

Thoracoscopic splanchnicectomy for the relief of chronic pancreatic pain

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Abstract

Chronic pancreatitis may cause disabling pain unresponsive to oral analgesics and/or drainage procedures. Radiological guided coeliac plexus ablation is beneficial, although it is only a temporary method for pain relief. Bilateral splanchnicectomy provides a more permanent pain relief method with minimum morbidity if performed by thoracoscopy. The results of twenty one thoracoscopic splanchnicectomies performed at the university surgical unit, Peradeniya, Sri Lanka from January 2011 to June 2015 were analysed to evaluate the surgical technique and to quantify the efficacy of pain relief. All had an acceptable operating time, no measurable blood loss, no conversions to open surgery, no intercostal drainage, early mobilization and feeding. All had an average pain score of 8-10 pre-operatively. This was reduced to 1 or no pain on post-operative day one in all patients. Eighteen patients out of 21 (86%) remained pain free during follow up; follow up ranged from one month to forty eight months.

Bilateral thoracoscopic splanchnicectomy is safe and provides effective relief of chronic agonizing pancreatic pain.

Introduction

Chronic pancreatitis is an inflammatory condition in which the most common symptom is an intermittent or persistent severe pain, which significantly affects the quality of life [1-3]. Pharmacological treatment is the first line for pain management [4]. Management of pain with analgesic drugs involves selection, timing and dose adjustment according to the nature and the severity of the pain. Most commonly used drugs include NSAIDs (Non-steroidal anti-inflammatory drugs), Paracetamol, Tramadol, Carbamazepine and opioids. There are many advantages and disadvantages with each of these drugs, amongst which opioids having a significant risk for the development of addiction to narcotics [5]. In Sri Lanka, the availability of oral opioids is restricted for out-patients.

Some patients continue to have disabling pain despite oral analgesics and/or drainage procedures. Alternatives for these patients could include nerve ablative procedures. Fluoroscopy guided, CT-guided or endoscopic ultrasonography guided [2,3,5,6] celiac plexus blocks with alcohol or steroids may achieve pain relief, but this is only temporary and results were noted to be inconsistent [2,4].

Surgical denervation by resection of the greater splanchnic nerve and celiac ganglion or ablation of the splanchnic nerves or its branches is an elegant option [4,7]. This could be performed by open surgery which requires bilateral thoracotomy where the morbidity could be substantially high. A smart option would be thoracoscopic ablation of the splanchnic nerves [3,5,8-13]. Thoracoscopy provides a clear visualization of the splanchnic nerve branches with a magnified view [8]. Initially the sympathetic chain is identified and with movement of the camera, the entire sympathetic chain can be well visualized along with the branches of the splanchnic nerves (Figure 1), and the branches joining to form the splanchnic nerves. A precise division of all the branches coming off the 5th to the 12th thoracic sympathetic ganglia or splanchnic nerves is thus possible.

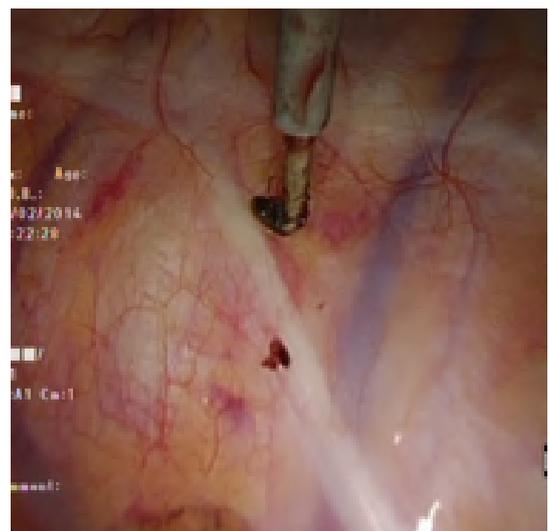


Figure 1. Splanchnic nerve branching off from the thoracic sympathetic chain.

The morbidity of a bilateral thoracotomy is removed and it can be done in a shorter time facilitated by clear visualization. The opening and closing time of a thoracotomy is saved and the blood losses are not measurable [3,9,13]. Intercostal drainage is not required [13] and early mobilization, early

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feeding and early discharge from hospital is possible [8,13,14].

