

## Perioperative Modification in Cirrhotic Patient Undergoing Pancreatoduodenectomy: A Case Report

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### ABSTRACT

Hepatic cirrhosis can be present in associated with patients undergoing pancreatoduodenectomy (PD). Many peri-operative measures need to be considered on such patients. A 83 years old gentleman presented with pain abdomen, Ultrasonographic evidence of dilated extrahepatic biliary system and distended gall bladder and contrast enhanced computed tomography (CECT) scan of the abdomen with features of a pancreatic head mass, further confirmed to be adenocarcinoma by endoscopic ultrasound (EUS) and biopsy. These findings were present on the background of Non-Alcoholic Steato-Hepatitis (NASH) associated liver cirrhosis, with Child-Turcotte-Pugh (CTP) score of 5 (CTP A) and Model For End-Stage Liver Disease- sodium (MELDNa) score of 13. The patient underwent PD. Histopathological evaluation showed a p T3 N2 moderately differentiated adenocarcinoma of the pancreatic head with Ishak scoring of liver biopsy 6. The postoperative course of the patient was uneventful and was discharged from the hospital on the 5th post-operative day. No readmission or re-operation was required.

### Keywords

*Pancreatoduodenectomy, pancreatoduodenectomy in liver cirrhosis, pancreatoduodenectomy modification in cirrhosis*

### INTRODUCTION

Cirrhotic patients undergoing any gastrointestinal surgery have a reported mortality rate up to 17.5% to 38%.<sup>1</sup> Pancreatoduodenectomy (PD), the treatment of choice for tumors in the periampullary region,<sup>2</sup> has a morbidity rate of 40%–60% and a postoperative mortality rate of about 5%, even in reference hospitals.<sup>3</sup> Preoperatively patients with comorbidity, obesity<sup>4</sup> advanced age and hypoalbuminemia<sup>5</sup> are at risk of developing post-operative morbidity. Post-operative morbidity and mortality in such patients is related to pre-operative comorbid factors.<sup>6</sup> Hepatic cirrhosis is one of such associated comorbidity. The hepatic functional reserve assessment with Child-Turcotte-Pugh (CTP) score helps in deciding the patient's fitness for surgery. CTP A patients seem to have better outcome than CTP B.<sup>7,8</sup> Modification of peri-operative management including surgical alteration

### Submitted

Feb 2, 2022

### Accepted

Mar 20, 2022

is not well described in the literature. We here report a case of geriatric cirrhotic patient undergoing PD and modification of the routine steps in the given scenario.

## CASE PRESENTATION

A 83 years old gentleman, known diabetic and hypertensive under medication, presented with the complaints of pain in the epigastrium and left upper abdomen on October, 2021, with no history of jaundice and pruritus. He had no complaints of weight loss, loss of appetite, fever, diarrhea, cough, shortness of breath and melena. He was not a regular alcohol consumer and a non-smoker. General condition of the patient was fair with no apparent icterus. Gall bladder was palpable on abdominal examination.

Abdominal ultrasonography showed a distended gall bladder and dilated common bile duct (CBD) and liver with coarse echotexture suggesting features of cirrhosis. A contrast enhanced computed tomography (CECT) scan of the abdomen revealed heterogeneously enhancing nodule in the head of the pancreas with the appearance of dilated common bile duct and the pancreatic duct (double duct sign) with loss of pancreatic parenchyma involving neck, body and tail. Liver echotexture was coarse on CECT with minimal appearance of collateral vessels suggestive of portal hypertension.

Endoscopic ultrasound (EUS) was done which showed results consistent with the CT findings with the presence of pancreatic head mass and double duct sign. EUS guided fine needle aspiration cytology (FNAC) confirmed the diagnosis of adenocarcinoma head of pancreas.

