Efficacy of celiac plexus block in chronic pancreatitis in pediatric age group

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Received - 23 September 2019 Initial Review - 12 October 2019 Accepted - 05 November 2019

ABSTRACT

Neurolysis of the celiac plexus has been found to be an effective way of palliating chronic pain due to non-pelvic intra-abdominal organ pathologies such as upper abdominal malignancies and chronic pancreatitis. We assessed the effectiveness of celiac plexus block (CPB) for pain due to chronic pancreatitis in pediatric age group. Eleven children between the age group of 3–10 years suffering from abdominal pain due to chronic pancreatitis underwent CPB through transaortic approach. Assessment of pain relief compared to pre-procedure status was done using Wong-Baker Faces Pain Rating Scale. Ten out of 11 children had symptomatic relief post-procedure and on 6 months follow-up. One child had relapse of pain after 3 months of CPB. We conclude that CPB is a promising solution for tackling intractable pain due to chronic pancreatitis in pediatric age group.

Key words: *Celiac block, Chronic pancreatitis, Celiac plexus*

Celiac plexus forms the relay center for nociceptive impulses that originate from the upper abdominal viscera, from the stomach to the proximal transverse colon. The celiac plexus proper consists of the celiac ganglia with a network of interconnecting fibers, on each side of L1 – aorta lying posteriorly, pancreas anteriorly, and inferior vena cava laterally [1]. Various approaches can be used to access the celiac plexus – anterior, posterior, and other less common approaches such as transaortic and transintervertebral disc.

Neurolysis of the celiac plexus has been found to be an effective way of palliating chronic pain due to non-pelvic intra-abdominal organ pathologies such as upper abdominal malignancies and chronic pancreatitis. The pancreas has a rich supply of afferent sensory fibers, which are responsible for the intense pain associated with advanced pancreatic cancer, as well as acute and chronic pancreatitis. These somatic fibers travel superiorly to the celiac ganglia, interruption of which can stop transmission of pain sensation. However, this does not affect the progression of the disease process [1-3]. In this case series, the effectiveness of celiac plexus block (CPB) in children suffering from chronic pancreatitis and its sequelae have been studied.

CASE REPORT

A total of 11 (5 males and 6 females) children of the age group of 3–10 years, diagnosed with chronic pancreatitis, underwent CPB. Chronic pancreatitis was diagnosed in the presence of typical abdominal pain and characteristic imaging findings (contrast computed tomography scan) or; exocrine insufficiency with imaging findings or; and endocrine insufficiency and imaging findings Table 1. Seven out of 11 children were known cases of chronic pancreatitis, three had chronic abdominal pain with a history of pancreatitis, and one child was post-cystogastrostomy for pseudocyst of pancreas. Abdominal pain was the most common presenting symptom, and the other associated symptoms were vomiting and loss of appetite [Table 2].

All the children were administered some form of analgesics (most commonly nonsteroidal anti-inflammatory drugs or opioids) but pain relief was not satisfactory. Pain assessment was done using Wong-Bakers Scale Figure 1 and Table 3 [2]. Institutional Ethical Committee approval was taken. The parents/caretakers were counseled regarding the possibility of increase in pain initially, recurrence of pain, hypotension, diarrhea, failure and need for repeat procedure, and other complications associated with the technique. A written consent was taken from the parents.

All the patients were planned for fluoroscopy-guided CPB under general anesthesia after a thorough pre-procedure workup. The single needle trans-aortic approach was used in all patients for the block. The needle entry point over the skin (corresponding to the midpoint of the lateral border of L1 vertebra) was marked and infiltrated with 2% lidocaine. A 22G 15 cm block needle was inserted at the entry point in tunnel view. The needle was advanced further slowly until it reached the lateral border of the vertebra. The needle was slowly walked off the lateral border, and further advanced deeply beyond the vertebral border until a pop (puncture of posterior wall of aorta) was felt.

Aortic puncture was confirmed by the backflow of aortic blood at the needle hub. At this point, the c-arm was rotated laterally to obtain a lateral view of L1. The stylet was reinserted, and the needle was further advanced until another pop was felt

Table 1: Patient profile and radiological workup

S. No.	Age	Gender	Imaging (USG+CECT abdomen)				Treatment/Drug history
			Atrophic pancreas	Calcifications	Ductal anomalies	Pseudocyst	
1.	3	Male	+	+	+	−	Opioid analgesics
2.	5	Female	+	−	+	−	Post cystogastrostomy+Opioid analgesics
3.	8	Female	+	−	+	−	Opioid analgesics
4.	10	Female	+	−	+	−	Opioid analgesics
5.	4	Male	+	−	+	−	Opioid analgesics
6.	4	Male	+	−	−	−	NSAIDs
7.	5	Male	+	+	+	−	Opioid analgesics
8.	6	Female	+	−	+	−	NSAIDs+Opiods
9.	8	Female	+	−	−	−	Opioid analgesics
10.	3	Male	+	−	+	+	Opioid analgesics
11.	6	Female	+	−	−	+	Opioid analgesics

USG: Ultrasonography, CECT: Contrast-enhanced computed tomography, NSAID: Nonsteroidal anti-inflammatory drug

