



Case Report

Robotic Enbloc Pancreaticoduodenectomy with Right Hemicolectomy and Non-Anatomical Segment VI Liver Resection for Malignant Colo Duodenal Fistula

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Abstract

Malignant Colo-duodenal fistula is a very rare entity in locally advanced colon cancer. Duodenal involvement close to ampulla requires combined pancreaticoduodenectomy (Whipple's procedure) with right hemicolectomy. R0 resection improves long-term survival in these patients. Minimally invasive approach helps in early postop recovery and return to adjuvant chemotherapy. We are reporting the first case of robotic en-bloc pancreatoduodenectomy with right hemicolectomy and non-anatomical liver resection for a case of malignant coloduodenal fistula from a locally advanced hepatic flexure adenocarcinoma. 70-year-old male admitted with vomiting, abdominal pain and weight loss of 2 months duration. CT and MRI abdomen and pelvis revealed hepatic flexure growth with colo duodenal fistula and endoscopy biopsy confirmed as mucinous adenocarcinoma. Whole-body PETCT showed uptake in the primary tumour without any distant metastases. Due to high risk of sepsis in neoadjuvant chemotherapy, MDT recommended surgery. After preoperative nutritional optimization with TPN, patient underwent combined pancreaticoduodenectomy with right hemicolectomy and non-anatomical segment 6 liver resection followed by reconstruction using Da Vinci Xi system. We used 4x8mm robotic ports and 2x12mm assistant ports. The specimen was taken out through umbilical port extension. The console and total operative time were 330 and 360 minutes. The patient had minimal blood loss without any intra-op blood transfusion. Patient was discharged on day 11. The postoperative histopathology reported as moderately differentiated mucinous adenocarcinoma (pT4bN1aMXPNi0V0R0) and he was started on oral capecitabine. The multi-visceral resections can be performed safely using robotic approach in experienced centres.

Keywords: Malignant Colo- duodenal fistula; Pancreatoduonectomy with right colectomy; Robotic Whipple with right hemicolectomy

Introduction

Malignant Colo-duodenal fistula is a very rare entity in locally advanced colon cancer. Upfront systemic chemotherapy is challenging due to a significantly increased risk of sepsis from fistula. Surgical resection remains the best treatment option although it involves two major operations. Duodenal involvement close to ampulla requires combined pancreaticoduodenectomy (Whipple's procedure) with right hemicolectomy. R0 resection improves long-term survival in these patients. Minimally invasive approach helps in early postop recovery and return to adjuvant chemotherapy. A few cases of laparoscopic en-bloc PD with right hemicolectomy have been reported in the literature but none robotically due to the complexity of two combined major procedures. We are reporting the first case of robotic en-bloc pancreaticoduodenectomy with right hemicolectomy and non-anatomical liver resection for a case of malignant Colo duodenal fistula from a locally advanced hepatic flexure mucinous adenocarcinoma.

Case Report

70-year-old male known diabetic patient admitted to his local hospital with vomiting, abdominal pain and weight loss of 5 kg in 2 months duration. He had positive faecal occult blood test and colonoscopy showed hepatic flexure growth with infiltration to second part of duodenum. Histopathology reported as adenocarcinoma with mismatch repair proficient. Upper GI endoscopy confirmed the colo-duodenal fistula. CT and MRI abdomen and pelvis showed growth arising from the hepatic flexure of colon, extending medially, frankly invading into the second part of duodenum close to the ampulla and abutting the segment VI of liver without infiltration (Figures 1,2). PET/CT showed no evidence of distant spread apart from a PET avid primary tumour (SUV max 13). Upfront chemotherapy was deferred due to high risk of perforation and sepsis in the presence of colo-duodenal fistula. The following options were discussed in the multidisciplinary meeting: combined Whipple with right hemicolectomy after nutritional optimization, small casse followed by chemotherapy and best supportive care. Detailed discussion with the patient about the various options and the risks, benefits of each option were also explained. After detailed discussion, MDT recommended upfront surgery in the form of combined pancreaticoduodenectomy with right hemicolectomy. Due to the vast experience in fast track and robotic HPB surgery, of our senior surgeon (LRJ) we decided to proceed for robotic en-bloc pancreaticoduodenectomy with right hemicolectomy for him after a period of nutritional optimization. Patient was admitted 7 days prior to surgery and nutritional

optimization was done with total parenteral nutrition in addition his oral intake of liquid and semisolids as per the hospital dietician. Bowel preparation was given with senna and citramag along with clear fluids only for 24 hours prior to surgery.

