Original article

Endoscopic palliative treatment of advanced pancreatic cancer: Thoracoscopic splanchnicectomy and laparoscopic gastrojejunostomy

Department of Surgery, University Hospital Dijkzigt, Rotterdam, The Netherlands

Summary

Design: Evaluation of thoracoscopic splanchnicectomy and laparoscopic gastrojejunostomy as endoscopic palliative treatment of advanced pancreatic cancer.

Patients and methods: Between November 1993 and September 1998 we performed 16 thoracoscopic splanchnicectomies and 6 laparoscopic gastrojejunostomies in patients with an advanced pancreatic cancer admitted to the Department of Surgery of University Hospital Rotterdam - Dijkzigt. These patients either did not achieve adequate pain control with medication or presented serious problems of gastric outlet obstruction, or both.

Results: There were fourteen patients (9 men and 5 women) with mean age of 51.8 years (range 28-83), mean BMI of 21.1 (range 17.2-27.2), ASA score I in 2, II in 11, III in 1. We performed 2 left, 2 right and 4 bilateral thoracoscopic splanchnicectomies, 4 laparoscopic gastrojejunostomies and 2 combined endoscopic procedures (bilateral thoracoscopic splanchnicectomy and laparoscopic gastrojejunostomy). The overall average operation ("skin to skin") time was 86 minutes (range 75-100) for bilateral thoracoscopic splanchnicectomies, 63 minutes (range 60-65) for unilateral splanchnicectomies, 88 minutes (range 65-115) for laparoscopic gastrojejunostomies and 190 minutes (range 180-200) for the combined procedure. Blood loss was insignificant with a median of 50 ml (range 30-150). The conversion's rate to open surgery was 4.5%. There were no intraoperative complications. The overall average postoperative mobilization was in 1.9 days (range 1-4) and the overall median postoperative hospital stay was 7 days (range 2-24). There was no mortality at 30 days after endoscopic procedures and the morbidity rate was 21.4%. The postoperative analgesic requirement was considerably reduced with a successful rate was 83.3%. The resolution of gastric outlet obstruction has been complete in all laparoscopic gastrojejunostomies.

Conclusions: Our results show the feasibility and safety of these minimally invasive approaches such as endoscopic palliative treatment of complications of advanced pancreatic cancer.

Key words: complications, gastrojejunostomy, minimally invasive surgery, laparoscopy, pain, pancreatic cancer, splanchnicectomy, thoracoscopy

Introduction

The incidence of pancreatic cancer has increased during the past 50 years. The diagnosis is usually made late when curative resections are precluded, and palliation remains to treat the complications of this aggressive cancer. Pain is the most frequent and distressing feature of this malignancy. It is present in 60% to 80% of patients with cancer of the body or tail of the pancreas [1]. A gastric outlet obstruction can occur in about 20% of patients at a later stage of disease. Approximately 30% of these patients will present with nausea and vomiting [2, 3, 4]. Recently, the increasing development of minimally invasive procedures has caused a resurgence of interest to treat these complications of an advanced cancer with a very poor prognosis. In this study, we present our experience with thoracoscopic splanchnicectomy and laparoscopic gastrojejunostomy and, reviewing recent literature, we discuss the feasibility and safety of these minimally invasive approaches to treat complications of advanced pancreatic cancer.

Patients and methods

Between November 1993 and September 1998 we performed 16 thoracoscopic splanchnicectomies and 6 laparoscopic gastrojejunostomies as palliative treatment of advanced pancreatic cancer. All the records of these patients admitted to the Department of Surgery of the University Hospital Rotterdam - Dijkzigt were reviewed. Advanced pancreatic cancer was defined as locally non resectable tumors, distant metastases, or both. The definitive diagnosis of pancreatic cancer was confirmed after pancreatic biopsy, biopsy of a metastatic lesion with evidence of a primary lesion in the head of the pancreas or patients with no histologically proved cancer but with obvious signs of this disease in the head of the pancreas, determined by suggestive radiological imaging technique and a supportive clinical course. These patients either did not achieve adequate pain control from narcotic agents or other conventional drugs or presented serious problem of gastric outlet obstruction, or both.