Objective

To evaluate the feasibility of bilateral thoracoscopic splanchnicectomies, the operative outcome, and both short and long term pain relief.

Materials and methods

Patients with chronic pancreatitis with persistent pain who were referred to the surgical unit from January 2011 to June 2015 were included. Pain was assessed using a visual analogue scale (VAS). Pharmacological pain relief was started at the anaesthetic pain clinic. Patients who had duct obstructions were treated endoscopically or surgically. Patients who failed to show an improvement of pain were enlisted for thoracoscopic splanchnicectomy. Pre-operative pain score was recorded using the VAS.

Bilateral thoracoscopic splanchnicectomy was performed under general anaesthesia with a conventional single lumen endotracheal tube with both lung ventilation. Patients were placed in prone position. While ventilating both lungs, the ipsilateral lung was collapsed with a capnothorax of 6-8mmHg. Three ports were used. A 5mm or 10mm camera port was placed in the 6th or 7th intercostal space in the mid axillary line. Two working ports were placed in the 4th/5th and 8th/9th intercostal spaces in the posterior axillary line. The camera used was a 30 degree 5mm or 10mm. At the beginning, the branches from the splanchnic nerves joining the sympathetic chain were identified and ablated with a diathermy hook. Later, any trunks formed by a few branches along with any remaining nerves (generally one or two) were ablated as it is quicker. In three of the patients the branches were not clear and the main splanchnic nerve was dissected at the diaphragmatic level. The respiratory and cardiovascular parameters were monitored. The operating time, blood loss, intraoperative haemodynamic or respiratory complications, conversion to open procedure and post-operative pain score were recorded. All the surgeries were performed by the same surgeon. Pre-operative and post-operative pain scores were compared with Wilcoxon Signed-Rank test. A p value of <0.01 was considered as significant.

Results

Twenty one patients underwent surgery as they were not responding to analgesics. There were three females and eighteen males. The age distribution ranged from sixteen to sixty years.

The patients were on a combination of paracetamol, diclofenac sodium, tramadol, amitriptyline and oral morphine. Five patients were getting frequently admitted for narcotic injections. One female who had pancreatitis during

her pregnancy continued to be on oral morphine after delivery with poor relief. Others, including a school child of sixteen years could not get on with day to day work. The preoperative pain scores are detailed in Table 1.

All had pain scores of 8-10. The frequency of severe attacks of pain ranged from two to ten per day (Table 1).

| Pain score | 8 | 9 | 10 |
|--------------------|---|----|----|
| Number of patients | 6 | 12 | 3 |

Table I. Pre-operative pain score. *(0 - no pain, 10 - known maximum pain).

Operative results

Average operating time was 60 min for the first seven patients. For the next 14 patients average operating time was 40 min. The respiratory and cardiovascular parameters were stable during the procedure. There was no measurable blood loss and no conversions to open surgery. Intercostal drainage was not used and all were extubated immediately post-operative. They were mobilized out of the bed and fed orally on the same day. There were no post-operative complications and all were discharged within 48hours.

The follow up ranged from one to forty eight months with 12 out of 21 patients being followed up beyond 18 months. The patient being followed up to 48 months was operated in January 2011 and the two followed up to one month operated in June 2015. The follow up will continue for all except for one patient who died after 6 months of pancreatic carcinoma.

Post procedure pain relief

All the patients reported a pain score of 0-1 on day one. The pain related to procedure was minimal and relieved with oral analgesics. All were discharged within 48 hours with oral analgesics to be used as required. Except for one patient all others were pain free one week after surgery with minimal or no analgesic use. A twenty three year old who had severe pancreatitis during her pregnancy and was dependent on oral morphine was admitted a week later complaining of severe pain. She was managed with diclofenac suppositories, oral tramadol and amitriptyline. After one week she was managed with tramadol only and reviewed in a month. One patient presented 6 months later with pain and cachexia, and repeat imaging revealed a carcinoma of the head of the pancreas. Another patient had a pain score of 3-5 one month after surgery needing regular medications. In these three patients with relapses, review of operative notes did not reveal any difficulty of identifying the nerves. All other 18 patients are remaining pain free and the maximum length of follow up was four years in one patient. Follow up has been longer than 18 months for 12 of them. The pre-operative and post-operative pain scores were compared with Wilcoxon Signed-Rank test (Table 3).