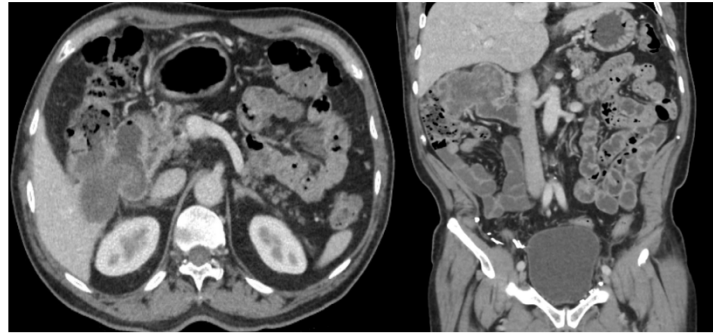


Figure 1: Contrast enhanced axial and coronal CT images in portal venous phase showing tumour arising from hepatic flexure and fistulising to second part of deodenum.

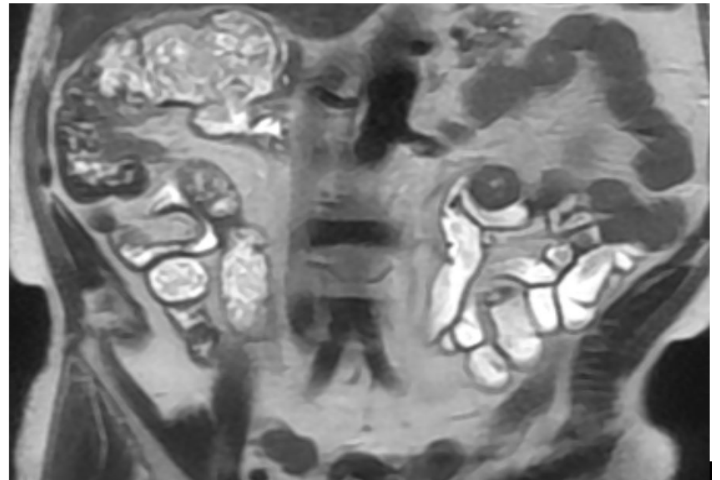


Figure 2: T2 weighted MRI coronal acquisition, the tumour demonstrates high signal consistent with mucinous pathology

After induction of anaesthesia, 12mm sub-umbilical port was made followed by diagnostic laparoscopy to exclude metastases in liver, peritoneum and omentum. Then, four 8mm robotic ports and 12 mm right iliac fossa were made. The umbilical port was used as assistant right hand working port and right iliac fossa port as assistant left hand working port (Figure 3). Standard docking was done. Since, the mass is adherent to segment 6 of liver it is decided to remove portion of liver along with pancreaticoduodenectomy and right hemicolectomy to improve the oncological margin safety. To start with, lymphadenectomy was done around common hepatic and proper hepatic arteries. The cystic, gastroduodenal and right gastric arteries were delineated and divided after applying haem o

Lok. The gallbladder was removed from the liver bed and common hepatic duct identified and prepared for transection just below the confluence of right and left hepatic ducts. Then, gastrocolic omentum was divided with vessel sealer followed by transection of stomach at the level of pylorus using ECHELON FLEX Articulating Endoscopic Linear Cutter 60mm Stapler (Ethicon, USA). Since, the tumour has infiltration into the duodenum, retroperitoneum and segment VI liver, we decided to modify our regular approach for Whipple procedure. We mobilized the duodenojejunal flexure in the infra colic compartment and divided the jejunum 15 cm distal to DJ flexure using ECHELON FLEX 60mm Staple. Then, we mobilized the caecum along with terminal ileum and transected the ileum 15 cm proximal to ileocecal valve using Echelon 60mm stapler. Subsequently, the caecum and ascending colon were mobilized from retroperitoneum caudocranially up to the level of third part of duodenum with the robotic arm 4 lifting the mesentery cranially to expose the posterior part of large and small bowel mesentery. Then, we created the retro pancreatic tunnel at the level of neck of pancreas followed by transection. After giving the adequate margins, the transverse colon was transected by using Echelon 60mm stapler after preserving left branch of middle colic. Right branch of middle colic, right colic and ileocolic arteries were divided using curved tip endo GIA 45mm stapler. Then, we brought out the proximal jejunum to the right side of DJ flexure. The head and uncinate process of pancreas were carefully mobilized off the portal vein and superior mesenteric vein. Dissection was proceeded to the hepatic hilus with en bloc cholecystectomy and transection of common hepatic duct. Finally, segment VI non anatomical liver resection with excision of right Gerota's fascia was carried out to complete the resection of this tumour with en bloc PD, right hemicolectomy, cholecystectomy, Gerota's fascia excision and non-anatomical liver resection of segment VI. The whole specimen was then placed in a 15mm endocatch and extracted through umbilical port by vertical extension. We used robotic vessel sealer (Intuitive, USA) for pancreaticoduodenectomy and hemicolectomy part and robotic harmonic (intuitive, USA) for liver resection part. The whole specimen was taken out in toto through umbilical port extension to 5cm using endocatch. We closed the umbilical port using 0 loop pds and skin with monocryl.

