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Case Report

Laparoscopic Double Bypass in Unresectable Pancreatic Cancer

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Abstract

Background: More than two thirds of patients with pancreatic cancers have evidence of obstructive jaundice on their first presentation to hospitals and outpatient clinics. Besides, 1 in 5 patients with pancreatic cancers will develop gastric outlet obstructions during the course of their disease. In patients not fit for curative resections of their tumours, bypass procedures have been developed to overcome these distressing symptoms. There have been a lot of studies describing bypass procedures for the treatment of these symptoms. On the other hand, many specialists prefer nonsurgical procedures when treating these patients. There is not much information in the literature describing minimally invasive laparoscopic bypass procedures.

Case Report: In this paper, I present a successful case of laparoscopic double bypass procedure for the symptomatic treatment of obstructive jaundice and gastric outlet obstruction in a 68 year old male patient who presented with obstructive pancreatic tumour. The patient had no postoperative complications or any recurrence of his obstructive symptoms.

Conclusion: Laparoscopic Double Bypass is a doable procedure that improves quality of life and might improve survival in obstructive unresectable pancreatic cancers.

Keywords: *Laparoscopic Double Bypass; Pancreatic Cancer; Jaundice; Gastric Outlet Obstruction, Minimally Invasive*

Introduction

Patients with obstructive pancreatic tumors usually suffer from significant distress due to inability to tolerate oral intake and also due to severe jaundice. Obstructive symptoms like biliary obstruction and gastric outlet obstruction (GOO) are common complications in patients suffering from advanced pancreatic cancers. About 70% of patients with pancreatic cancer have evidence of obstructive jaundice at the time of their first presentation to the hospitals. On the other hand, around 15 - 20% of patients with pancreatic cancer develop some degree of Gastric outlet obstruction [1].

Therapeutic options for the treatment of both gastric outlet obstruction and biliary obstruction include surgical bypass and endoscopic stenting procedures. There is not much information or evidence in the literature regarding laparoscopic double bypass surgery for pancreatic cancer patients presenting with double blockage.

In this paper, I present a 68 year old male who presented as an emergency with history of severe jaundice and symptoms of gastric outlet obstruction. Simultaneous laparoscopic gastric and biliary bypass procedures were successfully done. The patient was discharged from the hospital 6 days post operatively tolerating oral fluids and soft diet. The Jaundice had improved significantly post operatively. The patient was followed in the clinic and then by outpatient palliative team. His vomiting and jaundice didn't recur post operatively.

Case Report

A 68 year old male presented to our emergency department with long standing history of worsening jaundice and severe symptoms of gastric outlet obstruction. The patient failed to tolerate any solid diet for around two months prior to this admission. He was continuously, vomiting and losing weight. He presented to different emergency rooms on multiple occasions with severe dehydration and cachexia. He had been reviewed and assessed by multiple general surgeons and gastroenterologists but had never been correctly diagnosed or properly managed. He was investigated with an MRCP and a Gastroscopy. Both of these recent tests, done in other medical centres, failed to pinpoint the real pathology that the patient was suffering from. In those hospitals, he was diagnosed with severe benign gastritis and pancreatitis. Pancreatic tumour was never picked up before he presented to our hospital.

When the patient presented to our emergency department, he was suffering from severe dehydration, weakness, constipation, vomiting, abdominal pain and marked jaundice. I accepted to admit the patient under my care.

Blood tests showed total bilirubin 106 umol/L (6.21 mg/dL) and direct bilirubin was 99.1 umol//L. His Haemoglobin was 114g/L and the White Blood Cell Count (WBC) was normal. His liver function tests were elevated. The CA 19.9 was 113.8 U/L and Carcinoembryonic antigen (CEA) was 2.2 ug/L.

Resuscitation with IV fluids was done and a nasogastric tube was inserted. An emergency CT scan of the abdomen and pelvis was urgently requested. It showed a dilated stomach with evidence of gastric outlet obstruction (Figure 1). There was a large pancreatic tumour which was potentially unresectable (Figure 2). There was evidence of liver metastasis. There was no evidence of any viscous perforation. The diagnosis of metastatic and potentially unresectable pancreatic cancer was given to the family.

