

# Ultrasound-guided percutaneous celiac plexus neurolysis for pain management in a patient with end-stage gastric cancer

## Abstract

Celiac plexus neurolysis (CPN) is prescribed in cases of upper abdomen cancer, chronic pancreatitis, metastases, painful retroperitoneal tumors and chronic abdominal pain in patients who do not respond to treatment regimens based on high-dose narcotic analgesia. This study aimed at presenting a simple percutaneous interventionist technique ultrasound-guided, with excellent pain relief and free of major complications. We present a female patient, 37years old, with gastric cancer with metastasis and hospitalized for severe pain. Ultrasound-guided anterior celiac plexus neurolysis with 70% alcohol and 0,5% bupivacaine injection has provided effective abdominal pain control. They can be helpful in optimizing palliative care at home.

**Keywords:** celiac plexus neurolysis, CPN, ultrasonography, percutaneous, cancer pain

Volume 12 Issue 1 - 2021

**Delgado Maidana Walter, Vega Carduz Evanhy**  
Department of Anesthesiology, Hospital de Clínicas, Paraguay

**Correspondence:** Delgado Maidana Walter, Department of Anesthesiology, Hospital de Clínicas, Paraguay, Tel +595971969099, Email walterdelga@gmail.com

**Received:** January 31, 2021 | **Published:** February 10, 2021

## Introduction

Celiac plexus block (CPN) is prescribed in cases of upper abdomen cancer, chronic pancreatitis, metastases, painful retroperitoneal tumors and chronic abdominal pain in patients who do not respond to treatment regimens based on high-dose narcotic analgesia.<sup>1,2</sup> Especially in advanced stages of disease, can be extremely helpful for pain control and partially improves patient's condition.<sup>3</sup> The celiac plexus lies anterior to the aorta and epigastrium. The plexus extends for several centimeters in front of the aorta and laterally around the aorta. Fibers within the plexus arise from preganglionic splanchnic nerves, parasympathetic preganglionic nerves from the vagus, some sensory nerves from the phrenic and vagus nerves, and sympathetic post-ganglionic fibers. Afferent fibers concerned with nociception pass diffusely through the celiac plexus and represent the primary target of celiac plexus blockade.<sup>4-6</sup>

There are two main approaches to apply the CPN: anterior and posterior approach. In the anterior approach, a needle is inserted through the anterior abdominal wall directly into the region of the celiac plexus and a neurolytic agent is injected into the antecrural space. One of the classic posterior approaches is the fluoroscopy-guided two-needle retrocrural approach.<sup>7</sup>

CPN is basically a chemical splanchnectomy of efferent nerve fibers using chemical agents such as alcohol or phenol. Imaging guidance has become an imperative part of the procedure to ensure proper needle location and drug spread. Various techniques for performing CPN using fluoroscopy guidance and computed tomography (CT) have been described in the literature; and in recent years the use of ultrasonography has begun to be described.<sup>8,9</sup> This study aimed at presenting a simple interventionist technique ultrasound-guided, adequately tolerated by patients, with excellent pain relief and free of major complications.

## Description of the clinical case

A 37-year-old, 41-kilogram female patient with a diagnosis of type IV gastric adenocarcinoma with liver and lung metastasis was presented to the Anesthesiology service of the Hospital de Clínicas. The patient was on a drug palliative treatment plan and was

hospitalized three days earlier for severe abdominal pain, asthenia, anorexia, and significant weight loss.

At the time of the evaluation by the Department of Anesthesiology, the patient was found with low weight, Karnofsky score of 40%, nasogastric tube feeding and moderate pain (VAS=5) but with high requirements of intravenous morphine (10mg every 4 to 6hours). Ultrasonography-guided neurolysis of the celiac plexus was proposed as a therapeutic option to improve pain control and reduce morphine requirements.

The procedure was performed in the surgical block. The patient was administered 2mg of midazolam intravenously as an anxiolytic and oxygen via nasal cannula at 2 liters per minute. Ultrasound equipment with a low frequency convex probe (2-5Mhz) was used. Previously, the distance between the skin and the plexus was measured, obtaining a distance of 4.5 centimeters.

The transducer was placed at the level of the epigastrium in a transverse position angling caudally from the xiphoids process and it was evidenced in front of the abdominal aorta: the "seagull sign" (the celiac trunk, the splenic artery and the hepatic artery). Subsequently, a 10cm long echogenic needle was introduced through the transhepatic approach towards the celiac plexus.

Upon reaching the plexus, 10ml of 0.5% bupivacaine was first injected in order to determine the effectiveness of the block and provide local analgesia. Subsequently, 20ml of 70% alcohol was injected around the celiac plexus. The patient manifested a decrease in pain five minutes after the injection. At 6hours after neurolysis, the patient had only upon reaching the plexus, 10ml of 0.5% bupivacaine was first injected in order to determine the effectiveness of the block and provide local analgesia. Subsequently, 20ml of 70% alcohol was injected into the antecrural space (Figure 1).

The patient manifested a decrease in pain five minutes after the injection. At 6 hours after neurolysis, the patient had only mild abdominal discomfort (VAS=2). She did not present any dynamic instability after the procedure performed, but she had mild diarrhea the day after the procedure that quickly subsided. The patient was discharged 48 hours after the procedure without pain (VAS=0). One

week after CPN the decrease in pain severity was maintained at the same level.