Post-operative median pain scores for immediate, 1st month, 2nd month, 3rd month, 6th month, 12th month and 18th month periods were significantly lower compared to pre-operative pain scores (i.e. baseline).

| Time | Number of patients followed up | Median (Q1 - Q3) pain score | P value |
|-------------------|--------------------------------|-----------------------------|----------|
| Pre-op | 21 | 9 (8 - 9) | Baseline |
| Post-op immediate | 21 | 0 (0 - 1) | <0.01 |
| Post-op 1 month | 21 | 0 (0 - 1) | <0.01 |
| Post-op 2 month | 19 | 0 (0 - 0.75) | <0.01 |
| Post-op 3 month | 18 | 0 (0 - 1) | <0.01 |
| Post-op 6 month | 14 | 0 (0 - 0) | <0.01 |
| Post-op 12 month | 13 | 0 (0 - 0) | <0.01 |
| Post-op 18 month | 12 | 0 (0.5 - 1) | <0.01 |

Table 2. Comparison of pain scores during the follow-up period.

Discussion

Some patients with chronic pancreatitis continue to have disabling pain that significantly affect their quality of life despite medical management and/or surgical drainage procedures [1-3].

Although bilateral splanchnicectomy was noted to provide an acceptable method of pain relief, this option did not gain popularity as it carries the burden of a thoracotomy which could result in high morbidity. Thoracoscopy provides an alternative technique with reduced morbidity [3,5,8-14].

This case series provides evidence that thoracoscopic splanchnicectomy is a safe procedure. All were performed with bilateral lung ventilation and a partial lung collapse with a capnothorax of 6-8mmHg. This highlights the possibility of the use of this ventilation technique rather than single lung ventilation using the double lumen tube which has its own complications. All the patients had stable cardiovascular and respiratory functions. Prone position allowed the collapsed lung to fall away from the field of dissection providing adequate space for dissection. Clear and accurate recognition of the thoracic sympathetic chain and splanchnic nerve branches was possible. The surgery was completed in an acceptable time with no measurable blood loss. There were no conversions to open surgery and all the patients had an uneventful post-operative period requiring no intercostal drainage. All were mobilized and fed orally on the same day and discharged after 48 hours.

A literature review revealed a study comprising of eight patients with bilateral double lung ventilation as in this study [8]. A study comprising of 94 patients used a lateral position and prone position in the two study groups. The mean operating time was 58.3 minutes in lateral position and 43.5 minutes in the prone position. The same study reports increased incidence of intercostal neuralgia in the group operated in lateral position [9]. Prone position is described in

two other studies [8-9]. The prone position was used in all patients of this study.

In a systematic review of 302 procedures in 16 reports a conversion rate of 1.3% was recorded. Our conversion rate was zero. Use of diathermy division to obtain good haemostasis was a key to avoid conversion. The mean hospital stay reported in the same review was 2.7 days compared to 48 hours in this study.

Varying degrees of success has been reported in the literature. Two similar studies have reported 80% and 52% being pain free at one year [3,11]. The study documenting 52% success at one year had declining values of 38% and 28% at two and four years respectively [11]. Another study documented similar declining success rates of 90% at 6 months and 49% beyond 15 months [13]. The efficacy in relief of pain in pancreatic cancer by thoracoscopic splanchnicectomy is supported by three studies [8,10,12] and disputed in one [5]. Overall it appears to be an effective technique with varying success rates.

In this study, 18 out of 21 patients obtained good and persistent relief (86%) which is better than published data. One failure was in the patient with an underlying malignancy found on repeat imaging. Another failure was in the patient who was dependent pre-operatively on oral opioids. This was managed with oral analgesics and she is awaiting review in one month.

Conclusion

Bilateral thoracoscopic splanchnicectomy provides an excellent method to relieve chronic agonizing pancreatic pain in this case series. The post-operative morbidity is negligible, but long-term results need further evaluation.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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