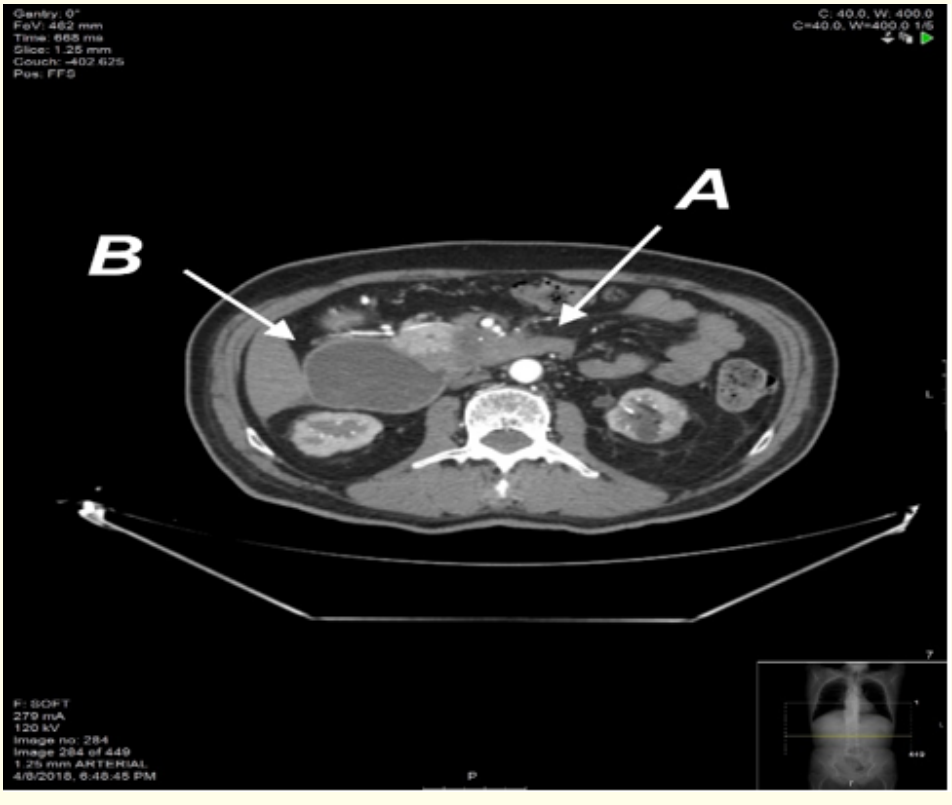

Figure 1: *Emergency pre-operative CT Abdomen and pelvis with oral and IV contrast showing the pancreatic tumour (A) encapsulating superior mesenteric vessels and causing severe dilatation of the first part of the duodenum (B).*

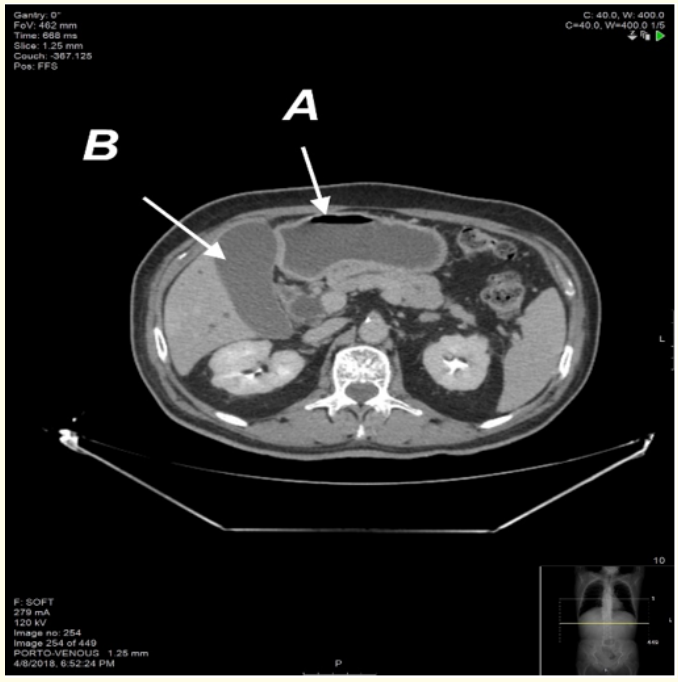

Figure 2: *The emergency CT of the abdomen and pelvis showing severely dilated stomach (A) and dilated gallbladder (B).*

After discussing the results with our radiologist and gastroenterologists, the family was consulted regarding these findings and the treatment options available for this patient. The patient and his family refused attempting curative surgical resection of the pancreatic tumour. They also refused referral to our specialized national cancer center.

On the second day, an emergency gastroscopy was performed. The gastroscope failed to reach the duodenum due to severe dilatation and elongation of the stomach. A colonoscope was then used and it reached the first part of the duodenum. The second part of the duodenum was completely obstructed by an extra luminal mass (Figure 3). A large amount of very old undigested food debris was filling the severely dilated stomach and the first part of the duodenum (Figure 4). Biopsies of the obstructed area were taken. Pathology report failed to show tumour cells, it only shows duodenitis. Total parenteral nutrition (TPN) was started centrally on the following day through central line.

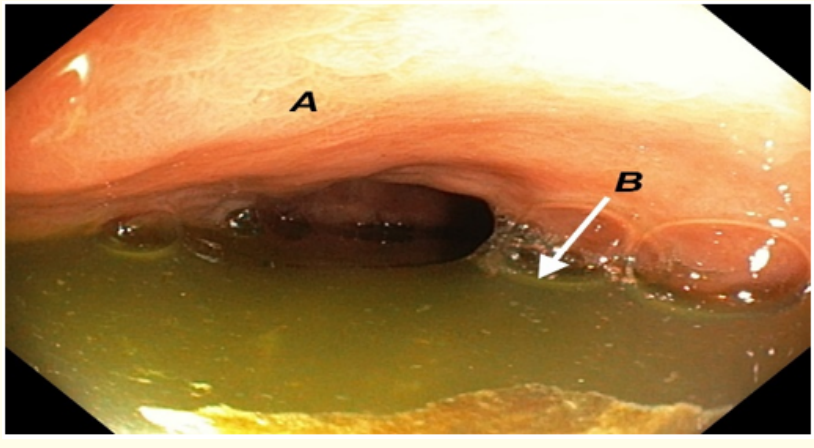

Figure 3: *Emergency gastroscopy showing dilated Stomach (A) containing large amount of stagnant fluid (B).*