**Figure 1** Diffusion of the neurolytic agent in the space anterior to the celiac plexus.

## Discussion

Pain relief is important in the comprehensive treatment of cancer patients. Most malignancies are accompanied by varying levels of pain interfering with the patient's normal life in some cases.<sup>10</sup> Celiac plexus block especially in advanced stages of disease can efficiently control the pain and partially improve the patient's condition. Celiac plexus block is performed either as a temporary or short-term block using local anesthetics or as a permanent or long-term block using plexus neurolysis by neurolytic agents like alcohol or phenol. In most cases, a combination of both is used to control the pain.<sup>8</sup> Several studies considered the celiac block to be relatively effective and preferred the sonographically-guided celiac plexus block as their choice and could offer a remarkable success and feasibility in plexus block.<sup>11–13</sup> The incorporation of ultrasonography for diagnostic and therapeutic processes is essential since it provides practicality in the performance of the procedures. The logistics for performing an ultrasound-guided percutaneous neurolysis is much simpler since it dispenses with more expensive equipment such as the tomograph and the fluoroscopy equipment.

We must consider that ultrasonography can be very useful for celiac plexus procedures, but this advantage is especially evident in patients with low weight, as was the case with our patient. In this situation, the short distance between the skin and the celiac plexus technically facilitates better handling of the needle. In fact, end-stage cancer patients are generally underweight; which favors the applicability of the technique guided by ultrasound.

We have obtained an excellent and uncomplicated result with ultrasound-guided percutaneous neurolysis, which favored a subsequent rapid discharge from hospital. The adverse effects that occurred (local pain and diarrhea) were not very significant as described in the bibliography.<sup>14</sup>

Percutaneous anterior abdominal ultrasound guidance for performing celiac plexus neurolysis is more economical, less time-consuming, readily available and is associated with no risk of radiation exposure to patient or operator.<sup>15</sup> In addition, the development of portable ultrasound machines has revolutionized the role of imaging in evaluation of patients in bedside setting and performing various procedures without having patient shifted to the different room.<sup>16</sup>

## Conclusion

Ultrasound-guided percutaneous neurolysis of the celiac plexus is a practical, safe and low-cost option for palliation of pain related to advanced gastric cancer. Pain relief can be almost immediate

and adverse effects are minimal. They can be helpful in optimizing palliative care at home.

## Conflicts of interest

All authors declared there are no conflicts of interest.

## Acknowledgments

My coauthors and I were thankful to Kadir Daştan, M.D. for revision of this manuscript.

## Funding

None.

## References

1. Pereira GA, Lopes PT, Dos Santos AM, et al. Celiac plexus block: an anatomical study and simulation using computed tomography. *Radiol Bras.* 2014;47(5):283–287.
2. Fugère F, Lewis G. Coeliac plexus block for chronic pain syndromes. *Can J Anaesth.* 1993;40:954–963.
3. Stephen E, Abram J, David Haddox. *The Pain Clinic Manual*. 2<sup>nd</sup> edn. Philadelphia, USA: Lippincott Williams & Wilkins; 2000, p. 293–392.
4. Gunduz OH, Kenis-Coskun O. Ganglion blocks as a treatment of pain: current perspectives. *J Pain Res.* 2017;10:2815–2826.
5. Erdine S. Celiac ganglion block. *Agri.* 2005;17(1):14–22.
6. John RS, Dixon B, Shienbaum R. Celiac Plexus Block. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2020.
7. Gunduz OH, Kenis-Coskun O. Ganglion blocks as a treatment of pain: current perspectives. *J Pain Res.* 2017;10:2815–2826.
8. Kambadakone A, Thabet A, Gervais DA, et al. CT-guided celiac plexus neurolysis: A review of anatomy, indications, technique, and tips for successful treatment. *Radiographics.* 2011;31(6):1599–1621.
9. Jain P, Dutta A, Sood J. Coeliac plexus blockade and neurolysis: An overview. *Indian J Anaesth.* 2006;50:169.
10. Miller KP. *Miller Anesthesia*. 6<sup>th</sup> edn. USA: Elsevier; 2005. p. 1711–1712.
11. Marcy PY, Magné N, Descamps B. Coeliac plexus block: utility of the anterior approach and the real time colour ultrasound guidance in cancer patient. *Eur J Surg Oncol.* 2001;27(8):746–749.
12. Noble M, Gress FG. Techniques and results of neurolysis for chronic pancreatitis and pancreatic cancer pain. *Curr Gastroenterol Rep.* 2006;8(2):99–103.
13. Radpay B, Farhadi K, Zaman M, et al. Comparison between CT-Scan and Trans-Abdominal Sonography in Celiac and Splanchnic Plexus Blocks in Patients with Advanced Pancreatic Head Cancer. *Tanaffos.* 2009;8(3):51–57.
14. Firdousi FH, Sharma D, Raina VK. Palliation by coeliac plexus block for upper abdominal visceral cancer pain. *Trop Doct.* 2002;32(4):224–226.
15. Bhatnagar S, Joshi S, Rana SP, et al. Bedside ultrasound-guided celiac plexus neurolysis in upper abdominal cancer patients: a randomized, prospective study for comparison of percutaneous bilateral paramedian vs. unilateral paramedian needle-insertion technique. *Pain Pract.* 2014;14(2):E63–E68.
16. Dhamija E, Khandelwal I, Bhatnagar S, et al. A systematic approach to give bedside ultrasound-guided celiac plexus block. *Indian Journal of Pain.* 2017;31(2):80–85.