

ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

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Endoscopic Ultrasound-Guided Celiac Plexus Neurolysis

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G&H What are the main indications for the celiac plexus block or neurolysis procedure?

FG The main indication for this technique is in patients with chronic abdominal pain, where the source for the pain has been located, but where standard treatment has not fully controlled the pain. Generally, most patients will feel at least partial relief with conventional therapy; however, there is a subgroup of patients who do not respond to treatment. This occurs most commonly in cases of chronic pancreatitis (CP), which is the main diagnosis that we have attempted to manage with celiac plexus neurolysis or celiac plexus block. At least 50% of patients with moderate-to-severe CP do not respond to standard therapy with pancreatic enzyme supplementation, narcotics-based pain management, or even endoscopic therapy using pancreatic stent placement via endoscopic retrograde cholangiopancreatography (ERCP). For these patients, the administration of a celiac plexus block can often provide significant long-lasting pain relief. The other indication for celiac plexus neurolysis would be in cases of intra-abdominal malignancy, such as advanced pancreatic cancer or metastatic cancer.

G&H How is an endoscopic ultrasound-guided celiac plexus block administered?

FG Celiac plexus block was initially reported as a blinded technique, passing a needle through the back and between the vertebrae under fluoroscopy in order to administer anesthetic agents, like bupivacaine or procaine hydrochloride. Over time, radiologic technology has allowed us to visualize the procedure in real time,

using either computed tomography (CT) or transcutaneous ultrasound techniques. Endoscopic ultrasound (EUS) is a unique device that combines flexible endoscopy with ultrasound. A transducer is fitted on the tip of an endoscope, and the endosonographer can direct the transducer to the area within the gastrointestinal tract using the endoscopic optics. Once in position, the ultrasound transducer is turned on and imaging initiated. In the early 1990s, the technique of EUS-guided fine-needle aspiration was developed as a real-time biopsy technique. This was made possible with the introduction of a linear array EUS instrument that allowed for real-time tracking of a needle into a target lesion. Eventually, we were able to adapt this technique to guide injection through the same needles and use the same protocol as radiologists to administer celiac plexus block.

The procedure involves passing the EUS scope through the oropharynx and into the esophagus. Once in the esophagus, we advance the linear array EUS instrument forward using the ultrasound and Doppler components to trace the vascular structures of the mediastinum. As the instrument is passed down the esophagus, the aorta is located and traced to the celiac trunk. At this point, the celiac axis or plexus is located just above this area. The plexus is generally not visualized but is believed to be located within the celiac axis.

Once in the celiac area, we pass the needle through the scope into this region under real-time EUS and then inject a total of 20 mL of 0.25% bupivacaine, followed by 80 mg of triamcinolone. The bupivacaine provides very early anesthetic pain relief and the steroid, in responding patients, provides long-term relief through its anti-inflammatory properties. Afterward, we flush the

needle with 5–6 cc sterile saline. The needle is retracted, and the scope is removed. The entire procedure requires approximately 15–20 minutes.

G&H How often does celiac plexus block need to be administered to maintain patient relief?

FG The average length of relief with this procedure is approximately 3 months, so it is really a temporizing measure. In patients with severe pain, I recommend that they reserve the celiac plexus procedure for periods of excruciating pain that cannot be relieved by conventional measures. Most patients can get relief from their pain by utilizing analgesics or narcotics. However, narcotics have side effects that can interfere with daily routine. They can make patients drowsy and, of greater concern, they can be addictive. Therefore, many patients do not like to take them unless it is absolutely necessary. Further, there are times when pain persists or even narcotics do not provide relief. In these cases, the celiac plexus block procedure can provide an alternative.