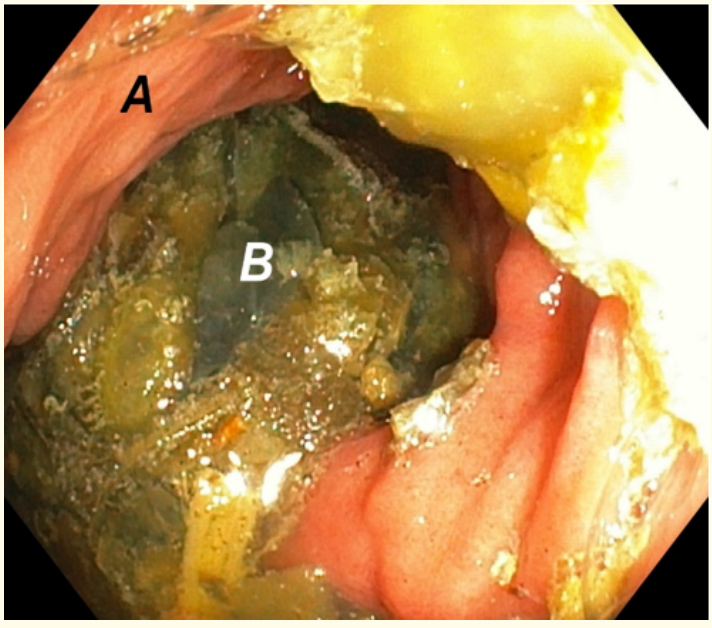

Figure 4: *The dilated pylorus and the first part of the duodenum (A) containing old food debris in (B).*

After 2 days, a second gastroscopy was again attempted using a colonoscope (Figure 5). Balloon dilatation of the second part of the duodenum was done using a 20 mm balloon (an achalasia balloon) (Figure 6). The procedure was quite challenging since the lumen was fully obstructed and the access to D2 was quite difficult. The patient tolerated the procedure quite well. He reported passing flatus and faeces immediately after the procedure. This was his first bowel activity in few weeks. His total bilirubin improved over the following couple of days. His total bilirubin was 73.5 umol/L (4.3 mg/dL) and direct bilirubin was 68.0 umol/L (3.98 mg/dL) but started to increase 2 days post endoscopy.

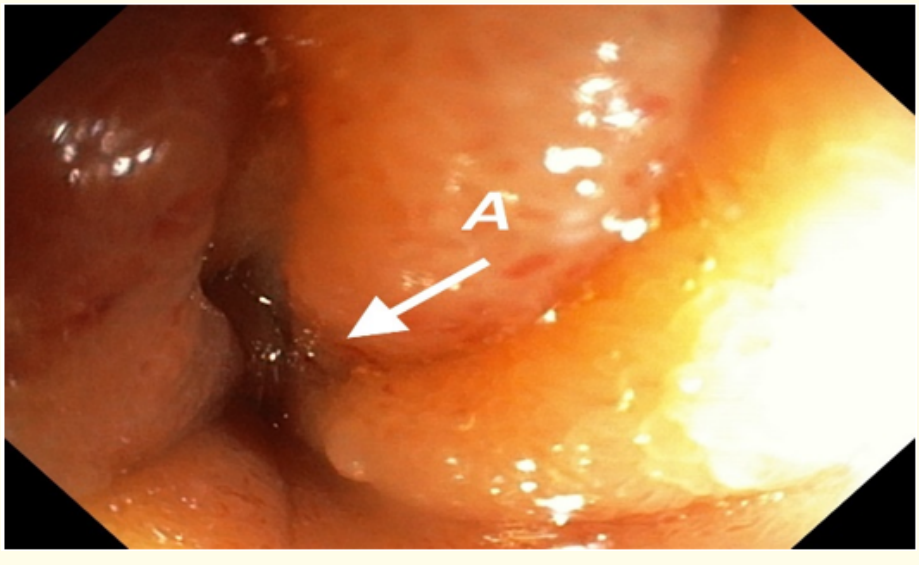

Figure 5: *The second part of the duodenum (A) is obstructed by the tumour causing complete stenosis of D2.*

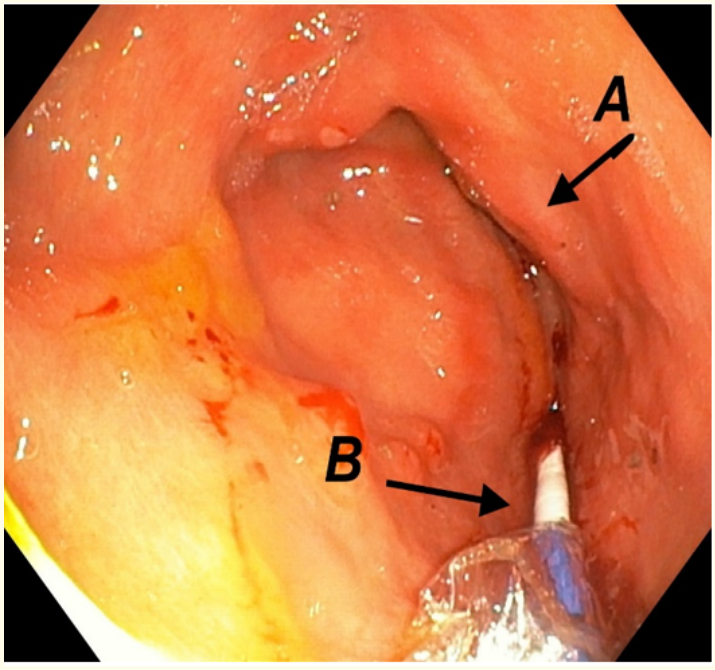

Figure 6: *The first attempted dilatation of the duodenal stenosis (A) using 20 mm pneumatic balloon (B).*

A third gastroscopy with a second dilatation attempt and biopsy were performed again, but the jaundice and gastric outlet obstruction didn't improve after this second dilatation attempt.

The total bilirubin deteriorated to 127.92 umol/L (6.48 mg/dl) and the direct bilirubin was 120.7 (7.1 mg/dl).

