractable epigastric pain caused by intraabdominal cancers. Multiple techniques have been described, including transaortic and transdiscal needle placement. The authors have preferred the single needle transaortic fluoroscopically-guided technique owing to the reproducible anatomic landmarks for needle tip placement within the anterior periaortic space at the midline of the T12-L1 spinal segment.

**Case Report:** A 70-year old man with intractable localized epigastric pain from stage IV adenocarcinoma of the stomach was referred for consideration of a neurolytic celiac plexus block. The abdominal computed tomography scan revealed a noncalcified abdominal aorta that was centrally located at the T12-L1 level. Face validity correlates optimal anatomic needle placement and the resultant minimal neurolytic injectate volume with maximal efficacy and minimal side effects. While specific fluoroscopic images guide needle track and depth, tactile sensations and blood return provide physiological confirmation of needle tip location. A characteristic contrast pattern confirms attainment of the anatomic target. We discuss a novel technique—a single needle transdiscal, transaortic approach—for celiac plexus neurolysis in a patient with atypical abdominal aortic anatomy.

**Conclusions:** This case demonstrates an effective, uncomplicated celiac plexus neurolysis using a small injectate volume. The authors present this case as a novel approach to celiac plexus neurolysis combining 2 previously described techniques.

**Key words:** Celiac plexus, neurolysis, single needle, transaortic, transdiscal

## BACKGROUND

Neurolytic celiac plexus blocks can effectively ameliorate intractable epigastric pain caused by intraabdominal cancers (1). Multiple techniques have been described, including transaortic (2,3) and transdiscal (4) needle placement. The authors have preferred the single needle transaortic fluoroscopically-guided technique owing to the reproducible anatomic landmarks for needle tip placement within the anterior periaortic space at the midline of the T12-L1 spinal segment. Face validity correlates optimal anatomic needle placement and the resultant minimal neurolytic injectate volume with maximal efficacy and minimal side effects. While specific fluoroscopic images guide needle track and depth, tactile sensations and blood return provide physiological confirmation of needle tip location. A characteristic contrast pattern confirms attainment of the anatomic target. We discuss a novel technique—a single needle transdiscal, transaortic approach—for celiac plexus neurolysis in a patient with atypical abdominal aortic anatomy.

## CASE

A 70-year old man with intractable localized epigastric

From: Touro University Nevada College of Osteopathic Medicine, Las Vegas, NV

Corresponding Author: Ky Raymond, DO, E-mail:kyraymond23@gmail.com
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.
Accepted: 2020-09-24, Published: 2021-05-31

pain from stage IV adenocarcinoma of the stomach was referred for consideration of a neurolytic celiac plexus block. The patient had failed systemic analgesic therapy. The abdominal computed tomography (CT) scan revealed a noncalcified abdominal aorta that was centrally located at the T12-L1 level (Fig. 1).

Based on the CT, a medial needle trajectory to penetrate the midpoint of the aortic lumen (Fig. 1, line 1) would place the needle tip in the right periaortic space, spatially distant from the celiac plexus. The standard left lateral approach (Fig. 1, line 2) would miss the aortic lumen and potentially damage the aortic wall. However, a transaortic approach (Fig. 1, line 3) through the T12-L1 disc would place the needle tip at the anatomic target—the midpoint of the anterior periaortic space. The absence of aortic calcification at the targeted site of needle penetration decreased the risk of atherosclerosis-related needle injury to the aortic wall. This novel approach was explained to the patient—a retired surgeon—and consent was obtained. Risks of aortic dissection, hemorrhage, and nerve damage were explained, as well as side-effects including postural hypotension and diarrhea.

The prone patient received midazolam for moderate sedation. One gram of intravenous cefazolin was administered owing to anticipated needle penetration of the disc. Skin and deep tissues were anesthetized with 1% lidocaine. The standard lumbar approach for intradiscal access was modified by entering the skin slightly more medially such that the 7-inch, 22-gauge spinal needle would exit the disc left of the midline, a needle trajectory determined by the abdominal CT (Fig. 1, line 3). The needle was then advanced through the left anterior abdominal aortic wall, utilizing the lateral fluoroscopic view, tactile sensation, and needle pulsation. Removal of the stylet confirmed bright red blood.

