

Original Research Article

# Comparative study on anterior and posterior approaches of coeliac plexus neurolysis on chronic pancreatitis patients in a tertiary care hospital in Chennai

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## Abstract

**Introduction:** Chronic unrelieved pain is not only a major drain on scarce health care resources, but it is the cause of needless suffering of millions of people worldwide. The direct palpable costs to these patients and their families include loss of job, loss of income, loss of savings, and loss of self-esteem. Clearly, the consequences of intractable pain in respect to both its impact our society is staggering. Finding a solution should be a high priority for healthcare intermediaries and health care workers. Abandoning patients when less costly and less invasive intervention does not work to relieve pain is unethical. The neuropathological effect of glycerol was discovered accidentally' and rapidly led to its use as a neurolytic agent in the management of facial pain. Pathology includes numerous inflammatory cells, myelin swelling and axonolysis. As with all neurolytic injuries, lipid droplets can be seen in the cytoplasm of Schwann cells, in phagocytic cells, and in perineal cells, where these droplets accumulate as a nonspecific manifestation of tissue injury. **The aim of the study:** Aim of the study was to compare the two approaches namely anterior and posterior for neurolysis of coeliac plexus for intractable pain in pancreatic malignancy and chronic pancreatitis. Comparison between the two approaches is ease of technique, accurate placement of needle tip at the coeliac plexus and complications.

**Materials and methods:** Totally 40 patients with diagnosed unresectable pancreatic malignancy and chronic pancreatitis with intractable pain who attended the surgical gastroenterology department of Govt. Stanley Hospital, Chennai during the period of May 2010 to November

2010 were selected for neurolytic coeliac plexus block with 100% Alcohol. They were grouped randomly into two comprising 20 each. Group A: ultrasound guided neurolysis of coeliac plexus through an anterior approach. Group P: fluoroscopy guided neurolysis of coeliac plexus through a posterior approach. On the day of the procedure, the patient was kept fasting for four hours. Intravenous access secured with 18g venflon approach to celiac plexus was chosen randomly. During the procedure, the patients' vitals were monitored. After the procedure, the patients were kept in ICU for one day for monitoring. The next day, if stable, discharged from the hospital. They were followed by phone about the intensity of pain and any complications like diarrhoea. They were instructed to attend the SGE department at 1, 4 and 8 weeks for assessment of pain relief.

**Results:** 34 patients with pancreatic malignancy and 6 patients of chronic pancreatitis with pain scores of 8 to 10 were taken up for the study. They were allocated randomly into 2 equal groups of 20 each. Group A underwent celiac plexus neurolysis through anterior approach with ultra-sonogram guidance. Group P underwent celiac plexus neurolysis through a posterior approach with fluoroscopic guidance. All the patients received the same amount of neurolytic agent and were followed for 8 weeks. Pain intensity was less after 1 week in group P when compared to group A. At the end of 4<sup>th</sup> and 8<sup>th</sup> week, the pain intensity in both the groups was not statically significant of p-value (0.875) assessed by Wilcoxon sum test. Patient discomfort score was more in group A when compared to group P which was statically significant of p value <0.001. In our study group P (19) patients were more prone for hypotension when compared to group A (18) which was found to be less significant of p-value <0.005. In our study group P (17) patients had diarrhoea when compared to group A (13) which was found to be less significant of p-value <0.005. In our study group P (19) patients had a backache when compared to group A (2) which was found to be more significant of p-value <0.001.

**Conclusion:** Both the groups reported a similar incidence of pain while injecting alcohol and complications like diarrhoea and hypotension, which was not significant. Patients in group P reported a significant backache up to 2 weeks which required painkillers. So the study demonstrates both the techniques are similar in successfulness of the block, but the anterior approach is easier to perform with less discomfort to the patients.

## Key words

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Chronic Pancreatitis, Alcoholism, Coeliac Plexus Neurolysis, Hypotension, Vomiting.