The patient and his family were thoroughly counseled and the consenting process was very thorough. They were advised to either insert percutaneous tubes for gastric and biliary drainage or opt for a laparoscopic or open double bypass procedure. They refused attempting curative surgical resection of the tumour (Whipple's procedure) and no consent was obtained for such procedure. They requested us to attempt the surgical bypass, preferably laparoscopic if possible. During the consent process, they were warned of the possibility of enteral and biliary leakage post operatively since the patient was cachectic and malnourished.

The patient was prepared for a diagnostic laparoscopy plus or minus a laparotomy and a double bypass. A standard five port laparoscopy was performed. Ports were inserted in a similar manner to laparoscopic bariatric (gastric) procedures. An extra port was added during the laparoscopic cholecysto-jejunostomy. The laparoscopy showed an enlarged head of the pancreas. No pancreatic resection was attempted as requested by the patient and his family. The liver looked quite cirrhotic. There was no evidence of intraperitoneal metastases.

A Laparoscopic double bypass was successfully performed as follows. The greater curvature of the stomach was mobilized using laparoscopic vessel sealer and divider (LigaSure™). Both of the anastomoses were performed using laparoscopic Endo GIA™ (60 mm, Ethicon) and reinforced with laparoscopic suturing. The posterior gastric wall was used to anastomose the stomach to the jejunum a side to side gastro jejunostomy (Duodenal Bypass) (Figure 7 and 8). A side to side Cholecysto-jejunostomy (Biliary Bypass) (Figures 9 and 10). The enterotomies were closed using Ethibond Endosuture and 3.0 Vicryl. The double bypass procedure was made of a single jejunal loop which was proximally anastomosed to the stomach and distally anastomosed to the dilated and thickened gallbladder without any resections of the jejunum. The gallbladder was enlarged with a thick wall which made the procedure easier. The jejunal loop was a simple C shaped loop and not a roux en Y to simplify the procedure and to minimize postoperative complications (Figures 10 and 11).

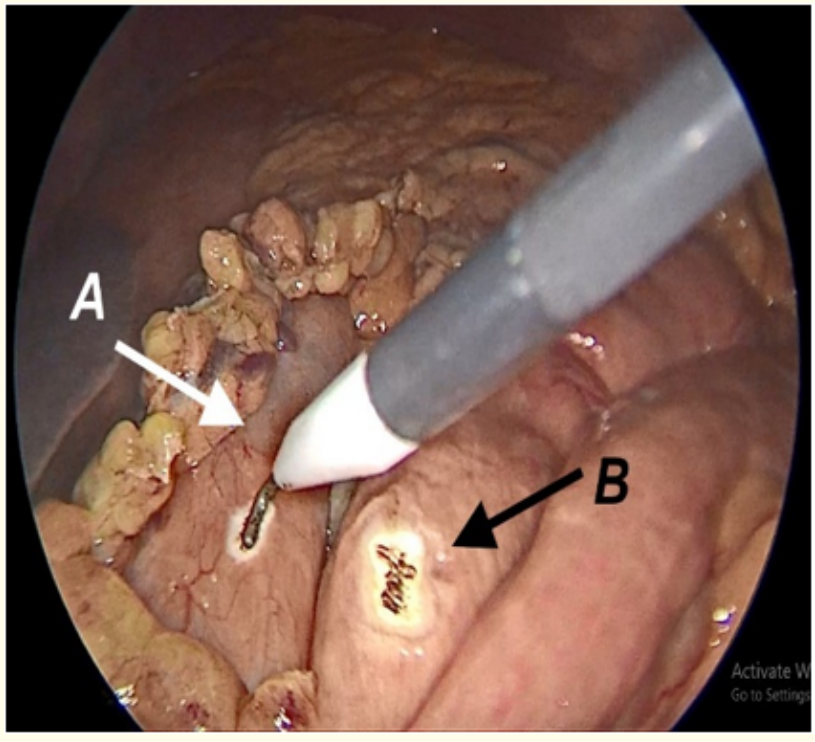

Figure 7: *This is the laparoscopic double bypass procedure. In this step, a posterior gastrotomy (A) and an enterotomy (B) in the proximal jejunum were made in preparation for the Gastrojejunosptomy.*

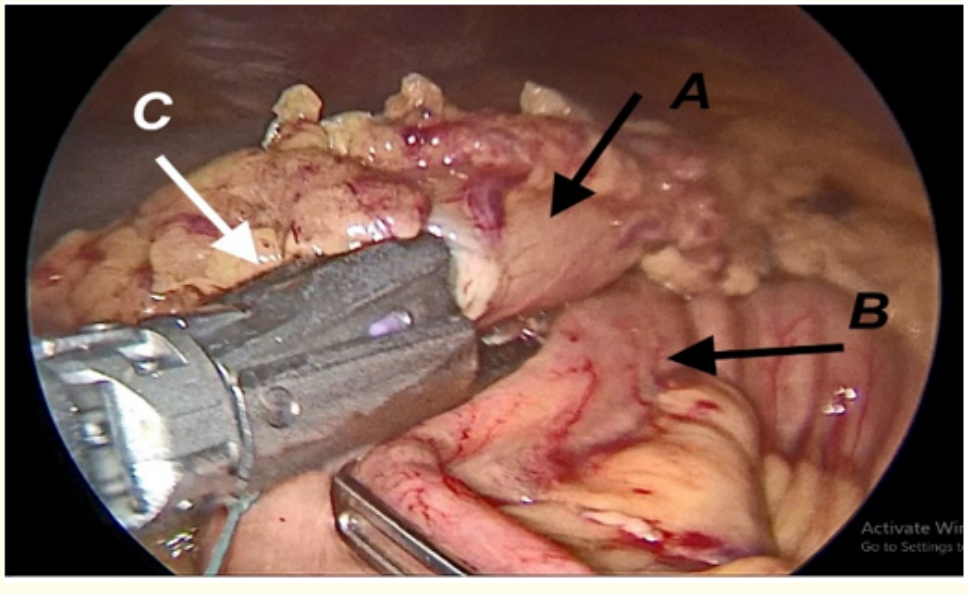

Figure 8: *Performing the posterior Gastro Jejunostomy using Endo GIA 60 mm. The figure is showing the posterior wall of the stomach (A), the proximal jejunal loop (B) and the Endo GIA (C).*