Thoracoscopic splanchnicectomy

General anaesthesia was established with single-lumen endotracheal intubation with high-frequency ventilation. The patient was placed in lateral decubitus. A pneumothorax was induced with gentle insufflation of carbonic dioxide (CO2) at 8-10 mmHg through a 2 or 5 mm trocar placed in the sixth
or seventh intercostal space and an zero degree thoracoscope was introduced. Thoracoscopic splanchnicectomy was performed through flank approach introducing a second trocar of 2 or 5 mm of size in the seventh or eighth intercostal space, through whom electrocautery forceps or scissors were introduced. In most patients the major splanchnic roots could be easily visualized through the parietal pleura before opening it. Electrocautery was performed from the fifth to eleventh thoracic vertebrae cauterizing and destroying visible nervous branches in a transverse fashion. After thoracoscopic splanchnicectomy the two trocars were withdrawn and a small size chest drain was left in place. In bilateral thoracoscopic splanchnicectomy the operation was performed on one side and when it was completed, the patient was repositioned, prepped and placed with the other side up.

**Laparoscopic gastrojejunostomy**

General anaesthesia was established with the patient placed in supine position. A pneumoperitoneum was induced with gentle insufflation of CO2 at 12-14 mmHg through a trocar of 10 mm of size placed supraumblically and a zero degrees laparoscope was introduced. After laparoscopic exploration of the abdominal cavity three other trocars, two of 5 and one of 12 mm of size, were introduced in subxiphoid, left and right hypochondrium respectively. After identification of Treitz's ligament, the first jejunum loop was endoscopically stitched in antecolic position to the anterior gastric wall. A laparoscopic anisoperistaltic side to side gastrojejunostomy was performed using a mechanical endoscopic stapler (Endo-GIA 60®, Autosuture, USSC, Norwalk, Connecticut, USA) introduced through two tomes endoscopically performed in stomach and in jejunum respectively. The remaining gap in stomach and jejunum were closed either by endoscopic suture or by mechanical endoscopic stapler (Endo-GIA 600®, Autosuture, USSC, Norwalk, Connecticut, USA).

**Results**

Among fourteen patients admitted to the Department of Surgery of University Hospital Rotterdam - Dijkzigt for advanced pancreatic cancer, there were 9 men and 5 women with a mean age of 51.8 years (range 29-83), mean body mass index (BMI) of 21.1 (range 17.2-27.2), American Society of Anaesthesiologists (ASA) score I in 2, II in 11, III in 1. In ten of these patients narcotic agents or other conventional drugs were unsuccessful in achieving adequate pain control. Six patients presented with serious problems of gastric outlet obstruction. We performed 6 bilateral thoracoscopic splanchicectomies, 4 laparoscopic gastrojejunostomies and 2 combined endoscopic procedures (bilateral thoracoscopic splanchicectomy and laparoscopic gastrojejunostomy). The overall average operation (“skin to skin”) time was 86 minutes (range 75-100) for bilateral thoracoscopic splanchicectomies, 88 minutes (range 65-115) for laparoscopic gastrojejunostomies and 190 minutes (range 180-200) for the combined endoscopic procedure. Blood loss was insignificant with a median of 50 ml (range 30-150). There were no intraoperative complications. None of the thoracoscopic procedures were converted. Two laparoscopic gastrojejunostomies were converted (33%). In these patients, the mesentery of the small bowel was shortened due to invasion of the pancreatic cancer in the mesenteric root. Therefore, the jejunum could not be mobilized to establish a tensionfree antecolic gastrojejunostomy. At laparotomy, the jejunum was pulled up posteriorly to the transverse colon and anastomosized to the posterior gastric wall. The overall average mobilization was in 1.9 postoperative days (range 1-4): in 1.25 postoperative days (range 1-3) for thoracoscopic splanchicectomy and in 3 postoperative days (range 2-4) for laparoscopic gastrojejunostomy. The overall median postoperative hospital stay was 7 days (range 2-24): 4 postoperative days (range 2-12) for thoracoscopic splanchicectomy and 8 postoperative days (range 7-24) for laparoscopic gastrojejunostomy. There was no mortality at 30 days after the endoscopic procedures and the morbidity rate was 21.4% (3 of 14 patients): one case of postoperative pneumothorax which required placement of another chest drain on the third postoperative day after thoracoscopic splanchicectomy, one episode of cholangitis after thoracoscopic splanchicectomy due to obstruction of endoprotetic drainage (PTC) and one gastric paralysis which resolved three weeks after gastrojejunostomy. At median follow-up of 4 months (1-12 months), 7 of 8 patients had considerable reduction of pain. The resolution of gastric outlet obstruction has been complete in all laparoscopic gastrojejunostomies.