Approximately 50–60% of patients undergoing celiac plexus block will achieve some degree of relief. Current data suggest average relief maintenance of 12 weeks, but relief can be as short as 4 weeks or as long as 1 year. There are approximately 40% of patients who achieve no relief at all. We have yet to pinpoint the factor that allows some patients to respond so well and others not at all. In our observational cohort of 90 patients, we found that younger patients and patients with prior pancreatic surgery were less likely to respond. The reasons for this are unclear at this point.

G&H Are there any risks or adverse events that have been associated with the EUS-guided celiac plexus block procedure?

FG There are very few reported complications. The only associated side effects that have been reported are transient hypotension and diarrhea, which can occur due to blockade of motility-related sympathetic and parasympathetic nervous systems. Orthostatic changes can occur and are treated with intravenous hydration and careful monitoring of vital signs postprocedure. We observe patients for 2–3 hours after a procedure. For the endosonographer, transient diarrhea is self-limited and usually responds well to symptomatic medical therapy, such as loperamide. When these side effects occur, they actually provide a sign that the block has been administered at the optimal location and that the proper area has been effectively blocked. This is important, because patients' anatomies vary, and though the celiac plexus is generally in the same area, the exact location can differ and therefore be missed. Further,

some patients image more clearly than others. There have been recent reports from one center that the celiac ganglia can be imaged with EUS. This is an exciting finding that should definitely help improve our overall accuracy in administering this technique.

Early on in our experience, we reported a patient who developed a peripancreatic abscess. We theorized that colonized bacteria may have been transmitted as the needle went through the stomach into the celiac region and that it seeded in the environment of recently administered steroids. However, this phenomenon has never been reported since, possibly because standard procedure now dictates that patients undergoing the procedure receive a broad-spectrum antibiotic like ciprofloxacin as a prophylactic measure.

Conceivably, these drugs could be mistakenly injected into the celiac trunk or the aorta, although Doppler capability is available on the linear EUS instrument to visualize exactly where the surrounding vessels are. I know of no reports where this has happened, but it would be a serious concern.

G&H How does EUS-guided celiac block compare to the earlier CT-based method of performing the procedure?

FG The CT-guided technique involves a through-the-back or posterior approach. The needle is passed between the vertebrae and the vertebral muscles and placed anterior to the aorta in a technique known as transaortic placement, where the needle is passed through the aorta. Other practitioners go around the aorta and then inject. Adverse events and effects associated with this method include retroperitoneal bleeding, back pain, and serious neurologic damage. There have been some reports of paralysis and paraplegia after CT-guided celiac plexus block.

This may be the main difference between the two methods. With EUS, we approach within several millimeters of the celiac plexus, right off the gastric wall. We don't need to go through the back, the vertebrae, and the muscles. This may be why the EUS method has proven to be more efficacious. The data for CT-guided celiac plexus block show approximately 30% of patients achieving some relief. This is why we felt the need to do a randomized trial and show definitively that the EUS method works better. We randomized patients to CT- or EUS-guided celiac plexus block and found that the patients undergoing the EUS block received significantly longer relief, their postprocedural pain was less, and they were more willing to undergo the procedure again. The majority of patients undergoing the CT block, however, would not undergo the procedure again. We also compared cost and found that, based on Medicare reimbursement rates in the

United States during the study period, the EUS method was less costly overall when procedural cost, recovery time, and length of effect were all factored into the analysis.

G&H Is there any other research currently ongoing in this area?

FG Yes. As mentioned above, one recent study by Dr. Michael Levy at the Mayo Clinic discusses some abnormal areas that were noted in the celiac region in some patients undergoing EUS, which initially were thought to be lymph nodes. Upon biopsy, they proved to be ganglion cells. What this means is that we may now be able, through improvements in our EUS scope and imaging technology, to image the celiac plexus itself. I have also seen these areas in the past and have never biopsied them, always assuming that they were shoddy benign lymph nodes. Dr. Levy

actually sampled tissue and found ganglion cells, which is exciting, as it indicates that we may now have the ability to locate and fully image the celiac region through current EUS technology.

Suggested Reading

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