Liver function test (LFT) showed total bilirubin (TB) and direct bilirubin (DB) of 0.7 mg/dL and 0.2 mg/dL, aspartate aminotransferase (AST) / Alanine Aminotransferase (ALT): 17/14 U/L, Alkaline phosphatase (ALP): 1100 U/L, serum albumin: 3.8 g/dL, PT/INR: 1.5. CTP score was 5 grade A (bilirubin: 1 albumin: 1 INR: 1 Ascites: 1 HE: 1). MELDNa score 13 points, there were no preoperative radiographic evidence of portal hypertension. Etiology of cirrhosis was labelled as NASH after ruling out all possible causes. There was no radiological evidence of pulmonary hypertension. Grade I to II distal esophageal varices were present on pre-operative upper gastro-intestinal endoscopy.

After pre anesthetic checkup patient was planned for SMA first, classical pancreatoduodenectomy (PD). The intraoperative findings showed minimal ascites with no peritoneal and hepatic metastasis, features of macro nodular liver with coarse liver parenchyma was seen. A hard irregular mass of 5x5cm was noted on the head of the pancreas, abutting the superior mesenteric vein (SMV). Dilated extra

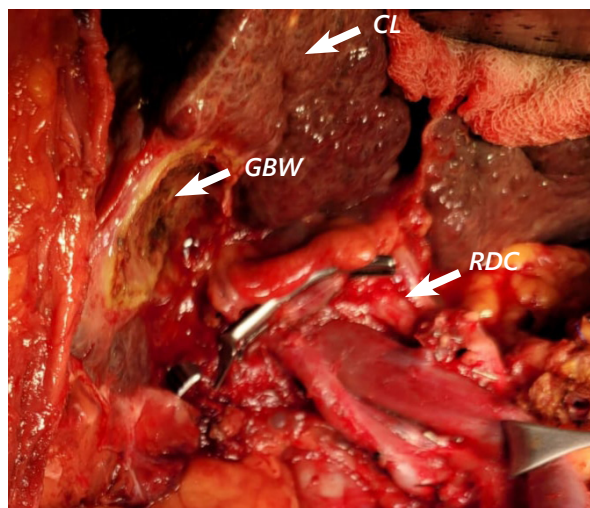


Figure 1. Intra-operative picture, RDC: retro-duodenal collaterals, CL: cirrhotic liver, GBW: posterior gall bladder wall left in-situ

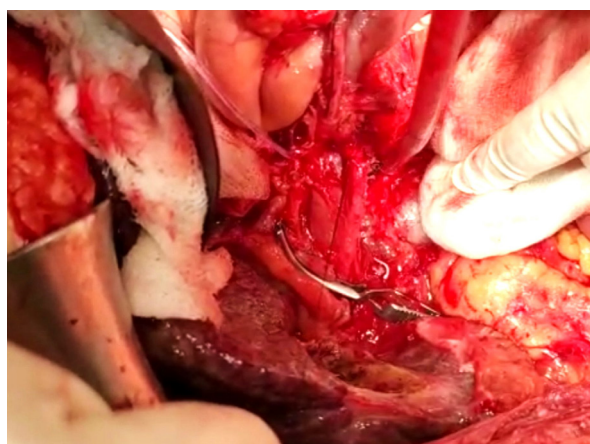


Figure 2. Intraoperative picture showing preserved collaterals

hepatic biliary tract with common bile duct (CBD) diameter of 15mm was noted. Pancreas was firm in texture with the duct diameter of 15mm. Replaced RHA arising from superior mesenteric artery (SMA) (Mitchel type III variation) was noted along with few collateral vessels at the periportal area. The coronary vein was not engorged. Few periportal lymph nodes were noted. Intraoperative blood loss was approximately 450ml. Triangle operation was not performed. Intraperitoneal drain was not placed after the surgery.

Operative duration was 372 minutes. Intra operative blood loss was estimated to be 400ml, post-operative Hb was 8.9 gm/dl.

