

# Thoracoscopic Left Splanchnicectomy: Two Trocar Technique

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## Abstract

**Background:** Abdominal hyperalgetic syndrome in unresectable pancreatic cancer worsens the quality of patients' life. The goal of this article is to evaluate the feasibility of performing the left splanchnicectomy using a two trocar thoracoscopic approach.

**Material and Methods:** One patient suffering from intractable pain due to unresectable pancreatic cancer (stage IV) with liver metastasis underwent thoracoscopic unilateral left splanchnicectomy. The procedure was performed using only two trocars, one of 10 mm for the optic and one 5 mm working trocar for Hook electrocautery, scissors and grasper. To assess pain severity and the impact of this palliative procedure for pain relief, the patient completed Wong-Baker Faces Pain Rating Scale with a preoperative pain degree of 9.

**Results:** Surgical procedure time was 30 minutes. Pleural drainage tube was removed 24 hours postoperatively. There were no complications. Immediate pain relief (pain degree 0 to 2) was achieved after thoracoscopic unilateral splanchnicectomy, same level being registered at first checkup after one month.

**Conclusions:** Thoracoscopic unilateral left splanchnicectomy using two trocars is feasible in selected cases, decreasing substantially the pain and significantly improving the quality of life in patients with unresectable pancreatic cancer.

**Keywords:** Pancreatic Cancer; Unresectable Cancer; Pain; Thoracoscopy; Splanchnicectomy

## Introduction

Thoracoscopic splanchnicectomy is a palliative procedure for the management of upper abdominal pain from unresectable pancreatic cancer. Thoracic splanchnic nerves conduct pain sensation from the abdominal organs around the celiac ganglion. Celiac plexus is the largest sympathetic plexus located at L<sub>1</sub> level posterior to the vena cava on the right side and just lateral to the aorta on the left side. The plexus is composed of a dense network of interconnecting presynaptic sympathetic nerve fibers derived mainly from the greater splanchnic nerve – GSN (T<sub>5</sub> - T<sub>9</sub>), lesser splanchnic nerve – LSN (T<sub>10</sub> - T<sub>11</sub>) and least (T<sub>12</sub>) splanchnic nerve. It also receives parasympathetic fibers from the vagus nerve [1]. Worsey and colleagues [2] reported in 1993 the first thoracoscopic left splanchnicectomy to relieve pain. This procedure is performed under direct vision and it is an alternative to celiac plexus block with a higher degree of precision and with less associated morbidity. Thoracoscopic splanchnicectomy consists in identification and division of all the roots of the splanchnic nerves from T<sub>5</sub> to T<sub>10</sub>. This procedure can be repeated contralateral in case of recurrence of pain or it can be performed bilateral from the beginning [3,4].

## Case Report

A 60-year-old woman recently diagnosed with pancreatic cancer was admitted in the Department of Surgery of Bucharest Clinical Emergency Hospital, for intractable epigastric pain. Pain was severe in intensity, radiating to back, resistant to usual and opioid analgesics. There was loss of weight and appetite. Physical exam revealed diffuse upper abdominal pain without any other symptoms and without a palpable tumoral mass. All routine laboratory tests were within normal range. The serum concentration of tumoral marker Carbohydrate-Antigen 19.9 (CA 19.9) was elevated at 1881 U/mL. Chest X-ray showed no metastases and upper digestive endoscopy was normal. Abdominal ultrasound revealed a pancreatic body solid nodule with

non-homogenous structure, 5 × 3.5 cm in diameter with irregular shape. CT scan of the abdomen and MRI revealed a pancreatic body mass lesion with extension into peri-pancreatic fat encasing adjacent vessels, with invasion of superior mesenteric artery and the celiac trunk and liver metastases which placed our patient in a preoperative stage IV (T<sub>4</sub>, M<sub>1</sub>) of pancreatic cancer.

Preoperatively pain assessment was done using the Wong-Baker Faces Pain Rating Scale (Figure 1) [5]. This scale is often helpful for patients with any degree of education, being very easy to understand and to answer. It uses faces from happy to tearful to demonstrate how a person might be feeling. Our patient preoperative pain level was 9.

The patient was prepared for a palliative surgical procedure–thoracoscopic left splanchnicectomy–in order to alleviate the symptoms of the abdominal hyperalgetic syndrome.

## Surgical Technique

The surgical procedure of thoracoscopic left splanchnicectomy was made under general anesthesia without selective intubation. The patient was placed in right-lateral decubitus position with slightly tilt anteriorly to expose the left thorax. We used a two trocar technique with

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a 10 mm trocar (optical trocar) placed in through 6<sup>th</sup> intercostal space on anterior axillary line and a 5 mm working trocar placed under direct vision in 9<sup>th</sup> intercostal space on the posterior axillary line (Figure 2).