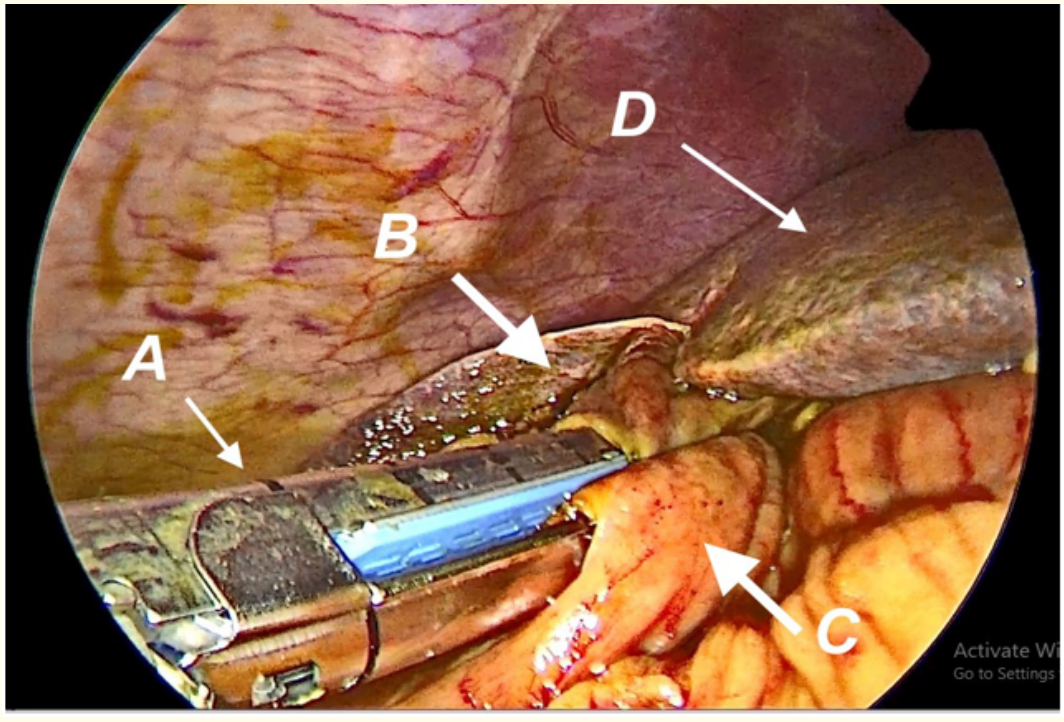

Figure 9: *Performing the Cholecysto-jejunostomy. The figure shows the Endo GIA (A), the gallbladder (B), the proximal jejunal loop (B) and the cirrhotic liver (D).*

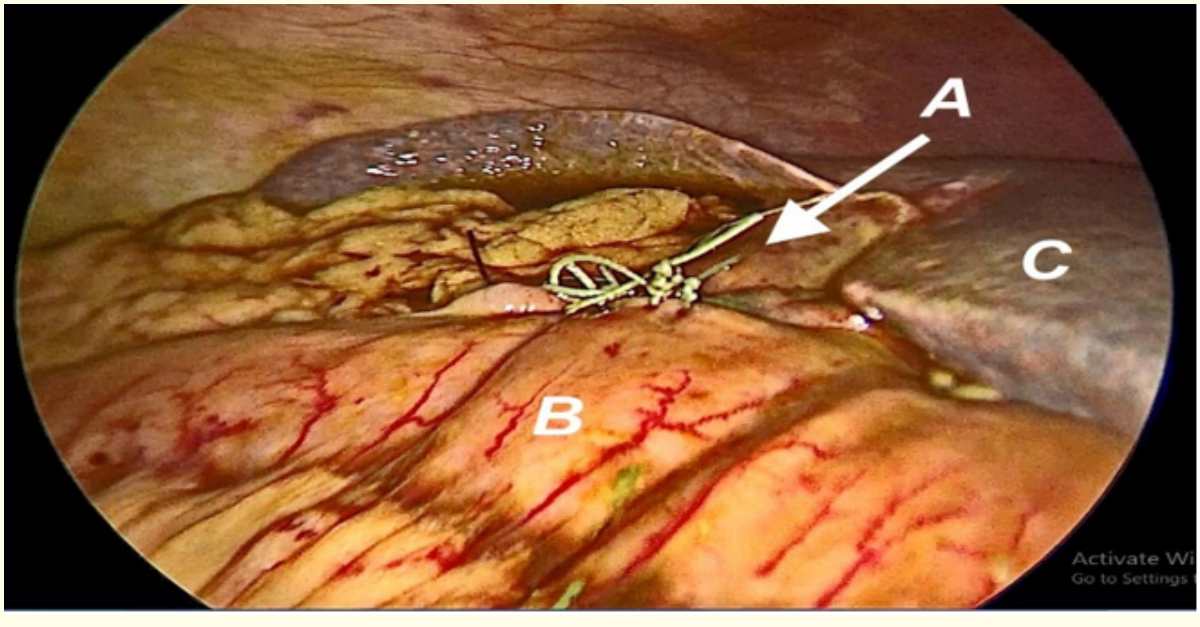

Figure 10: *The cholecysto-jejunostomy after it was fully made: This figure shows the Gallbladder (A), the jejunum (B) and the liver (C).*

A 16 French drain was inserted and the patient was started on clear fluids on the following day. He recovered quite quickly after the surgery.

