

# A case series of fluoroscopy-guided neurolytic splanchnic nerve block for chronic pancreatitis pain

## ABSTRACT

**Context:** Splanchnic nerve block (SPN) with local anesthetic and steroid is used to relieve the pain of chronic pancreatitis. However, it does not provide long-lasting relief. We hypothesize that the use of 70% alcohol will give adequate analgesia for more than months.

**Aims:** The primary objective was to find out the analgesic efficacy of the use of 70% alcohol with SPN. Secondary objectives included the incidence of side effects, analgesic consumption postintervention, quality of life (QOL) assessed via a self-reported quality of life scale, and repeat block during the 1-year follow-up period.

**Settings and Design:** Retrospective analysis of all patients with chronic pancreatitis who received bilateral SPN over the last 4 years.

**Methods and Materials:** SPN was performed using the posterior retrocrural approach with the patient in the prone position as described in the literature using a 23 G × 90 mm spinal needle bilaterally at the level of T12 using C-arm/fluoroscopy guidance. Data were collected from the procedure book of the pain clinic and medical records.

**Statistical Analysis Used:** Quantitative data for change in pre- to post-block VAS score was collected using the non-parametric Wilcoxon signed ranks test.

**Results:** The baseline VAS, post-procedure VAS, and VAS at 3 months follow-up was  $7.69 \pm 1.3$ ,  $2.44 \pm 0.96$  and  $1.56 \pm 1.15$ . A pairwise comparison of VAS performed between baseline and immediate post-procedure, baseline, and VAS at 3 months was found to be highly significant.

**Conclusions:** Fluoroscopy-guided neurolytic SPN with 70% alcohol gives significant pain relief for more than 3 months. It also leads to improvement in 3 months QOL.

**Key words:** Abdominal pain, chronic pancreatitis, nerve blocks

## Introduction


Chronic pancreatitis is an inflammatory condition that results in permanent structural changes in the pancreas

with impairment of its function. Abdominal pain is the most frequent symptom that drives the patient to seek medical care.<sup>[1]</sup> Many possible endeavors have been made

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unsuccessfully to treat this chronic abdominal pain, including analgesics, antidepressants, opioids, pancreatic enzymes, cholecystokinin antagonists, antioxidants, and finally nerve blocks such as celiac plexus block, splanchnic nerve block, and endoscopic ultrasonography-guided celiac plexus block.<sup>[2]</sup>

Nerve blocks such as celiac plexus block and splanchnic nerve block, when given percutaneously under fluoroscopy, have not been able to give either complete pain relief or long-term benefit in chronic pancreatitis,<sup>[3]</sup> although the same has been able to give satisfactory and sustained pain relief in pancreatic carcinoma. This difference could probably be explained due to the technique where neurolysis with alcohol is performed in pancreatic cancer and steroid-like triamcinolone is used in chronic pancreatitis.<sup>[4,5]</sup> We hypothesize that the use of absolute alcohol is the essence for the long-term benefit of splanchnic nerve block, considering the fact that chronic pancreatitis is a debilitating and lifelong illness and not a benign issue as discussed.<sup>[2]</sup>

We aimed to assess the efficacy of neurolytic bilateral splanchnic nerve block in patients with chronic pancreatitis. The primary aim of our case series was to find out the analgesic efficacy of the bilateral splanchnic plexus neurolysis (SPN) performed with 70% absolute alcohol in patients with chronic pancreatitis over the last 4 years. Secondary objectives included assessing the incidence of side effects, analgesic consumption postintervention, quality of life (QOL) assessed via self-reported quality of life scale, and request for repeat block during the 1-year follow-up period.

## Subjects and Methods

We conducted a retrospective analysis of all patients with chronic pancreatitis who received bilateral SPN over the last 4 years administered by the authors by going through the medical records and pain clinic registry at our tertiary care hospital. Data were recollected from the procedure book of the pain clinic and medical records maintained at a tertiary care hospital, and in places where data were missing, telephonic calls were made for the same. We excluded all those patients who underwent splanchnic nerve neurolysis for other indications such as carcinoma pancreas, liver cancer, esophageal cancer, or any other indication. Ethical committee approval was taken and ethical committee registration number ECR/486/Inst/KA/2013/RR-16 dated 30<sup>th</sup> September 2023.

The SPN was administered by the authors in a tertiary care hospital from June 2019 to July 2023 for patients suffering from chronic abdominal pain with VAS score of more than

7/10 due to chronic pancreatitis of varying etiology including alcoholism and gall stones, for at least 3 months and not responding to conservative measures. The diagnosis was confirmed by ultrasonography reports and was considered for intervention if referred by a surgical gastroenterologist for pain relief.