## Introduction

Chronic pancreatitis (CP) is characterised by pancreatic inflammation and fibrosis the endpoint of which is the destruction of pancreatic parenchyma with the eventual loss of exocrine and endocrine function. The genesis of these endpoints of pancreatic injury may follow years of continual or recurrent injury, implying that pre-clinical disease is likely to exist earlier in life [1]. Recognition of CP at this pre-clinical or paucisymptomatic stage is an important challenge for paediatricians when there are opportunities to alter the natural history of CP with the goal of prevention of progression to exocrine and endocrine pancreatic failure and intractable pancreatic pain. The search for other

genetic influences, for example in families with HP not associated with PRSS1 mutations is ongoing [2]. Studies in adults have identified polymorphisms in UDP glucuronosyltransferase, an enzyme important in detoxification within the liver as a risk factor for ICP. The intensity of acute inflammatory response following pancreatic injury is also influenced by monocyte chemotactic protein-1 genotype. Taken together it is easy to envisage a model whereby genotypes at these 3 or more genetic loci might influence susceptibility to pancreatitis as a complex genetic trait [3]. The celiac "plexus" is the largest plexus of the sympathetic nervous system, innervating the upper abdominal organs (pancreas, diaphragm, liver, spleen, adrenal glands, kidneys,

abdominal aorta, mesentery, stomach, small bowel, ascending colon and the proximal portion of the transverse colon) [4]. The celiac plexus is situated within the retroperitoneal space posterior to the stomach and pancreas, close to the celiac axis, and it is separated from the vertebral column by the crus of the diaphragm. It comprises a dense network of ganglia around the aorta, with considerable variability in size (0.5-4.5 cm), number and position (from the T12-L1 disc space to the middle of the L2 vertebral body) [5]. The left celiac plexus is typically located more caudally than its counterpart on the right. Celiac neurolysis may target either the plexus or the ganglia. The main preganglionic neurotransmitter of the celiac ganglion is acetylcholine, yet the celiac ganglion-mesenteric complex also contains  $\alpha$  and  $\beta$  adrenergic receptors and is innervated by fibres of adrenergic nature that come from other preaortic ganglia [6]. A celiac plexus block performed via an anterior approach offers several potential advantages over a posterior approach, including shorter procedure time, less discomfort to the patient, and less risk of neurologic complications [7]. The procedure was performed in 17 consecutive patients referred for treatment of chronic abdominal pain thought clinically to be of celiac ganglion origin. The anterior approach to a celiac plexus block is a safe and effective means of pain control in patients with pancreatic carcinoma. It offers several potential advantages over the posterior approach and should be considered for all patients with pain caused by pancreatic carcinoma that is refractory to pain medication [8].

### **Materials and methods**

Totally 40 patients with diagnosed unresectable pancreatic malignancy and chronic pancreatitis with intractable pain who attended the surgical gastroenterology department of Govt. Stanley Hospital, Chennai during the period of May 2010 to November 2010 are selected for neurolytic coeliac plexus block with 100 % Alcohol. They are grouped randomly into two comprising 20 each 1.

Group A: ultrasound guided neurolysis of coeliac plexus through an anterior approach. Group P: fluoroscopy guided neurolysis of coeliac plexus through a posterior approach. On the day of the procedure, the patient was kept fasting for four hours intravenous access secured with 18g venflon. This is to approach to celiac plexus randomly.

### **Inclusion criteria**

- Age: 40-60 years.
- ASA: II and III (HTN under control, DM under control)
- Patients on long term opioids.
- Unresectable pancreatic tumour and chronic pancreatitis.

### **Exclusion criteria**

- Patients on anticoagulant therapy.
- Congenital abnormalities of coagulation.
- Antineoplastic cancer therapies.
- Chronic alcoholic with liver abnormalities
- Intestinal obstruction. 6. Local or intraabdominal sepsis.
- Electrolyte disturbances and hypotension.
- Abdominal aortic aneurysm.

Patients attended the outpatient department of surgical gastroenterology with the complaints of severe abdominal pain, loss of weight, poor feeding were evaluated. Those who were diagnosed to be suffering from the malignancy of pancreas or chronic pancreatitis were informed about the disease, non-operability of the stage and possibility of only pain palliation. Those patients were explained about celiac neurolysis as a method of pain alleviation and its serious complications. Those who accepted and gave consent were included in the study. The patient was admitted to inpatient, the day before the procedure. On the day of the procedure, the patient was kept fasted for four hours, intravenous access secured with 18G venflon. The approach to celiac plexus was randomly chosen.