He didn't have any anastomotic leak and the drain was removed 5 days post op. His inpatient postoperative total bilirubin dropped to 41.04 umol/L (2.4mg/dl) and direct Bilirubin dropped to 38.27 umol (2.2 mg/dl). The jaundice resolved and he was discharged home 5 days post op.

The biliary obstruction never recurred postoperatively.

The patient was followed in the outpatient clinic every 2 weeks. A repeat staging CT scan of the abdomen and pelvis with IV contrast was repeated 6 weeks post operatively. The two anastomoses looked patent but the duodenum was still dilated (Figure 11). The pancreatic mass located in the uncinate process became larger and was invading the duodenum (Figure 12). The tumour was encapsulating the superior mesenteric vessels and the superior mesenteric vein was narrowed. The liver metastases in segments VI and VIII looked larger on this scan and more metastatic lesions were seen in these two segments. The CBD diameter was 10 mm which was smaller than on the previous scan.

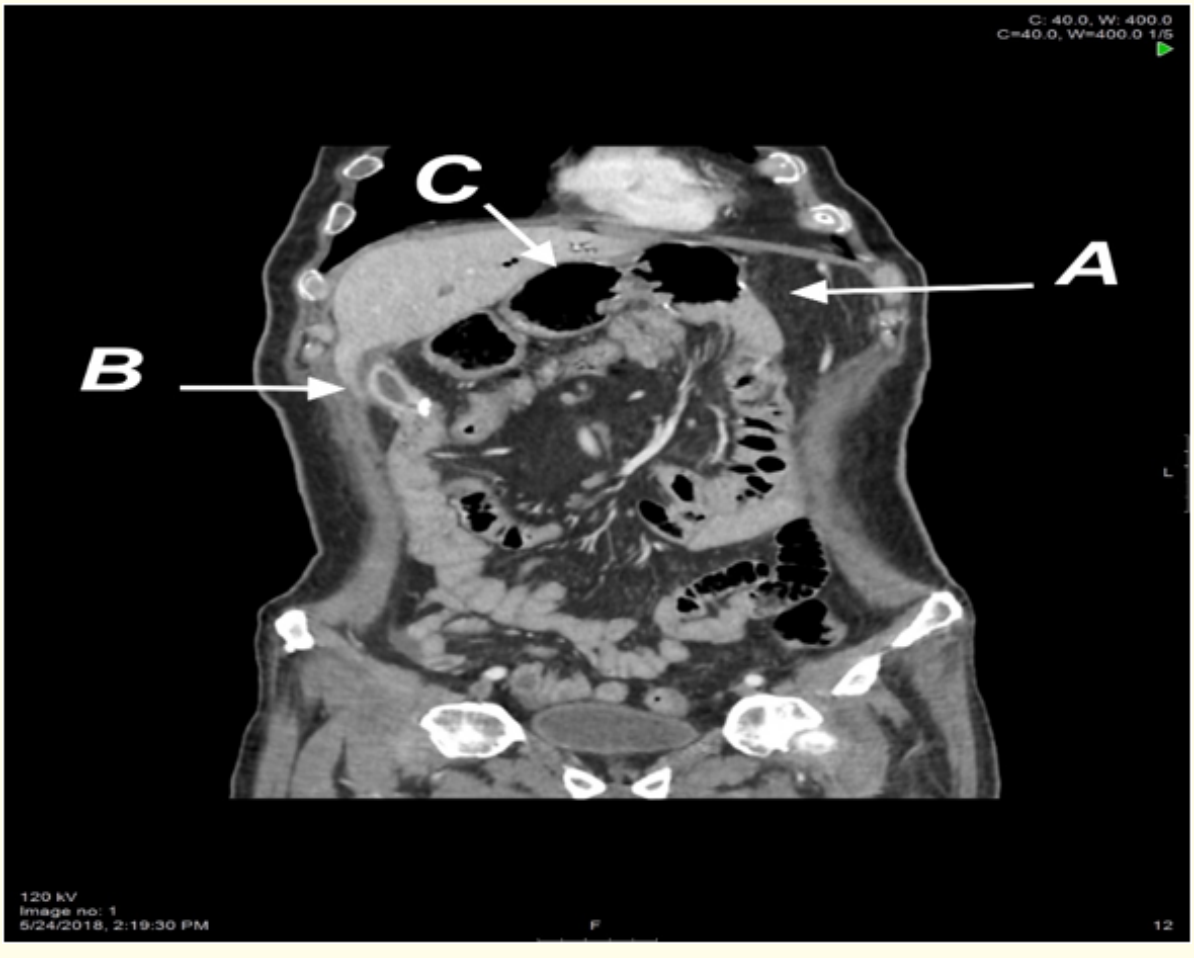

Figure 11: *Routine CT abdomen and pelvis seven weeks post operatively. This Coronal view shows the proximal gastrojejunal anastomosis (A), the distal cholecysto-jejunal anastomosis (B) and the dilated first part of the duodenum (C).*