In the post-operative period patient was extubated on the operating table and shifted to the intensive care unit (ICU). Oral sips of clear liquid were started on the day of surgery. Octrotide was used in the perioperative period from the beginning of procedure. Oral lactulose was started from the



Figure 3. Post-operative picture of the incision with no drain placement

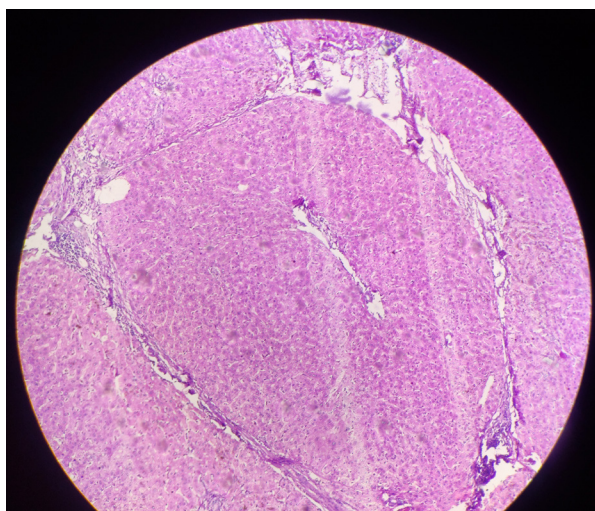


Figure 4. Histopathological picture of liver cirrhosis showing cirrhotic nodule surrounded by fibrosis

first post-operative day, for prevention of Hepatic Encephalopathy (HE). Patient complained of mild post-operative abdominal distension till post-operative day (POD) 3. Patient passed flatus on the 2<sup>nd</sup> POD and stool on the 3<sup>rd</sup> POD. There was no wound complication. Patient had edema of the lower limbs, albumin and furosemide infusion was started immediately after surgery, later switched to oral tablet of furosemide+ spironolactone from the 3<sup>rd</sup> POD. Patients had developed uncontrolled hypertension during his post-operative period which was managed with medication by the cardiology team. Postoperative liver function test on the day of discharge was TB/DB: 1.6/ 0.9 mg/dl, AST/ALT 62/46 U/L, ALP 574 U/L.

There was no major complication like liver decompensation, features of renal failure, respiratory failure, intra-abdominal bleed, sepsis, post-operative pancreatic fistula (POPF). Patients required no readmission and reoperation. He required three days of Intensive care stay and was discharged from the hospital on the fifth POD. He was followed up one weeks and 3 weeks after surgery and he is doing well.

Histopathological report showed pT3N2 as per AJCC 7th staging system with grade 2, moderately differentiated adenocarcinoma of head of pancreas, ductal type invading up to the mucosa of the duodenum. Nine out of thirteen dissected lymph nodes (9/13) were positive for tumor deposits. With no involvement of Gall bladder and Liver. The Superior and posterior margins of the resected specimen were both 1mm away from the tumor. The proximal, distal, anterior, cut end of the common hepatic duct and uncinate margin were uninvolved by the tumor. Ishak scoring of liver biopsy was 6.

## DISCUSSION

Various peri-operative considerations are required while managing patients undergoing PD with liver cirrhosis. Our patient was admitted 3 days prior to surgery for a detailed workup. The functional hepatic reserve is of utmost importance which is measured in terms of CTP scoring and MELDNa score.<sup>7</sup> Our patient had CTP score of 5 and MELDNa score of 13. Better treatment outcome is seen in CTP A patient than in CTP B patient<sup>7,8</sup> and a MELDNa score  $\leq 10$  showed better outcome.<sup>9</sup>

Radiological sign of pulmonary hypertension denotes end stage liver disease.<sup>10</sup> Presence of varices is also a marker of second stage cirrhosis. Mortality is reported to be increased from 1% to 3.4% in patient with the presence of esophageal varices,<sup>11</sup> absence of which shows a compensated liver cirrhosis. Our patient had evidence of distal esophageal varices on upper gastrointestinal endoscopy but no radiological evidence of pulmonary hypertension.