The needle was then further advanced under alternating lateral and anteroposterior (AP) fluoroscopic guidance until blood flow ceased, indicating that the needle tip was within the anterior aortic wall. At this point, a plastic loss-of-resistance syringe was used to confirm passage of the needle tip into the anterior periaortic space. AP imaging confirmed the central needle position (Fig. 2). Injection of 2 ccs of contrast medium documented an appropriate pattern in AP (Fig. 3) and lateral (Fig. 4) fluoroscopic views. After negative needle aspiration, a test dose of 5 ccs of 0.5% bupivacaine with 1:200,000 epinephrine resulted in no hemodynamic change or noxious patient response. Fifteen ccs of absolute ethanol were then injected. The needle was cleared with one cc of 0.5% bupivacaine and removed. The patient remained prone for 45 minutes, was observed for another 30 minutes while sitting, and was then discharged home. He had no side-effects or complications. His 2-week follow-up appointment confirmed 80% pain improvement. The patient succumbed to his disease after 4 weeks.

## DISCUSSION

In 29% of the population, the abdominal aorta is


Fig. 1. CT axial view at T12-L1 level. Line 1: midaortic approach, Line 2: standard paravertebral approach, Line 3: transdiscal, transaortic approach

Fig. 2. Fluoro, AP image

Fig. 3. Fluoro, AP image, contrast spread
Abbreviations: AP, anteroposterior; CT, computed tomography

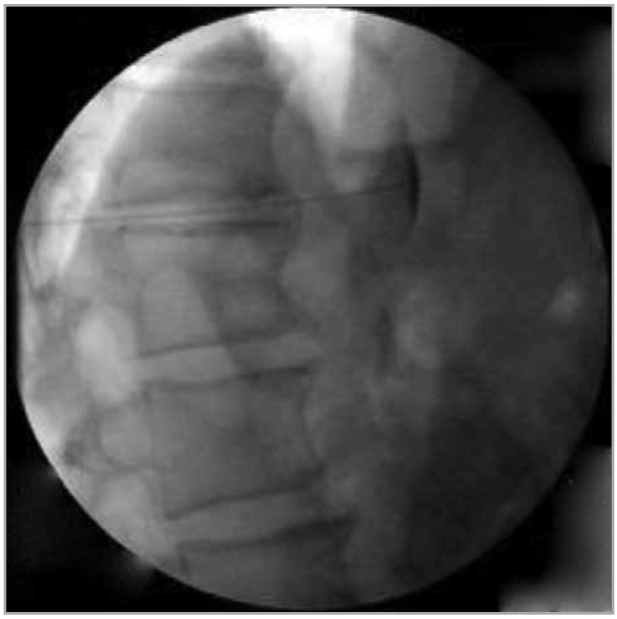

Fig. 4. Fluoro, lateral image, contrast spread

located in the middle tertile of the L1 vertebral body (5). As illustrated by this case, an aorta located in the middle tertile could complicate the standard left-sided approach to a transaortic celiac plexus block, resulting in either failure to penetrate the aortic lumen (losing the primary anatomic landmark) or right lateral placement (losing the optimal anatomic target). Or worse, the needle could penetrate and track through the lateral aortic wall, resulting in catastrophic damage (6).

This case illustrates a novel approach to the celiac plexus necessitated by the common right-shifted variant of abdominal aorta anatomy. It reinforces the importance of using preprocedural advanced imaging to understand the specific patient's aortic anatomy in order to predetermine the optimal needle trajectory and avoid calcified regions of the aortic wall that increase the risk of iatrogenic dissection. Furthermore, it demonstrates the safe and effective combination of 2 techniques—intradiscal and transaortic—for successful neurolytic celiac plexus blockade.

The authors prefer the single needle transaortic approach owing to the simplicity and efficiency of attaining optimal needle placement, thereby minimizing tissue trauma, procedural time, discomfort, and neurolytic injectate volume.

## CONCLUSION

The transdiscal, transaortic approach to the celiac plexus represents a safe, minimally invasive single-needle technique for patients with the common anatomic variant of a right-shifted abdominal aorta.

## REFERENCES


1. Eisenberg E, Carr DB, Chalmers TC. Neurolytic celiac plexus block for treatment of cancer pain: A meta-analysis. ***Anesth Analg*** 1995; 80:290-295.
2. Ischia S, Luzzani A, Ischia A, Faggion S. A new approach to the neurolytic block of the coeliac plexus: The transaortic technique. ***Pain*** 1983; 16:333-341.
3. Lieberman RP, Waldman SD. Celiac plexus neurolysis with the modified transaortic approach. *Radiology* 1990; 175:274-276.
4. Ina H, Kitoh T, Kobayashi M, Imai S, Ofusa Y, Goto H. New technique for the neurolytic celiac plexus block: The transintervertebral disc approach. *Anesthesiology* 1996; 85:212-217.
5. Yang IY, Oraee S, Viejo C, Stern H. Computed tomography celiac trunk topography relating to celiac plexus block. *Reg Anesth Pain Med* 2011; 36:21-25.
6. Kaplan R, Schiff-Keren B, Alt E. Aortic dissection as a complication of celiac plexus block. *Anesthesiology* 1995; 83:632-635.