Patients were kept nil by mouth for solids 6 h and liquids 2 h before the procedure. All ongoing analgesics were stopped 6 h before the procedure. No previous diagnostic block was planned in these patients. A wide-bore intravenous line was secured and patients were hydrated with 500 mL of normal saline. SPN was then performed by posterior retrocrural approach with the patient in the prone position as described in the literature using 23 G × 90 mm spinal needle bilaterally at the level of T11 or T12 using C-arm/fluoroscopy guidance.<sup>[6]</sup> The placement of the needle was confirmed by non-ionic iohexol injection (Omnipaque™) dye spread [Figure 1]. 10 ml of 0.25% bupivacaine on each side was then administered initially as a test performed as well as a diagnostic block, following which the patient was enquired of pain relief. If no obvious side effects and adequate pain relief were noted after 5 min, 10 mL of 70% alcohol was administered on each side, which was prepared by mixing 100% alcohol (7 mL) with 3 mL of normal saline. The patient was monitored for 24 h for complications and discharged on the next postoperative day if pain relief was adequate. The regular analgesics were restarted after the procedure.

The patient's records were followed up for 1 year for visits or requirements of analgesics.

The following parameters were investigated by going through these medical records-

1. Demographic details including age, sex, duration of pain, prior surgery, prior analgesics, and date of intervention
2. The baseline visual analog score (VAS) and the immediate post-procedure VAS scores.
3. The baseline QOL and QOL after 3 months using a self-reported QOL questionnaire using a Likert scale.<sup>[7]</sup>

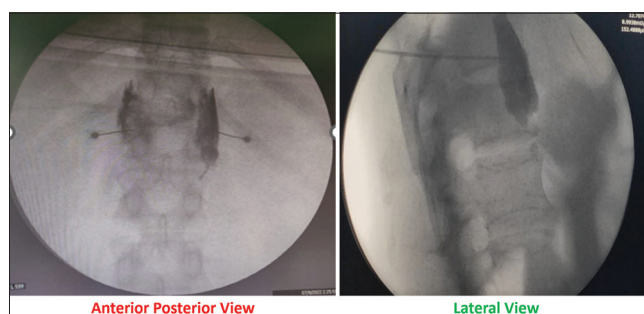


Figure 1: Fluoroscopic view of one patient posted for bilateral splanchnic nerve block

4. Adverse complications such as diarrhea, hypotension, back pain, pneumothorax, shoulder pain, hematuria, CSF tap, and neurological deficits if any.
5. The need for additional analgesics.
6. The need for repeat injection.

The analgesic efficacy of SPN was confirmed if there was a 50% decrease in pain intensity (VAS) from the baseline to the immediate post-procedure period. Categorical variables are summarized as frequency, and percentage, and numerical variables are summarized as mean, standard deviation, median, and interquartile range. Quantitative data for change in pre- to post-block VAS score was performed using a non-parametric Wilcoxon signed ranks test. Analysis was conducted using R software version 4.2.3 and MH Program version 1.2. A *P*-value less than or equal to 0.05 was considered statistically significant.

### Results

A total of 18 cases meeting the inclusion criteria and who received SPN were included in the analysis. The mean age of patients was  $44.56 \pm 13.65$  years. Only one patient among the 18 patients was female. The median duration of pain in the patients was 2 years  $\pm$  interquartile range of 1–3 years. The minimum duration of pain was 6 months and the maximum duration was 9 years. Two patients had undergone previous surgery when they presented to us. Also, 66.7% of the patients were on tramadol and paracetamol and 22% were on only paracetamol. One patient was on buprenorphine patch (10  $\mu$ g/h) and one patient was also on Tab pregabalin along with tramadol and paracetamol. One case was considered a failure as no change in pain scores was noted following the procedure. Complications included hypotension (one case) and radicular pain in the chest. One case (33%) of the patients continued to need analgesics post-procedure at 3 months, whereas the rest did not. Two patients received repeat SPN blocks after 3 months.

The baseline VAS, post-procedure VAS, and VAS at 3 months follow-up was  $7.69 \pm 1.3$ ,  $2.44 \pm 0.96$ , and  $1.56 \pm 1.15$ ,

respectively. A pairwise comparison of VAS was performed between baseline and immediate post-procedure, baseline, and VAS at 3 months using the Wilcoxon signed rank test. It was found to be highly significant, whereas the pairwise comparison between immediate post-procedure and VAS at 3 months was also significant [Table 1].

The baseline self-reported QOL compared to QOL at 3 months reported significant improvement [Table 2].

### Discussion

Chronic pancreatitis is a fibro-inflammatory disease that causes parenchymal and ductal injury leading to severe, unrelenting pain in the upper abdomen; hence, it is pivotal to manage the pain. It has an estimated prevalence of about 35 to 125 cases per 100,000 persons.<sup>[8]</sup> Alcohol consumption has been noted as the causative reason in most cases. Hence, only one case among the 18 cases was female. Most strategies for managing this condition include alcohol abstinence, lifestyle change, diet modification, and pancreatic enzyme supplementation. However, the efficacy of pain management strategies is still found wanting.<sup>[9]</sup>

The present pain management strategy includes the use of acetaminophen, pregabalin, gabapentin, tricyclic antidepressants, and antispasmodics along with endoscopic and surgical interventions with opioids as a last resort.<sup>[8]</sup> Those refractory to these measures are often referred to a pain clinic for either celiac plexus or splanchnic nerve block.<sup>[10]</sup> In our study, the median duration was 2 years before they presented to us for intervention.