### Anterior approach

With the patient in supine position, under the guidance of ultra-sonogram, the needle entry point is marked. From the skin to the peritoneum, the abdominal wall is infiltrated with 1% xylocaine. Under USG guidance, celiac axis is located, a 15 cm 23G needle is passed from the skin towards celiac axis so that the needle tip is just to the left of the artery. After negative aspiration for blood 20 ml of a neurolytic mixture (15 ml of 100% alcohol with 5 ml 0.5% bupivacaine) is injected and the spread of the solution witnessed. The same procedure was repeated on the right side.

### Posterior approach

With the patient in prone position, with a pillow under iliac crests L1 vertebra is located with fluoroscopy. At the junction of 12th rib with erector spinal muscle, the needle entry point is marked. Skin up to the muscle layer is infiltrated with 1% xylocaine on both sides. A 15 cm 23 G needle is advanced at 45 degrees from the horizontal plane. The needle tip is advanced beyond the body of L1 vertebra which is confirmed by the image intensifier. After negative aspiration of blood contrast dye is injected, the spread of the dye witnessed. Then 20 ml of a neurolytic mixture (15 ml of 100% alcohol with 5 ml 0.5% bupivacaine) is injected. The same procedure was repeated on the other side. During the procedure, the patients' vitals were monitored. After the procedure, the patients were kept in ICU for one day for monitoring. The next day, if stable, discharged

from the hospital. They were followed by phone about the intensity of pain and any complications like diarrhoea. They were instructed to attend the SGE department at 1, 4 and 8 weeks for assessment of pain relief.

### Results

34 patients with pancreatic malignancy and 6 patients of chronic pancreatitis with pain scores of 8 to 10 were taken up for the study. They were allocated randomly into 2 equal groups of 20 each. Group A underwent celiac plexus neurolysis through anterior approach with ultra-sonogram guidance. Group P underwent celiac plexus neurolysis through a posterior approach with fluoroscopic guidance. All the patients received the same amount of neurolytic agent and were followed for 8 weeks. All the data were expressed as mean  $\pm$  standard deviation (SD). The qualitative variable was compared with 'Chi-square test' and quantitative variables were compared with 'student's' test'. The level of statistical significance was set at  $P < 0.005$ .

Group A underwent celiac plexus neurolysis through anterior approach with ultra-sonogram guidance. Group P underwent celiac plexus neurolysis through a posterior approach with fluoroscopic guidance. All the patients received the same amount of neurolytic agent and were followed for 8 weeks. There were no significant changes observed in both the groups of p-value 0.168 (**Table – 1**).

**Table – 1:** Pain intensity at 1 week of post-procedure among patients (Group A and Group- P).

Group	Mean	Standard deviation	Standard error	P-value
A	2.3	1.83	0.41	0.168 (not significant)
P	1.5	1.76	0.39	

**Table – 2:** Pain intensity at 4 week of post procedure.

Group	Mean	Standard deviation	Standard error	P-value
A	1.6	1.84	0.41	0.875 (not significant)
P	1.7	2.15	0.48	

**Table – 3:** Pain intensity at 8 weeks post procedure among patients (group A and group- P).

Group	Mean	Standard deviation	Standard error	P-value
A	1.6	1.84	0.41	0.875 (not significant)
P	1.7	2.15	0.48	

**Table – 4:** Patient discomfort during procedure among patients (group A and group- P).

Group	Mean	Standard deviation	Standard error	P value
A	2.35	0.58	0.13	0.000 ( significant)
P	6.6	0.75	0.16	

**Table - 5:** Prevalence of hypotension among patients (Group A and Group- P).

Hypotension Events		Group			
		A	P	Total	
Groups	0	Count	2	1	3
		% within Group	10.0%	5.0%	7.5%
	0	Count	18	19	37
		% within Group	90.0%	95.0%	92.5%
	Total	Count	20	20	40
		% within Group	100.0%	100.0%	100.0%

**Table – 6:** Prevalence diarrhoea among patients (Group- A and Group- P).

Diarrhoea among the groups		Group			
		A	P	Total	
Groups	0	Count	7	3	10
		% within Group	35.0%	15.0%	25.0%
	0	Count	18	19	37
		% within Group	65.0%	85.0%	75.0%
	Total	Count	20	20	40
		% within Group	100.0%	100.0%	100.0%

At the end of the 4<sup>th</sup> week the pain intensity in both the groups were not statically significant of p-value (0.875) assessed by Wilcoxon sum test (Table – 2).

