

# Celiac Plexus Block and Neurolysis: A Review



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## KEYWORDS

- Chronic pancreatitis • Pancreatic cancer • Treatment • Endoscopic ultrasound
- Celiac plexus block • Celiac plexus neurolysis • Celiac ganglia

## KEY POINTS

- Pain is often associated with chronic pancreatitis and pancreatic cancer.
- Often times opioids are used to treat pain; however, the use of opioids is frequently difficult because of the adverse effects associated with these medications.
- Endoscopic ultrasound-guided celiac plexus block and celiac plexus neurolysis are safe and effective modalities used to alleviate pain associated with chronic pancreatitis and pancreatic cancer, respectively.
- Although used interchangeably, celiac plexus block is a transient interruption of the plexus by local anesthetic, while celiac plexus neurolysis is prolonged interruption of the transmission of pain from the celiac plexus using chemical ablation such as alcohol or phenol.
- The techniques also vary.

## INTRODUCTION

Abdominal pain related to chronic pancreatitis and pancreatic cancer is often times extremely disabling.<sup>1–4</sup> Endoscopic ultrasound (EUS)-guided celiac plexus block (CPB) is used to reduce pain associated with chronic pancreatitis. EUS-guided celiac plexus neurolysis (CPN) is typically used to reduce pain associated with pancreatic cancer.<sup>5</sup> Initially, pain associated with chronic pancreatitis and pancreatic cancer is managed medically. Medical management from pancreatic cancer pain begins with nonopioid drugs. Often times, more powerful opioid medications are needed, because non-narcotic medications are inadequate for pain relief and are associated with a variety of adverse effects including nausea and constipation. If patients have refractory pain or cannot tolerate increasing amounts of opioid medications, EUS-guided celiac plexus block and neurolysis play an important role. Celiac plexus block (CPB), a temporizing treatment, most commonly refers to the

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injection of a steroid and a long-acting local anesthetic into the celiac plexus. In contrast, CPN generally refers to injection of alcohol or phenol, agents with more permanent effect.

This article discusses the history of EUS-guided celiac plexus block and neurolysis, the anatomy of the celiac plexus, the indications, contraindications, preprocedural evaluation and technique, associated complications, and the efficacy of EUS-guided CPB and CPN.

## HISTORY OF CELIAC PLEXUS BLOCK AND CELIAC PLEXUS NEUROLYSIS

The initial technique for performing CPN was described in 1914 by Kappis and colleagues<sup>6</sup> and was an intraoperative procedure. Since that time, CPB and CPN have been conducted under radiographic, fluoroscopic, ultrasound, and computed tomography (CT) approaches.<sup>7-9</sup> The first case of EUS-guided CPB/CPN in pancreatic cancer was described in 1996 by Faigel and colleagues<sup>10</sup> and Wiersema and colleagues.<sup>11,12</sup> The first case of EUS-guided CPB in patients with pain related to chronic pancreatitis was described in 1999 by Gress and colleagues.<sup>13</sup> Since then, numerous medium-sized prospective and retrospective studies have been performed and have shown that CPB/CPN is beneficial in alleviating pain. The advantage of the EUS approach is the fine orientation of the needle above or lateral to the celiac trunk and the real-time performance of the procedure under Doppler control of vessel interposition. In addition, the technique is easy, requiring only 2 to 3 minutes immediately after the staging or sampling of an inoperable pancreatic tumor. Better results can be expected owing to the better orientation of the needle, compared with the US or CT approach, and the real-time accomplishment of the procedure.<sup>14</sup>

## ANATOMY OF THE CELIAC PLEXUS

The celiac plexus is a network of ganglia that relays preganglionic sympathetic and parasympathetic efferent fibers and visceral sensory afferent fibers to the upper abdominal viscera. The celiac plexus transmits the sensation of pain from the pancreas. The visceral sensory afferent fibers transmit nociceptive impulses from the liver, gallbladder, pancreas, spleen, adrenal glands, kidneys, distal esophagus, and bowel to the level of the distal transverse colon. Located in the retroperitoneum just inferior to the celiac trunk and along the bilateral anterolateral aspects of the aorta, between the levels of T12-L1 disc space and L2, the celiac plexus can easily be reached by several different approaches.

The plexus contains 1 to 5 large ganglia, which receive sympathetic fibers from the 3 splanchnic nerves. Although the terms celiac plexus and splanchnic nerves are often used interchangeably, it is important to note that they are distinct structures.<sup>15</sup> The splanchnic nerves are located above and posterior to the diaphragm and anterior most often to the twelfth thoracic vertebra. The celiac plexus is located below and anterior to the diaphragm and surrounds the origin of the celiac trunk. The greater (T5-T9), lesser (T10-T11), and least (T12) are preganglionic in nature, and traverse the posterior mediastinum and enter the abdomen through the crura of the diaphragm above L1.<sup>15</sup> Parasympathetic fibers from the vagus nerve provide autonomic supply to the liver, pancreas, gallbladder, stomach, spleen, kidneys, adrenal glands, omentum, small bowel, and large bowel to the level of the splenic flexure, as well as the blood vessels of the abdomen.

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