**Discussion**

Pancreatic cancer is the fourth cause of death for malignancy in the United States [5]. The diagnosis is usually made late when curative resections are precluded. Among the pancreatic cancer patients undergoing operation the overall resectability rate is about 10% to 20% and an exploratory laparotomy is performed in 20% of cases [1, 3, 6]. Pain control is of prominent importance for palliation when narcotic agents and other conventional medical therapies are unsuccessful in achieving adequate pain control. Anatomic interruption of the afferent pathways from the pancreas to the central nervous system may be considered [7]. Transcutaneous blocks of the celiac plexus probably represent the most common minimally invasive method for pancreatic “denervation” [7]. Various approaches are possible with a success rates of 60% to 80% [8]. The complication rate of these transcutaneous procedures is quite high such as hypotension, pain, impotence, diarrhea, hematuria, pneumothorax, paraplegia, kidney punctures, urinoma and aortic pseudoaneurysm [9]. Furthermore at present a complete anatomic interruption of sympathetic nervous fibers is suitable with improved minimally invasive thoracoscopic technique. In fact many authors have reported advantages of this thoracoscopic splanchicectomy, including shorter operative time, shorter postoperative
hospital stay, reduced morbidity and an uncomplicated postoperative course, than those reported by conventional thoracotomic approaches [7, 10, 11]. Our results confirm these reports and we agree with Cameron that this thoracoscopic minimally invasive procedure has to remain confined to specialist centres in order to avoid major complications [12]. Furthermore our series shows that the thoracoscopic splanchnicectomy with single-lumen endotracheal intubation and high-frequency ventilation is a safe and effective minimally invasive technique for access to the thoracic cavity such as we reported in other study [13]. A gastric outlet obstruction can occur in an average of 20% of patients at a later stage of their pancreatic cancer and approximately 30% of patients will present with nausea and vomiting [2, 3, 4]. There has been considerable debate as to whether prophylactic gastrojejunostomy should be performed routinely in all patients with pancreatic cancer [4]. Some authors have reported serious morbidity an gastric emphysema problems after gastrojejunostomy[4, 14]. However others authors argue convincingly for the routine use of prophylactic gastrojejunostomy excluding only the patients with ascites and peritoneal implant of malignancy because they have a very limited life expectancy and high postoperative mortality [15]. Although most surgeons favour resection for cure whenever feasible thinking to provide the best possible palliation [4, 16], the correct palliative treatment remains uncertain and prophylactic gastrojejunosotomy remains a controversial issue in the management of unresectable advanced pancreatic cancer [14]. A gastrojejunostomy performed for symptomatic reasons should be considered carefully because the success rate is low and it is accompanied by a considerable incidence of morbidity and mortality [14]. Recently, the increasing development of minimally invasive procedures has caused a resurgence of interest to perform a endoscopic gastrojejunostomy in patients with an advanced pancreatic cancer with a very poor prognosis [17]. Experimental and clinical series have well shown the feasibility and safety of laparoscopic gastrojejunosotomy [17, 18].

References