EUS-guided celiac plexus neurolysis for pain due to chronic pancreatitis or pancreatic cancer pain: a meta-analysis and systematic review
Puli SR, Reddy JB, Bechtold ML, Antillon MR, Brugge WR

CRD summary
This review concluded that endoscopic ultrasound guided celiac plexus neurolysis offered a safe alternative technique for pain relief in patients with abdominal pain from chronic pancreatitis or pancreatic cancer. These conclusions reflected the evidence presented. However, in view of the small size and questionable quality of the included studies, the conclusions should be interpreted with caution.

Authors' objectives
To assess the effectiveness of endoscopic ultrasound (EUS)-guided celiac plexus neurolysis (CPN) for pain relief in patients with abdominal pain from chronic pancreatitis or pancreatic cancer.

Searching
MEDLINE, PubMed, EMBASE, CINAHL, ACP Journal Club, DARE, IPA, HealthSTAR and Cochrane Central Register of Controlled Trials (CENTRAL) were searched from 1966 to June 2008; search terms were reported. The authors manually searched abstracts in major gastroenterology journals for the previous three years.

Study selection
Studies that assessed EUS-guided CPN for pain control in patients with chronic pancreatitis or unresectable pancreatic cancer were eligible for inclusion in the review.

The substance used for neurolysis in most of the included studies of patients with chronic pancreatitis was bupivacaine with triamcinolone. Most studies of patients with pancreatic cancer used bupivacaine with absolute alcohol (dosage varied). Where stated, most of the included studies used bilateral celiac plexus injection and not unilateral celiac plexus injection. Most studies used visual analogue scales (scale of 0-10) to measure pain relief.

Two reviewers independently selected studies for the review. Disagreements were resolved through consensus.

Assessment of study quality
The authors did not assess validity of the included studies.

Data extraction
The proportion of patients with pain relief in each study was calculated. Two reviewers independently extracted data from the included studies. Disagreements were resolved through consensus. Authors of studies were contacted for additional data when outcome measures could not be determined from publications.

Methods of synthesis
The proportion of patients with pain relief was pooled using fixed-effect and DerSimonian and Laird random-effects models. Heterogeneity was assessed using Cochran's Q test. A subgroup analysis was performed to assess the effect of unilateral versus bilateral celiac plexus injection on the results. The authors stated that some of the included studies may have used the same patient population over the years; therefore, a subgroup analysis was performed removing earlier studies by the same first author. Publication bias was assessed using funnel plots, Harbord-Egger test and Begg-Mazumdar test.

Results of the review
Nine studies of patients with chronic pancreatitis (n=376 patients) and eight studies of patients with pancreatic cancer (n=283 patients) met inclusion criteria. Only three of the chronic pancreatitis studies and four of the pancreatic cancer studies were published in full; the others were published as abstracts. None of the included studies had a control group. Number of included patients ranged from four to 90. Average length of follow-up ranged from seven days to 24 weeks,
where stated.

**EUS-guided CPN for chronic pancreatitis pain:** The pooled proportion of patients with pain relief was 59.5% (95% confidence interval (CI) 54.5 to 64.3). Heterogeneity was not significant. A subgroup analysis that excluded earlier studies by the same first author showed very little difference to the proportion of patients with pain relief. Two patients were reported to have diarrhea as an adverse effect.

**EUS-guided CPN for pancreatic cancer pain:** The pooled proportion of patients with pain relief was 63.3% (95% CI 57.8 to 68.7). There was significant statistical heterogeneity. After removing the two heterogeneous studies, the pooled proportion of patients with pain relief was 80.1% (95% CI 74.5 to 85.2). A subgroup analysis that assessed the effect of unilateral versus bilateral celiac plexus injection on the results found that a higher proportion of patients who received bilateral injections had pain relief (84.5%, 95% CI 72.2 to 93.8) compared with those who received unilateral injections (46.0%, 95% CI 37.3 to 54.8). Eight patients were reported to have diarrhea as an adverse effect. Other adverse effects (one patient each) were peripancreatic abscess, flare of pancreatitis and infection of pseudocyst.

Funnel plots and Harbord-Egger and Begg-Mazumdar tests indicated no significant publication bias.

**Authors' conclusions**
EUS-guided CPN offered a safe alternative technique for pain relief in patients with chronic pancreatitis or pancreatic cancer. However, better techniques or injected materials were needed to improve the response in patients with chronic pancreatitis.

**CRD commentary**
The review addressed a clear question and was supported by appropriate inclusion criteria. The authors searched a number of sources to identify relevant studies and included both published and unpublished studies in the review, which reduced potential for publication bias. It was unclear whether language restrictions were applied. Publication bias was formally assessed and no evidence of significant publication bias was found. Two reviewers independently undertook study selection and data extraction procedures, which reduced potential for reviewer bias and errors. Included studies were not assessed for validity. Most of the included studies were published only as abstracts, none had a control group and sample sizes were small (fewer than 50 participants in most studies). It was unclear whether adverse effects were fully reported in the included studies. Studies were pooled using appropriate methods. Statistical heterogeneity was assessed. Subgroup analyses were undertaken.

This was generally a well-conducted systematic review and the authors' conclusions reflected the evidence presented. However, in view of the small size and questionable quality of the included studies and the apparent incomplete reporting of adverse effects, these conclusions should be interpreted with caution.

**Implications of the review for practice and research**
The authors did not state any implications for practice or further research.

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