Hypoalbuminemia is a predictor of morbidity and mortality in cirrhotic patients undergoing surgery.<sup>12</sup> Hypoalbuminemia suggests derangement in the liver function and a state of malnutrition which needs to be corrected.<sup>12</sup> Our patient had a serum albumin level within the normal range so a prolonged pre-operative nutritional built up was not required. Regarding hemostasis, the Liver Intensive Care Group of Europe (LICAGE) has come up with an overview of hemostatic management in such patient.<sup>13</sup> It advocates the preoperative identification of anemia and its correction. Prophylactic use of fresh frozen plasma (FFP) is not recommended unless there is evidence of coagulopathy-associated bleeding which is significant clinically.<sup>13</sup>



During surgery collateral vessels developed due to portal hypertension, pose a challenge. Octreotide was used from the start of the surgery as it act by constricting the portal vessels.<sup>14</sup> A meticulous surgical dissection was performed. Surgical ligature and energy devices like harmonic scalpel or LigaSure needs to be used more frequently in such patient. The retroperitoneal collaterals and the coronary vein was left in situ for providing a passage for vascular drainage. There were very minimal collateral vessels around the pancreatic head that was sacrificed. The collaterals in the hepatoduodenal ligament were preserved as far as possible. Gall bladder posterior wall was left intact after ablation by electrocautery, to prevent bleeding from this potential site. Many patients with cirrhosis usually have a history of chronic alcohol intake, this leads to a state of chronic nutritional depletion. Such patients have a greater likelihood of complications related to wound healing. Anastomotic dehiscence is also more likely in these patients.<sup>15,16</sup>

During PD chance of developing post-operative hemorrhage and ascites after Kocherization of the duodenum, Cattell-Braasch maneuver and lymphadenectomy is high as the collateral vessels and the lymphatic channels in these area are dissected. Postoperative ascites, defined as ascitic fluid drainage of a volume greater than 10 mL/kg of weight/day after the 4<sup>th</sup> post-operative day,<sup>17</sup> if present may be difficult to manage. Intra peritoneal drain was avoided in our patient for this reason and presence of ascites was monitored regularly with bedside abdominal sonoscopy.

The effect of peripheral arterial vasodilatation in cirrhotic patients leads to a decrease in the effective circulatory volume, which in turn activates the endogenous vasoconstriction mechanism resulting in renal vasoconstriction causing hepatorenal syndrome.<sup>18,19,20</sup> This is a fatal complication and the mortality rate is nearly 50% within two weeks of onset of the condition.<sup>21</sup> This is often treated with systemic vasoconstrictors, albumin infusion and intravenous octreotide.<sup>22,23</sup> To mitigate it all nephrotoxic drugs were avoided, albumin infusion was started immediately after surgery and octreotide was used from the initiation of surgery. Lactulose and rectal enema was used from the first POD to prevent hepatic encephalopathy and all hepatotoxic medications were avoided.

Albumin, a volume expander plays a role in the protection of the circulatory system, as loss of plasma in the ascitic fluid causes a dysfunction in the circulatory system which ultimately results in hepatic and renal impairment.<sup>24,25</sup> Albumin infusion started in the immediate post-operative period helped alleviate this concern. Diuretic infusion along with albumin and later on oral tablets of furosemide +spironolactone was started to prevent

development of ascites.<sup>26</sup>

## CONCLUSION

PD is feasible in patients with cirrhosis. Careful pre-operative patient selection, and work up is important in the pre-operative period. A meticulous operative surgical technique is required during the surgery. Watchful monitoring in the post-operative period is required, keeping in mind all the possible complications.

## FINANCIAL SUPPORT

The author(s) did not receive any financial support for the research and/or publication of this article.

## CONFLICT OF INTEREST

The author(s) declare that they do not have any conflict of interest with respect to the research, authorship, and/or publication of this article.

## CONSENT

Written informed consent was obtained from the patient family for publication of this case report and the accompanying images.

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