The key point of our operation was intrathoracic carbon dioxide insufflation to a pressure level of 10 mmHg, which allowed a better exposure and a more distal division of the greater splanchnic nerve (GSN) and lesser splanchnic nerve (LSN). We used the standard thoracoscopic kit, with a 0° optical angle videoscope, hook cautery, scissors and an atraumatic grasper. The surgeon stands in front of the patient with the assistant on his left side. Working trocar insertion was done under direct vision. Identification of splanchnic nerves (GSN – T<sub>5</sub>-T<sub>9</sub> and LSN – T<sub>10</sub>-T<sub>11</sub>) through the transparency of the parietal pleura down to the diaphragm was easy (Figure 3). This might be difficult in case of pleural adhesions.

The GSN was identified through the parietal pleura from its first root along the descending aorta, to the diaphragmatic recess. To expose the trunk of the GSN, a pleural incision using hook electrocautery was made in the region between the descending aorta and the sympathetic trunk. Pleurotomy from the fifth intercostal space to the diaphragmatic recess was then performed. The main trunk of the GSN was isolated using the hook electrocautery as distally as possible and sectioned using electro-surgical scissors. The LSN was identified laterally to the GSN, dissected and divided. The excised nerves were sent for pathological examination (Figure 4).

We finished the operation by pleural drainage connected to water seal with a chest tube of 20 F inserted under direct vision through the space created by the 5 mm trocar in the 9<sup>th</sup> intercostal space on posterior axillary line (Figure 5).

After controlling the hemostasis, the lung is reinflated by the anesthesiologist, and the optic trocar is removed and the chest wounds are closed. Surgical intervention duration was 30 minutes. A postoperative

chest X-ray is performed routinely at 24 hours postoperatively and then the chest tube is removed.

## Results

There was no postoperative complications. In this case, thoracoscopic left splanchnicectomy performed with a two trocar technique using intrathoracic carbon dioxide insufflation proved itself as a good method of pain control in unresectable pancreatic cancer.

Pain was totally relieved and drug addiction stopped. In our experience we encountered pain at the site of the trocars so we decided to inject locally lidocaine 1% at the end of the surgical procedure [6]. Pain level was assessed at 24 hours postoperatively and the results were good with a pain level of 2 on Wong-Baker Faces Pain Scale. Our patient was discharged after 72 hours postoperative and she was referred to a territorial oncological department for chemotherapy. Results remained good at one month control.

## Discussion

The first left splanchnicectomy was performed in 1942 by Mallet-Guy [7] through laparotomy in order to alleviate intractable pain due to chronic pancreatitis. In 1990, Stone and Chauvin [8] first reported the clinical results of splanchnicectomy by thoracotomy. In 1993 Worsey et al. [2] described the use of videothoracoscopy to perform a left splanchnicectomy in patients with intractable pain due to advanced pancreatic cancer. An easier and faster procedure was proposed by Pietrabissa et al. [9] consisting in dividing only the main trunk of the greater and lesser splanchnic nerves with the same good results. Recently, many authors have reported good results with thoracoscopic unilateral left splanchnicectomy for pancreatic pain relief [3,4,10,11].

Thoracoscopic splanchnicectomy is a percutaneous procedure performed under direct vision. The advantages include higher precision video assisted identification and division of all the roots of the splanchnic nerves, from T<sub>5</sub> through T<sub>11</sub>. Use of CO<sub>2</sub> insufflation to create the working space allows us to perform a two trocar technique. The limitations include difficulty created by strong pleural adhesions and the likelihood that pain relief reduces with increased period of survival in cancer patients. This procedure has been reported with either few or no complications [12]. The patients referred for palliative

### WONG - BAKER FACES PAIN RATING SCALE



Figure 1: Wong-Baker Faces Pain Rating Scale.



Figure 2: Trocars' placement.



Figure 3: Identification of Greater Splanchnic Nerve (GSN) through the transparency of parietal pleura.



Figure 4: Dissection and division with hook electrocautery of Lesser Splanchnic Nerve – LSN (left) and Greater Splanchnic Nerve–GSN (right).



Figure 5: Pleural drain.

surgery have on an average 6 months survival time, and subjecting these for procedures that can become an important source of morbidity is not justified.

## Conclusion

Thoracoscopic left splanchnicectomy performed through only two trocar ports is an effective and safe minimally invasive procedure with good results for pain control in abdominal hyperalgetic syndrome from unresectable pancreatic cancer. Necessitating a short hospital stay and having a short learning curve this procedure could become highly accepted among patients and surgeons as treatment of choice of intractable pancreatic pain in selected cases.

## Conflict of Interest

Authors have no conflict of interest to disclose.

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