The pain of pancreatitis is transmitted through the greater, lesser, and least splanchnic nerves of the celiac ganglia. Both celiac plexus block and splanchnic nerve block have been tried for the alleviation of pain. The splanchnic nerve block is more specific for the relief of chronic non-malignant pain compared to celiac plexus block.<sup>[11]</sup> It is also known to cause lesser complications such as hypotension and bleeding. Hence, we opted for splanchnic nerve block for patients presenting to us with chronic pancreatitis.

**Table 1: Visual analog score (VAS) and pairwise comparison at the three time points**

	Mean (SD)	Median (IQR)	Min	Max	Friedman test
VAS Baseline	7.69 (1.3)	8 (7–9)	5	9	$\chi^2=26.88, P<0.005$
VAS Post-procedure	2.44 (0.96)	2.5 (2–3)	1	4	
VAS 3 months	1.56 (1.15)	1 (1–3)	0	3	
					Wilcoxon signed-rank test
VAS baseline vs. VAS post-procedure					<i>P</i> <0.005
VAS baseline vs. VAS 3 months					<i>P</i> <0.005
VAS post procedure vs. VAS 3 months					<i>P</i> =0.030

**Table 2: Quality of life (QOL) at baseline and three months**

	Mean (SD)	Median (IQR)	Min	Max	Wilcoxon signed-rank test
QOL baseline	2.75 (2.24)	2.5 (1–3.5)	0	8	Z=3.45,
QOL 3 months	8.44 (1.09)	8.5 (7.5–9)	7	10	P=0.001

The use of steroids along with local anesthetics has been advocated during the splanchnic block in chronic pancreatitis due to the potential risks of nerve injury including rare instances of paraplegia.<sup>[12]</sup> Unfortunately, none of the blocks performed with local anesthetics and steroids have given long-lasting pain relief whatever the mode and route of delivery including celiac plexus, endoscopy-ultrasound guided, or splanchnic neurolysis.<sup>[2,12]</sup> Considering these factors, the irreversible damage to the pancreas, and our experience of long-term efficacy with the use of absolute alcohol, we performed splanchnic neurolysis with a lesser dilution of 70% alcohol for patients with chronic pancreatitis pain. No previous study has been performed to study the efficacy and safety of splanchnic neurolysis with the use of alcohol for chronic pancreatitis.

In our retrospective case series of 18 patients, 17 patients had significant and long-lasting pain relief as evidenced by VAS scores at 3 months. Although one-third of patients continued to need oral analgesics postoperatively, only two patients needed a repeat procedure. There was also significant improvement in the QOL at 3 months. To our knowledge, we believe this is the first study performed to assess the efficacy of SPN for chronic pancreatitis with the use of 70% alcohol and not steroids.

Complications include pneumothorax, sensory loss, motor loss, spinal cord ischemia, paraparesis, paraplegia, neuritis, inadvertent epidural or intrathecal injection, chylothorax, and inadvertent intravascular injection and hemi-diaphragmatic paralysis.<sup>[13]</sup> Though nerve injury and paraplegia are reported as complications, no such permanent damage was noted in any of our patients. Immediate short-lasting burning pain due to alcohol was noted in almost all patients possibly due to neuritis. In our experience, this can be prevented by injecting normal saline along the needle track while withdrawing the spinal needle after SPN. One patient had hypotension and needed intensive care unit (ICU) admission, whereas one patient had radicular pain from the back to the chest, which was managed conservatively with medications.

Our study has limitations. Due to the low prevalence of chronic pancreatitis needing intervention, the sample size was small. Future randomized controlled studies at multiple centers are needed to confirm our findings. Though the

baseline characteristics of all patients were comparable, the duration of pain before the procedure was always variable.

Alternatively, bilateral radiofrequency ablation of the nerves could have been performed and when conducted correctly has been shown to give long-lasting pain just like chemical ablation. It produces safer, predictable, and accurate lesions and is a useful alternative to more conventional phenol and alcohol neurolytic methods proven by many studies.<sup>[14]</sup> Due to the absence of a radiofrequency ablator at the time of study in our institute, we considered alcohol neurolysis. Future studies comparing the efficacy of both methods can be performed.

## Conclusion

Fluoroscopy-guided neurolytic splanchnic nerve block gives safe, long-lasting, and effective pain relief for patients with chronic pancreatitis pain 3 months to 1 year along with improvement of self-reported QOL.

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Nil.

## Conflicts of interest

There are no conflicts of interest.

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