In our study group P (19) patients are more prone for hypotension when compared to group A (18) which is found to be less significant of p-value <0.005 (Table – 5).

At the end of the 8<sup>th</sup> week also the pain intensity in both the groups were not statically significant of p-value (0.168) assessed by Wilcoxon sum test (Table – 3).

In our study group P (17) patients had diarrhoea when compared to group A (13) which is found to be less significant of p-value <0.005 (Table – 6).

Patient discomfort score was more in group P when compared to group A which is statically significant of p value<0.001 (Table - 4).

## Discussion

Debilitating pain is a common symptom in patients with pancreatic cancer and chronic pancreatitis. Narcotic therapy is associated with a

number of side effects; including somnolence, dry mouth, constipation, nausea, vomiting, and confusion. Intraoperative chemical splanchnicectomy for patients with malignancy was described by Copping et al in 1969. Further studies demonstrated success with this technique, including permanent pain relief in some patients [9]. A meta-analysis of 24 publications and 1145 patients treated with percutaneous celiac plexus neurolysis for cancer pain found good to excellent relief in 70 — 90 % of the patients for up to 3 months. In 1996, Fragile, et.al. reported a case of a patient with chronic pancreatitis who required high — dose narcotics. Pain improved in 55% of the patients [10]. The mean pain scores declined from 8 to 2 after both 4 and 8 weeks of follow-up. In 26% of the patients, there was a persistent benefit at 12 weeks, and in 10% of patients, there was a persistent benefit at 24 weeks. So far no studies, to the best of our knowledge, attempted to compare anterior and posterior guided techniques of celiac plexus neurolysis [11]. This study attempts to assess the effectiveness and complications of neurolysis between these 2 techniques. We found no considerable difference in the effectiveness of block between two techniques. One patient in group A and 2 patients in group P did not show pain relief and considered the failure of neurolysis due to some reason. Others had pain relief up to 8 weeks. Patients experience greater pain and discomfort while performing the block in the posterior technique [12]. Almost all the patients in group P showed pain intensity of 6 to 8 in VAS scale. The patients in Group A experienced pain of 2 to 3. Positioning and imaging take longer time in the posterior technique compared to anterior. The time to perform the procedure in the anterior technique ranges from 15 to 30 minutes while in the posterior technique it is 40 to 55 minutes [13]. The effectiveness of the block is evidenced by pain relief, physiological complications like diarrhoea and hypotension. In our study except for 2 patients out of 40 developed significant hypotension and diarrhoea. Injection of alcohol produces burning sensation in both the techniques. Almost all the patients in our study

complained pain during injection of alcohol [14]. In the posterior technique, as the needle pierces the muscular layer of the back, patients complain of a backache up to 1 to 3 weeks which may require some pain medication [15]. In our study all the patients who underwent celiac neurolysis through the posterior approach complained of back ache up to 2 weeks of bearable intensity [19, 20].

## Conclusion

This randomized prospective study was designed to compare the two approaches of celiac plexus neurolysis with respect to effectiveness, time to perform, patient discomfort and complications. After the procedure, a reduction in the pain intensity was assessed at 1, 4 and 8 weeks. Complications like diarrhoea, hypotension and backache are accounted. Anterior and posterior approaches successfully neurolyse the celiac plexus under ultrasonogram and fluoroscopy guidance respectively. Local abdominal and back pain during or immediately after a celiac plexus block has been reported commonly because of the ablative effect of the neurolytic agent. Another common self-limiting complication is diarrhoea occurs due to sympathetic blockade and unopposed parasympathetic efferent influence after the block, and usually resolves in around 24-36 hours. Orthostatic hypotension may occur due to loss of sympathetic tone and dilated abdominal vasculature. Neurologic complications such as paraplegia, leg weakness, sensory deficits, and paresthesias have been reported in few patients. In conclusion, the ultrasound guided anterior celiac plexus block is a safe and economical alternative to conventional fluoroscopic guided posterior and CT guided celiac plexus block.

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