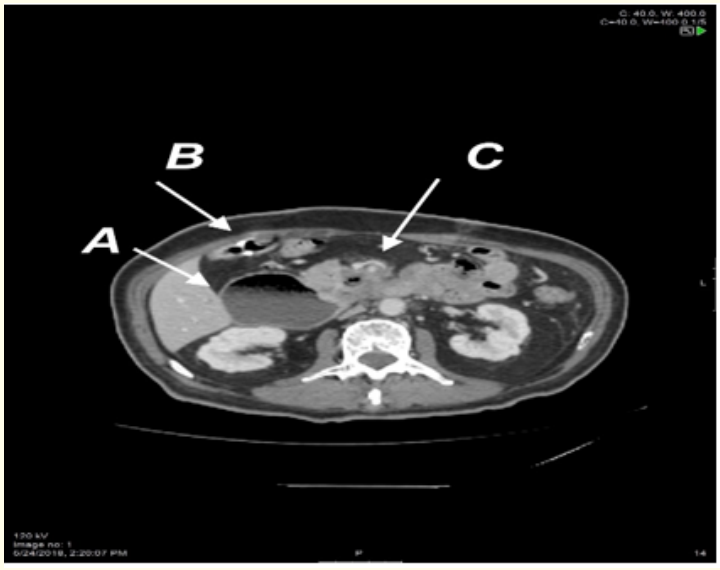

Figure 12: *The same routine CT Abdomen and pelvis seven weeks post-operatively. This axial plane shows, the dilated first part of the duodenum (A), the cholecysto-jejunal anastomosis (B) anteriorly, and the enlarging pancreatic mass (C).*

Another repeat outpatient liver function tests were done two and a half months post operatively and showed his total bilirubin to be 7.7 umol/L (0.45 mg/dL) and his direct bilirubin to be 4.93 umol/L (0.288 mg/dL).

The patient was never readmitted to the hospital post operatively. He presented once to the emergency department seven weeks post operatively with acute fatigue and dizziness. On examination the patient was found to be drowsy. He was discovered to be severely hypoglycaemic. He was discharged home after being treated with IV dextrose in the emergency room.

His abdominal pain was slowly worsening over the following few months. It was treated with paracetamol, tramadol and Lyrica.

The patient was regularly reviewed in the clinic for 4 months post op. He was doing quite well. He was satisfied with the outcomes of the procedure and the resolution of the severe vomiting. He felt much better after he was able to tolerate oral intake and after the jaundice had resolved. He was discharged from the clinic and remained under the care of home palliative Team.

Discussion

Biliary obstruction is much more common than gastric outlet obstruction in patients suffering from ampullary and pancreatic cancer patients. Biliary obstruction is estimated to occur in 65 - 75% of patients, with resulting pruritus, diarrhoea, cholangitis and potential hepatic failure [2].

About 80% of pancreatic carcinomas are located in the head of the pancreas, and most (75%) are adenocarcinomas [3].

Gastric outlet obstruction, which occurs in 15 to 20% of pancreatic cancer patients, typically presents with nausea and nonbilious vomiting, but signs of anorexia, malnutrition, dehydration, and epigastric fullness may present earlier. Gastric outlet obstruction (GOO) can also cause significant morbidity including severe weight loss, malnutrition, dehydration, and electrolyte abnormalities [4].

Computed tomography has a sensitivity and specificity of more than 85% in detecting resectability of pancreatic cancer. Staging laparoscopy can improve this figure by further 8 - 17% in patients with metastatic disease not detecting on CT scans. This has made laparoscopy as a standard approach in these patients to avoid unnecessary laparotomies [5].

Therapeutic options for the treatment of both gastric outlet obstruction and biliary obstruction include surgical bypass and endoscopic stenting procedures. Depending on the availability, stenting can be done either endoscopically, like endoscopic retrograde cholangiopancreatography (ERCP), or radiologically like percutaneous transhepatic cholangiography placement of stents. Surgical bypass can be done in the form of hepaticojejunostomy or cholcystojejunostomy [6].

There is still disagreement as to whether endoscopic or surgical palliation is associated with a better outcome, and there have been a number of retrospective studies which have shown the superiority of one treatment or the other (i.e. endoscopic vs. surgical treatment [7].

Some reports have suggested that local extension of periampullary malignancies may result in duodenal obstruction in 20 - 40% of cases [8,9].

A comprehensive retrospective study from the Memorial Sloan-Kettering Cancer Center, New York, analyzed a 10-year cohort of patients. The study included 157 patients who underwent non-therapeutic laparotomy. Diagnostic laparoscopy was performed in 109 patients (69%) prior to non-therapeutic laparotomy. Laparotomy alone was performed in 21% of patients; duodenal bypass, biliary bypass and double bypass were performed in 11%, 30% and 38% of patients, respectively. This means that 60 patients underwent double bypass procedures. Only 10% of the double bypass patients (16%) had preoperative nausea or vomiting. About 15% of this group had postoperative complications which was the highest among the different cohorts of patients. Postoperatively, 8% of patients who did not undergo duodenal bypass at the initial operation, underwent duodenal bypass for GOO. Non-surgical therapy (chemotherapy or radiation therapy) was given to 114 (73%) patients following surgery. Median overall survival (OS) in all patients was 11 months [interquartile range (IQR): 5 - 21 months]. This did not differ significantly amongst surgical groups. Finally, fewer patients needed interventions for GOO following a gastrojejunostomy: 1% of duodenal and double bypass patients, and 29% of laparotomy and biliary bypass patients required such an intervention. The authors concluded that patients rarely require interventions for GOO following gastrojejunostomy, and rarely require procedures for malignant biliary obstruction following surgical biliary drainage. It could be concluded that the best surgical procedure to perform at operation would be a double bypass and this is now commonly recommended ($P < 0.001$) [10].