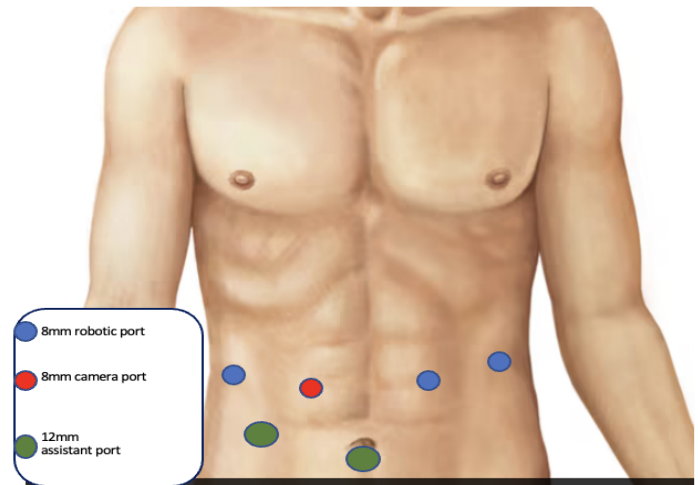


Figure 3: Port Position.

After the resection, the reconstruction was done using 4 robotic ports and one assistant port in the right iliac fossa as per our standard approach [1]. After adequate mobilization of pancreatic remnant, duct to mucosa pancreatojejunostomy was done using 4-0 pds by modified Blumgart technique. Around 15 cm distal to the pancreatic anastomosis, end to side duct to mucosa hepaticojejunostomy was done using 4-0 pds. Then, side to side posterior gastrojejunostomy was done 60 cm distal to biliary anastomosis using endo GIA 45mm stapler and closed the rent using 3-0 Fili bloc. 15 cm distal to gastric anastomosis, side to side jejunojunctionostomy was done using endo GIA 45mm stapler and the enterotomy was closed with 3-0 Fili bloc. After careful orientation of mesentery, side to side ileocolic anastomosis was done to the remnant transverse colon using endo GIA 45 mm stapler and enterotomy was closed with 3-0 Fili bloc. Two 20 French Robinson drains were kept after complete haemostasis. All the ports were closed with 3-0 Monocryl. The total operative time was 360 minutes, and the console time was 330 minutes. There was minimal blood loss and no intra-operative blood transfusion.

Postoperatively patient was started on oral liquids on day 5 and solids on day 9 and discharged home on day 11. He was on

total parenteral nutrition during the postoperative period till day 8. Perioperatively, he lost 7 kg in 4 weeks' time, so he was advised to increase his oral intake. Postoperative histopathology reported as moderately differentiated mucinous adenocarcinoma from colonic origin without perineural or vascular invasion. Resection margins were free from tumour and 1/11 lymph nodes positive for tumour. According to TNM 8th edition it was reported as pT4b, pN1a, pMX, pN10, V0, R0. Currently he has completed 6 cycles of single agent capecitabine based on CTDNA negative, as part of TRACC C randomized controlled trial at the Royal Marsden hospital, London. He has completed 12 months follow up and remains disease free.

Discussion

Duodenal involvement in colonic malignancy is a rare event (less than 0.4% xxx) consisting of simple inflammatory adhesions to fistula formation which poses challenge to surgeons as it may entail major resection in a malnourished patient. Depending on the duodenal involvement they were classified into 3 types: Type 1 involving lateral duodenal wall less than half circumference; Type 2 involving more than half circumference away from papilla; Type 3 involving more than half circumference close to papilla. Along with colonic resection, type 1 is managed with sleeve resection of duodenum, type 2 with segmental resection of duodenum and type 3 with pancreatoduodenectomy. The diagnosis of colo-duodenal fistula is established by endoscopic, radiological evaluation or at surgery. Majority of patients are usually anaemic, moribund and malnourished. Upfront systemic chemotherapy is challenging due to significantly increased risks of sepsis from fistula. Extended multi-visceral resection is an established modality to treat local invasions to achieve R0 resection margin. There are studies which reported open enbloc pancreaticoduodenectomy with right hemicolectomy for colo-duodenal fistulas with good survival outcomes. [2,3] The presence of lymph node involvement, tumour differentiation and adjuvant therapy were factors determining long term survival [4]. Endoscopic treatment with self-expandable metal stent is an option in patients with poor performance status, but the risk stent migration is high when the fistula is not associated with significant stricture [5]. Minimally invasive approach useful in early postop recovery, less postoperative pain and early return to adjuvant chemotherapy. There are few reports of laparoscopic enbloc pancreatoduodenectomy with right hemicolectomy [3,6-9] But, there is no report available in English literature about robotic combined Whipple with right hemicolectomy for malignant colo-duodenal fistula. This is first case of enbloc pancreaticoduodenectomy with right hemicolectomy done by robotic approach using DaVinci Xi approach.

Conclusion

This is the first ever case of robotic combined pancreaticoduodenectomy (Whipple) with right hemicolectomy done for malignant colo-duodenal fistula. This shows that multivisceral resections can be done safely using robotic approach. This minimally invasive approach increases the chance of early postop recovery and early start of adjuvant chemotherapy.

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