

Effectiveness of Single-Port Thoracoscopic Splanchnicectomy in Controlling Pain in Patients with Chronic Pancreatitis

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ABSTRACT

Introduction: Chronic pancreatitis is defined as a persistent pancreatic inflammatory disease. In chronic pancreatitis, recurrent episodes of inflammation lead to the replacement of pancreatic parenchyma with fibrotic connective tissue. Chronic pancreatitis pain, which may initially mimic acute pancreatitis, is severe, frequent, and continual and has a major impact on the quality of life and social functioning of patients. The standard treatments for this disease are endoscopy, surgery, splanchnic nerve denervation, thoracoscopic splanchnicectomy (TS), and video-assisted thoracoscopic surgery (VATS). Considering the advantages of the single-port method, we attempted to describe the post-treatment conditions of the patients undergoing this therapeutic approach.

Materials & Methods: Ten chronic pancreatitis patients with severe resistant pain volunteered to enter the study. We recorded the data on patients' age, gender, pre-operative pain level, surgical complications, and post-operative pain level (two weeks after surgery) were recorded. Visual analogue scale (VATS) was used for pain assessment and paired sample t-test was performed for statistical evaluation of response to the treatment for pain.

Results: The participants included one female and nine male patients with the mean age of 53.3±0.8 years. The mean duration of severe pain before the onset of treatment was 13 months (range: 6 to 20 months). The pain level was determined 3 to 5 days before the operation and re-graded two weeks post-operation. Pre- and post-operative pain scores showed a significant reduction in the severity of pain before and after surgery (P<0.004).

Conclusion: Single-port technique is recommended as a safe way to reduce pain in patients with chronic pancreatitis.

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Introduction

Chronic pancreatitis is defined as a persistent pancreatic inflammatory disease that is characterized by irreversible morphological changes, resulting in pain or permanent loss of pancreatic function (1). In chronic pancreatitis,

recurrent episodes of inflammation lead to replacement of pancreatic parenchyma with fibrotic connective tissue (2). The main clinical manifestations of chronic pancreatitis include pain, digestive problems, and diabetes (3). Chronic

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pancreatitis pain may initially mimic acute pancreatitis, but with the advancement of the disease, pain attacks increase and painless intervals shorten, resulting in persistent pain often resistant to treatment (4). The pain in chronic pancreatitis is severe, frequent, and continual and has a major impact on the quality of life and social functioning of patients (5). The pain experienced by chronic pancreatitis patients is the main reason for hospital admission, job loss, early retirement, and drug addiction (4). Other chronic pancreatitis manifestations that are more advanced include steatorrhea and weight loss (3). Within five years, 50% of patients develop endocrine deficiency and 80% exocrine deficiency (5). The annual incidence of chronic pancreatitis is 7.8 per 10,000 cases, and assuming a survival of 15 to 20 years, its annual prevalence is between 120 and 143 per 10,000 cases (6). The causes of chronic pancreatitis include alcohol consumption, nicotine use, hereditary factors, efferent duct factors, immunologic risk factors, and other miscellaneous factors (e.g., tropical chronic pancreatitis, hypercalcemia, hyperparathyroidism, and hyperlipidemia) (7).

Based on the severity of chronic pancreatitis, the treatments are alcohol avoidance, nonsteroidal anti-inflammatory drugs (NSAIDs), acetaminophen, and opioids, endoscopy and surgery in patients with dilated pancreatic duct, splanchnic nerve denervation for patients with severe pain without pancreatic duct dilatation and inflammatory mass and in case of patients (15%) who do not respond to the aforementioned therapeutic methods, radiofrequency ablation of the splanchnic nerves (RFSN), thoracoscopic splanchnicectomy (TS), video-assisted thoracoscopic surgery (VATS) (8), which includes two methods of multiple-port access and single-port access (1).

Splanchnic nerve denervation entails celiac plexus blocks under ultrasound endoscopy that relieves pain in 50 % of patients for a period of 15 to 24 weeks. In RFSN, high-frequency radio waves are used to damage the splanchnic nerves. It has an average response rate of 45 weeks, but engenders several problems such as reduced visual control over an area with anatomical variations, which causes nerve damage in vicinity of blood vessels (1). For areas with anatomical variations, TS method is more suitable and can reduce complications through facilitating the catheterization of small bleeding vessels near the nerves. Pain reduction was reported in 50-75% of patients one year after TS and in 25% of the patients four years after it.

The advantages of the single-port access method include diminished post-operative pain, reduced recovery time, shortened surgery duration, improved cosmetic results, lower

incidence of residual paresthesia and neuralgia compared to the multiple-port access method, and reduction of postoperative pleural effusion after surgery (8). Considering the advantages observed in single-port method compared to other CP therapeutic methods, we aimed to describe the post-treatment conditions of patients who underwent this treatment.

Materials and Methods

In this study, 10 chronic pancreatitis patients with severe resistant pain visiting Ghaem Hospital, Mashhad, Iran, during 2016-2017, volunteered to enter the study. The inclusion criteria entailed chronic pancreatitis confirmed by computerized tomography (CT) scan, severe pain that did not respond to other non-invasive treatments, and the patient's willingness to participate in the study. The exclusion criteria comprised of other causes of pancreatitis, such as inflammation or pseudo-cyst, pancreatic tumors, and the patient's unwillingness to enter the study. Written informed consent was obtained from all of the patients enrolled in the study. We recorded data regarding the patients' age, gender, pre-operative pain level, surgical complications, and post-operative pain level (two weeks after surgery). VATS was used for pain assessment, and Wilcoxon sign test and paired sample t-test were performed for statistical evaluation of response to the treatment for pain.

