Is there a role for celiac plexus block for chronic pancreatitis?

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Endoscopic ultrasound–celiac plexus block (EUS-CPB) and endoscopic ultrasound–celiac plexus neurolysis (EUS-CPN) have been reported to provide pain relief and reduce narcotics use in patients with chronic pancreatitis [1]. The techniques of EUS-CPB and EUS-CPN are identical; the differences are in the substances injected and in the indications. Neurolysis, in which bupivacaine and ethanol are injected, has been used in patients who have pancreatic cancer or chronic pancreatitis. On the other hand, block, in which bupivacaine with or without triamcinolone is injected, has been used mainly in patients who have chronic pancreatitis [2].

The injection of ethanol, bupivacaine, and triamcinolone into the celiac plexus disrupts signal transmission to the spinal cord and central nervous system, theoretically interfering with the perception of pain. The effects of ethanol are much less reversible than the effects of bupivacaine and triamcinolone, and albeit rare, more severe adverse effects have been reported with EUS-CPN than with EUS-CPB [3–5]. Moreover, meta-analysis of EUS-CPN showed results in patients with pain due to chronic pancreatitis (pain relief in 59% of 376 patients in 9 studies) that were inferior to results in patients with pancreatic cancer (pain relief in 80% of 283 patients in 8 studies) [6]. For these reasons, EUS-CPN is the technique of choice for patients with pancreatic cancer, whereas EUS-CPB is preferred for patients affected with a benign condition, such as chronic pancreatitis.

Because of the anatomical location of the celiac plexus around the origin of the celiac trunk and superior mesenteric artery, the EUS-guided technique provides near-field and real-time visualization, resulting in a safer approach than is possible with percutaneous techniques [7]. A randomized, controlled trial, in which EUS-guided and fluoroscopy-guided percutaneous CPB with bupivacaine and triamcinolone were compared in patients who had chronic pancreatitis, demonstrated improvement in pain scores (visual analogue scale) in 70% of patients in the EUS group versus 30% of those in the percutaneous group ($P=0.044$) [8].

However, the efficacy of EUS-CPB has been questioned because of inconsistent results in terms of the degree and duration of pain reduction in published studies [8–14] (**Table 1**). A systematic review of the efficacy of steroid-based EUS-CPB in patients with refractory pain due to chronic pancreatitis (6 studies including 221 patients) showed satisfactory reduction of abdominal pain in only 51% of patients [15]. Moreover, in a study in which 40 patients were randomized to receive either bupivacaine alone or bupivacaine and triamcinolone, no significant difference in pain control was found between the two groups (14% vs. 16% for controls) [14].

Sey et al. have offered an original perspective on the topic of EUS-CPB, addressing the problem of the short duration of its effects [16]. From a huge EUS-CPB database of 1108 patients treated at the Indiana University Medical Center, Indianapolis, Indiana, USA, they extrapolated data for 248 patients with chronic pancreatitis who underwent two or more procedures and investigated the incremental effects of repeated EUS-CPB procedures.

Either a standard 22-gauge needle or a dedicated 20-gauge needle with sideholes at the end was used for EUS-CPB. When visible, the celiac ganglia were targeted; otherwise, 20 mL of 0.75% bupivacaine followed by 40 to 80 mg of triamcinolone, according to the endosonographer's preference, was injected at the level of the celiac trunk.

The majority of the patients underwent 2 to 4 procedures, but some had 5 to 6 and a few of them even had up to 10 EUS-CPB procedures. After the first session, 76% of the patients reported pain relief, a value in line with the upper limit of the range of effectiveness reported in the literature. The median duration of pain relief was 10

Table 1 Endoscopic ultrasound and celiac plexus block in chronic pancreatitis.

Article	Study	Patients	Techniques	Technical success	Clinical success (pain relief)	Complications
Gress et al., 1999	RCT	n = 10 n = 8	EUS-CPB CT-CPB	100 % 	50 % 25 %	None
Gress et al., 2001	PS	n = 90	EUS-CPB	100 %	55 %	3 diarrhea
Levy et al., 2008	RS	n = 18	EUS-CGN (n = 5) EUS-CGB (n = 13)	– 	80 % 38 %	12 hypotension 6 diarrhea
O'Toole et al., 2009	RS	n = 128	EUS-CPB	–	–	2 post-procedural pain 1 retroperitoneal abscess 1 hypotension
Santosh et al., 2009	RCT	n = 27 n = 29	EUS-CPB Percutaneous CPB	100 % –	70 % 30 %	2 diarrhea
Leblanc et al., 2009	RCT	n = 23 n = 27	EUS-CPB (central) EUS-CPB (bilateral)	100 %	65 % 59 %	None
Stevens et al., 2012	RCT	n = 40	Triamcinolone + bupivacaine (n = 21) Bupivacaine alone (n = 9)	100 %	68 % – 86 %	1 severe hypertension 4 pain exacerbation 1 gastric hematoma

RCT, randomized controlled trial; EUS, endoscopic ultrasound; CPB, celiac plexus block; CT, computed tomography; PS, prospective study; RS, retrospective study; CGN, celiac ganglia neurolysis; CGB, celiac ganglia block.

weeks. Subsequent EUS-CPB procedures produced fairly longer intervals of pain relief (12 – 20 weeks). Failure to obtain pain relief after the first EUS-CPB was associated with failure after subsequent EUS-CPB procedures. On the other hand, older age (P = 0.026) and pain relief after the first block (P = 0.0024) were associated with pain relief after subsequent EUS-CPB procedures. Finally, the number of EUS criteria for chronic pancreatitis was not associated with pain relief.

Given the nearly complete absence of complications (only 3 minor transient events occurred), the study of Sey et al. is a unique and interesting demonstration of the feasibility and efficacy of repeated EUS-CPB procedures to control pain in patients with chronic pancreatitis. Given the benign but chronic nature of chronic pancreatitis, these patients are natural candidates to undergo a treatment that is reasonably effective, safe, and repeatable.

The good results of the study from the Indiana University Medical Center agree with those of an ongoing randomized, multicenter trial comparing EUS-CPB (bupivacaine + triamcinolone) with a sham procedure, in which patients are blinded to the procedure, and should revive interest in EUS-CPB. In preliminary results, the rate of pain reduction was significantly higher in the treated arm than in the sham arm; morphine use was also reduced in the treatment group, although the difference between the treatment group and the sham group was not significant. Crossover to the active treatment was requested by 100 % of the patients in the sham group after a median of 46 days [17].

In summary, according to this new evidence, EUS-CPB appears to be a safe, moderately effective, and repeatable treatment for patients with pain caused by chronic pancreatitis. Of course, recourse to EUS-CPB should be weighed against the alternative options that are available. These include lifestyle changes (e.g., cessation of alcohol and tobacco use), supplementation of pancreatic enzymes, and psychosocial support to reduce opiate dependence. For patients who have severe disease with main pancreatic duct dilatation, endoscopic or surgical duct decompression and total pancreatectomy with islet auto-transplantation are also options. Gastroenterologists must use their clinical judgment in order to select the patients who may benefit from EUS-CPB (e.g., those who experienced relief after a previous EUS-CPB procedure and those who are elderly). On the other hand, precious time should not be wasted on EUS-CPB when it is ineffective; in these cases, other treatments should be readily adopted before the disease becomes too advanced (with the development of excessive organ fibrosis and nociceptive pathway remodeling) to respond even to surgical treatment [18].

Competing interests: None

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