Table 2: Patient profile and clinical workup

S. No.	Age	Gender	Clinical presentation				Clinical examination		Pancreatic enzymes	
			Pain	Vomiting	Reduced appetite	Weight loss	Mass	Icterus	Serum amylase (U/L)	Serum lipase (U/L)
1.	3	Male	+	+	+	+	−	−	88	200
2.	5	Female	+	−	+	+	−	−	80	170
3.	8	Female	+	−	−	−	−	−	76	243
4.	10	Female	+	+	−	−	−	−	59	100
5.	4	Male	+	+	+	+	−	−	56	222
6.	4	Male	+		+	+	−	−	55	231
7.	5	Male	+	−	+	+	−	−	55	180
8.	6	Female	+	+	+	+	−	−	67	250
9.	8	Female	+	+	+	+	−	−	80	228
10.	3	Male	+	+	−	−	−	−	90	160
11.	6	Female	+	+	+	+	−	−	45	280

Table 3: Assessment of pain using faces scale pre- and post-procedure

S. No.	Age	Gender	Wong-Bakers Faces Pain Scale assessment				
			Pre-procedure	At discharge	1 month	3 months	6 months
1.	3	Male	10	0	0	0	0
2.	5	Female	10	0	0	0	0
3.	8	Female	8	0	0	2	8
4.	10	Female	8	0	0	0	0
5.	4	Male	8	0	0	0	0
6.	4	Male	8	0	0	0	0
7.	5	Male	8	0	0	0	0
8.	6	Female	8	0	0	2	2
9.	8	Female	8	0	0	0	0
10.	3	Male	6	0	0	0	0
11.	6	Female	10	0	0	0	0

(puncture of anterior wall of aorta). At this point, the stoppage of backflow of blood was observed. Next, the needle tip placement was confirmed by injecting 2 ml of water-soluble iohexol dye, and vertical spread of the dye was noted in c-arm image.

Next, 15 ml of absolute alcohol was injected slowly, fluoroscopy images were taken at regular intervals (after every 3 ml of alcohol injection), and further washout of dye was noted under fluoroscopy. The needle was withdrawn after injecting 1 ml of air to wash any traces of alcohol in the needle shaft concluding the procedure (Fig. 2).

The children were observed for improvement in symptoms and development of complications such as hypotension and

Figure 1: Wong-Bakers Scale Pain assessment scale

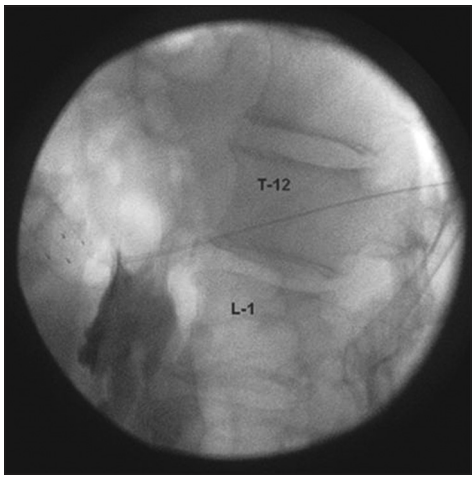

Figure 2: Fluoroscopy image of celiac plexus block

diarrhea. Symptomatic relief in the form of improved general conditions, improved activity, increased appetite, and feeding was noted. Faces scale was used to assess improvement in pain severity and thereby effectiveness of the procedure. All 11 children had an uneventful intra- and post-procedure period with no complications related to hypotension, diarrhea, or other unprecedented technical adversities. All 11 children had pain relief without any other symptoms, at discharge, 1 month, and at 3 months follow-up. On follow-up, it was found that quality of life improved, with all of them returning back to school and increased daily activity as reported by the caretakers. However, one child had recurrence of pain at 6 months follow-up.

DISCUSSION

In our study, clinical features and corroborative imaging findings were used to diagnose chronic pancreatitis like in the previous studies [4]. We found that ductal anomalies were more common than the calcifications, as seen in adult with chronic pancreatitis [5]. Shah *et al*. analyzed 133 studies about interventional procedures and indications in pediatric patients; out of which, three studies showed effectiveness of CPB in refractory pain of pancreatitis [6]. The results were consistent with our study showing dramatic pain relief and decreased opioid requirements. As discussed by Schwarzenberg *et al*., poor quality of life and loss of school days added onto the major disease burden in chronic pancreatitis in addition to physical and psychological effects [7]. In our study, we found that CPB is an effective method of pain relief leading to improvement in day to day activities and return to school in these children.

Evidence of efficacy of CPB in adult chronic pancreatitis has been studied in various large scale centers with a large study population. Fusaroli and Caletti concluded that endoscopic ultrasound-guided CPB appears to be a safe, moderately effective, and repeatable treatment for pain caused by chronic pancreatitis in 221 adult patients [8]. In a study, Goldschneider *et al*. found that the 3D rotational angiography showed promise for understanding the spread of medication necessary to accomplish a successful block and help to explain failures in cases where anatomic distortion might interfere with proper injected flow [9].

CONCLUSION

Neurolytic CPB was found to be effective in relieving chronic abdominal pain due to pancreatitis in the pediatric age group with 90% of subjects being pain free for 6 months. It can be considered as an effective cure when other methods fail to achieve pain relief.

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Funding: None; Conflict of Interest: None Stated.

How to cite this article: Syam D, Gajanthody S, Kulkarni R, Ahmed A. Efficacy of celiac plexus block in chronic pancreatitis in pediatric age group. Indian J Child Health. 2019; 6(11):620-622.

Doi: 10.32677/IJCH.2019.v06.i11.012