This study was approved by the Ethics Committee of Mashhad University of Medical Sciences (proposal code is: 961032).

Techniques

With general anesthesia and one-lung ventilation in the right lateral decubitus position in the 6th intercostal space of mid-axillary line, a trocar (10 mm) was passed, and after entering the pleural cavity with a special lens through the working channel and seeing the splanchnic network, electrocautery nerve degeneration was performed from level 6 to 10. After completing the operation, a chest tube (no. 24) was planted and 48 h after its removal, the patient was discharged.

Results

Nine of the patients under study were males and one was female, and the mean age of the patients was 53.3 ± 0.8 years. The mean duration of severe pain before the onset of treatment was 13 months (ranging from 6 to 20 months). The pain level (VATS pain score) was determined 3 to 5 days before the operation and re-graded two weeks after the surgical procedure. The following chart exhibits a significant reduction in pain severity after the surgery compared to the preoperative period ($P < 0.004$; Figure 1).

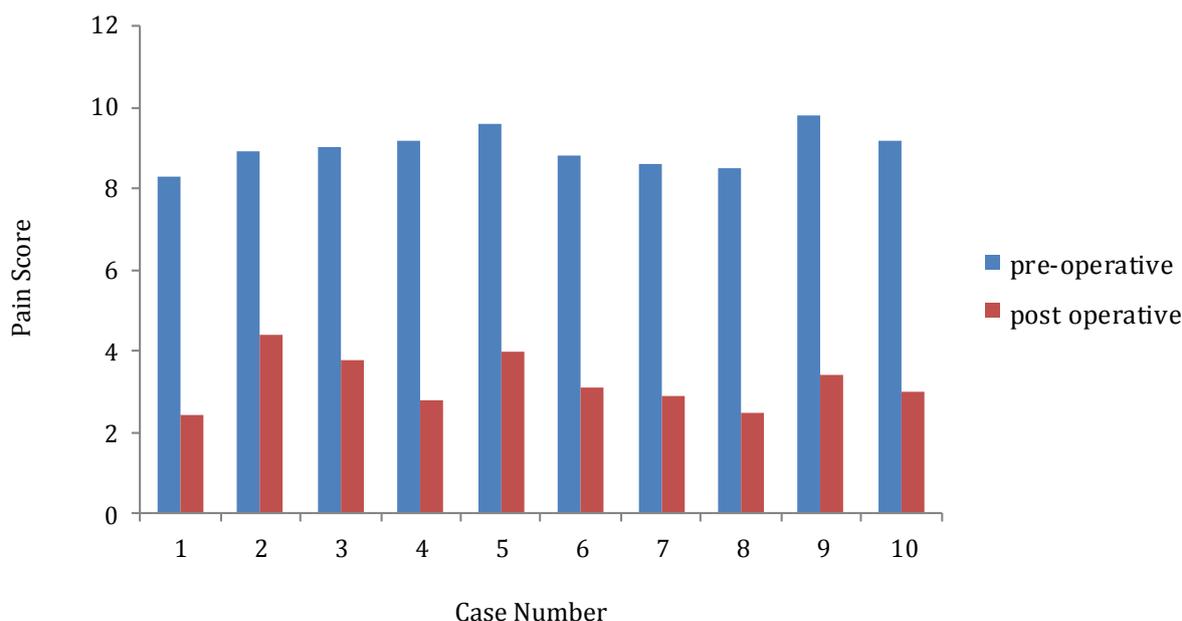


Figure 1. Pre- and post-operative pain scores (pre-operative 8.99 ± 1.1 , post-operative 3.23 ± 1.0)

Discussion

In a retrospective study by Verhaegh et al., 18 RFSN procedures were evaluated in 11 patients with chronic pancreatitis, who were resistant to analgesics. Five patients underwent a secondary procedure, and two patients were subjected to a third-party procedure. RFSN was effective in 15 out of 18 interventions. The mean score of repetitive nerve stimulation pain decreased from 7.7 ± 1 to 2.8 ± 2.7 . The mean duration of the painless course was 47 weeks and the effect of repeated interventions was the same as the initial method. A transient complication was also reported. Four patients reported a significant reduction in the use of analgesics. Four patients discontinued their pain treatment. It was concluded that RFSN is a mild invasive technique, which is effective in pain relief and can be repeated after its effective use (1).

In a study by Kuijpers et al., four patients suffering from uncontrolled pain due to chronic pancreatitis for more than 10 years (12.8 ± 5.9) underwent splanchnicectomy from R5 to R11 through a unilateral single-port procedure. Post-operative recovery was uneventful and no intraoperative complications were observed, and all the four patients experienced excellent pain relief (mean VAS score: 8.8 ± 1 before surgery and 3 ± 1.1 after surgery). According to their study, single-port VATS splanchnicectomy is a safe and effective method, which can be adopted as an alternative to multi-portal methods or open procedures (8).

Bosanquet et al. in 2016 concluded that the use of prone positioning and two thoracoscopic ports was a safe strategy that allowed easy access, better and less dissection of splanchnic neurons,

significant pain reduction, and shorter duration of post-operative admission. Furthermore, post-operative complications were reduced and quality of life was improved (9).

Constant pain due to chronic pancreatitis has severe harmful effects on the quality of life. In many patients, the use of analgesics or open and endoscopic surgical procedures have not been successful (1, 5, 10-12). In some of them, cutting the nerves from afferent celiac plexus was performed through the splanchnic denervation method as the last treatment, the effects of which were significant but temporary (1, 12).

Conclusion

Single-port technique is recommended as a safe pain relief method in patients with chronic pancreatitis. To achieve more precise results, further studies with larger sample sizes are recommended.

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Conflict of Interest

The authors declare no conflict of interest.

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