Furthermore, there have only been four randomized trials comparing the outcomes of endoscopic stent placement vs. surgical biliary bypass in a palliative setting. Endoscopic intervention in the form of biliary and duodenal stenting has become another standard of care for most patients presenting with obstructive jaundice and gastric outlet obstruction, respectively. Performing surgical interventions to solve the double obstruction has been traditionally offered to patients with prolonged life expectancy. For patients with gastric outlet obstruction, duodenal stents seem to be preferable by some authors in patients with a short life expectancy and gastrojejunostomy may be preferable in patients with a more prolonged prognosis [4].

In an analysis done by Schwartz and colleagues in 2000 based on controlled trials, they concluded that the initial success rate in palliation of jaundice is similar after endoscopic stent insertion and biliary bypass operation (range: 90 - 95%). But the morbidity (range: 11 - 36% vs 26 - 40%) and 30 day mortality (range: 8 - 20% vs 15 - 31%) were both higher after bypass operations. On the other hand, stent insertion was accompanied by a higher rate of hospital readmission and re-intervention because of recurrent jaundice (range: 28 - 43%) and a recurrent but later gastric outlet obstruction (up to 17%) [11].

A retrospective study by Scott., *et al.* in 2009 compared morbidity, mortality, hospital stay, readmission rate and survival in consecutive patients with incurable locally advanced pancreatic ductal adenocarcinoma. They concluded that bypass represented an effective way of palliation for patients with locally advanced pancreatic tumours [12].

Ausania' s retrospective analysis of the double bypass procedures in the management of inoperable pancreatic malignancy at laparotomy was published in 2012. His team investigated postoperative complications and long-term outcome. A total of 576 patients were planned to have an operation for pancreatic cancer. Only 57 patients (10%) underwent palliative double bypass surgery. All patients had a pre-operative biliary stent. (Plastic stents were the most common; but four patients had a short metal stent used.) None of their patients had any pre-operative gastric outlet obstruction. Out of the 57 patients who had double bypass surgery, only 50 patients were included in

this study. They underwent a laparotomy for a planned pancreaticoduodenectomy but they had a double bypass procedure for inoperable disease. There were 33 males and 17 females included in the study. The median age of these patients was 64 years. The complication rate was around 50% and the in-hospital mortality rate was about 4%. The group concluded that the postoperative complications following double bypass procedures, have a major impact on long-term survival. They recommended that this type of surgery should therefore only be performed in specialized centers [13].

Most surgeons perform a gastrojejunostomy only in cases of duodenal obstruction, as most patients do not live long enough to develop gastric outlet obstruction, thereby making prophylactic gastroenterostomy unnecessary [14].

Retrospective studies of palliative surgical biliary bypass have reported mortality and morbidity rates of 3 - 16% and 28 - 48% respectively [15]. But the same group concluded that open combined biliary and gastric bypass procedures were quite effective in palliation of jaundice and gastric outlet obstruction for unresectable malignant diseases until death in > 95% of patients in there study. This means that open double bypass procedures are still the first-line therapy in patients identified as having unresectable disease at laparotomy [16].

There have been no randomized controlled studies investigating laparoscopic double bypass procedures in the management of obstructive pancreatic malignancy. This might reflect the severity of the symptoms and the poor general clinical status of these patients in addition to the lack of experience in this complex field. Most of these patients present late with advanced metastatic diseases with very poor health conditions.

Laparoscopic biliary bypass has also been developed as a minimally invasive approach [17]. But there has been no randomised trials to show any superiority when comparing open and laparoscopic biliary bypass surgery [6].

With regard to gastric outlet obstruction, which occurs in 10 - 20% of pancreatic cancer patients [18] laparoscopic gastroenterostomy has been introduced as a minimally invasive approach to surgical bypass and there is some evidence of a quicker recovery rate [19]. Currently, malignancy is responsible for 50 - 80% of Gastric outlet obstruction cases.

In a retrospective review of 26 laparoscopic biliary bypasses performed in as single center which included 23 laparoscopic choledochoduodenostomy (LCD), 2 laparoscopic roux-en-Y choledochojejunostomy (LCJ) and 1 laparoscopic cholecystojejunostomy (LCCJ). The authors concluded that major complications occurred in 6 patients (23%), which included 3 bile leaks (11.5%), 1 intraabdominal collection (3.8%), 1 wound infection (3.8%) and 1 gastric stasis (3.8%). There was one mortality out of the 26 patients involved in this study [20].

Conclusion

There have been no randomized controlled studies investigating laparoscopic double bypass procedures in the management of obstructive pancreatic malignancy. This might reflect the severity of the symptoms and the poor general clinical status of these patients in addition to the lack of experience in this complex field. Most of these patients present late with advanced metastatic diseases with very poor health conditions.

Laparoscopic Double Bypass is a doable procedure in that improves quality of life and might improve survival in obstructive unresectable pancreatic cancers. In our case, endoscopic palliation was not very successful and the laparoscopic surgical intervention was quite effective in achieving our goals for both duodenal and biliary obstructions.

Implementing the best care plan options for biliary and gastric outlet obstruction from pancreatic cancers necessitates a multidisciplinary approach for palliation with input from radiologists, gastroenterologists, gastrointestinal surgeons, oncologists, dieticians and palliative care teams.

Finally, more studies are needed to investigate the feasibility and clinical outcomes of laparoscopic double bypass procedures in obstructive pancreatic cancer patients.

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