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Outcomes of pancreaticoduodenectomy in chronic liver disease

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Abstract:
Pancreaticoduodenectomy (PD) in chronic liver disease (CLD) carries increased perioperative risk. We retrospectively analysed 28 Child-Pugh A/B patients undergoing PD between 2008 and 2024. Median operative time was 420 minutes, blood loss 600 mL and 30-day mortality 10.7%. Hepatic decompensation occurred in 44.8%; median survival was 309.5 days, with 2-year survival of 50%. Thus, PD is feasible in carefully selected patients, but hepatic and infective complications remain substantial.

Keywords: Pancreaticoduodenectomy (PD), chronic liver disease (CLD), Whipple's surgery

Background:
Pancreaticoduodenectomy (PD) is a potentially curative operation for resectable pancreatic head and periampullary malignancies, but post-operative morbidity remains substantial even in experienced centres **[1, 2]**. Chronic liver disease and cirrhosis increase surgical risk through impaired hepatic reserve, portal hypertension, coagulopathy and susceptibility to post-operative complications **[3, 4]**. Non-hepatic surgery in cirrhotic patients has consequently been associated with increased morbidity and mortality, particularly in patients with advanced liver dysfunction **[5, 6]**. Studies specifically evaluating pancreatic surgery in cirrhotic patients have reported greater blood loss, post-operative morbidity and mortality, with adverse outcomes particularly associated with Child-Pugh B disease and portal hypertension **[7, 8]**. Conversely, pancreaticoduodenectomy has been reported to be feasible in carefully selected Child-Pugh A patients with preserved hepatic function **[9, 10]**. An earlier Indian institutional experience also demonstrated that PD can be performed selectively in patients with chronic liver disease **[11]**. A recent systematic review and meta-analysis of more than 18,000 patients confirmed increased mortality and major morbidity after PD in patients with cirrhosis and identified portal hypertension as an adverse prognostic factor **[12]**. More recent population-level data have similarly shown increased in-hospital mortality and length of stay after pancreaticoduodenectomy in patients with cirrhosis, while contemporary reviews continue to emphasize prevention and early management of pancreaticoduodenectomy-related complications **[13, 14]**. Therefore, it is of interest to evaluate the perioperative outcomes, post-operative complications and long-term survival of patients with chronic liver disease undergoing pancreaticoduodenectomy at our centre. Contemporary multicentre and pooled evidence further supports this risk profile. A Japanese multicentre study of chronic hepatic dysfunction and a separate risk-stratification meta-analysis identified portal hypertension and impaired hepatic reserve as important adverse factors after PD **[15, 16]**. A 2025 meta-analysis reported markedly increased mortality and major morbidity in patients with cirrhosis; with portal hypertension further increasing mortality **[17]**. A recent single-centre series likewise identified thrombocytopenia and deranged coagulation as markers of high mortality risk **[18]**. Recent reviews also emphasize the broad complication burden, nutritional support and evolving technical approaches to pancreaticoduodenectomy **[19-22]**. Therefore, it is of interest to report the perioperative outcomes, post-operative complications and long-term survival of patients with chronic liver disease undergoing pancreaticoduodenectomy at our centre.

Materials and Methods:
Study design:
We conducted a retrospective observational study at the Institute of Surgical Gastroenterology, GI and HPB Oncosurgery and Liver Transplant, Sir Ganga Ram Hospital, New Delhi, India. The study included all patients with chronic liver disease (CLD) who underwent pancreaticoduodenectomy (PD) for pancreatic head adenocarcinoma or periampullary malignancy between January 2008 and December 2024. Data were retrieved from a prospectively maintained institutional database. Patients were included if CLD was diagnosed either preoperatively or intraoperatively and if they had Child–Pugh class A or B disease (score <8). Patients with decompensated liver disease, Child–Pugh class C cirrhosis, unresectable disease, or distant metastases were excluded. Clinical, laboratory, operative, histopathological and post-operative data were collected from hospital medical records after obtaining institutional ethical committee approval.

Pre-operative assessment:
All patients underwent detailed clinical evaluation, laboratory investigations and radiological assessment before surgery. Laboratory investigations included complete blood count, liver function tests, serum albumin, coagulation profile including International Normalized Ratio (INR), renal function tests and tumour markers including carbohydrate antigen 19-9 (CA19-9) and carcinoembryonic antigen (CEA). Child–Pugh scores were calculated using standard clinical and biochemical parameters. Radiological investigations included triple-phase contrast-enhanced computed tomography (CECT) or magnetic resonance cholangiopancreatography (MRCP) for assessment of tumour resectability and evaluation of chronic liver disease. Portal hypertension was defined based on clinical, biochemical, endoscopic and radiological evidence of portal venous hypertension. All patients were counselled regarding the increased perioperative risks associated with pancreaticoduodenectomy in the background of CLD. Patients with resectable periampullary malignancy and acceptable hepatic reserve were considered for surgery.

Surgical procedure and post-operative management:
All patients underwent classical Whipple's pancreaticoduodenectomy under general anaesthesia without specific operative modifications for cirrhosis. Standard lymphadenectomy was performed in all cases. Reconstruction included stented pancreatojejunostomy, stented hepaticojejunostomy and gastrojejunostomy, along with feeding jejunostomy. Post-operatively, patients were managed in the intensive care unit (ICU) for initial monitoring and received intravenous antibiotics, nutritional support and routine post-operative care. Patients were monitored for surgery-related complications, hepatic decompensation and post-operative pancreatic fistula (POPF), which was graded according to the International Study Group of Pancreatic Surgery (ISGPS) criteria.

Follow-up and outcome measures:
Patients were followed up in the outpatient department or through telephonic communication for assessment of post-operative morbidity, hepatic decompensation, recurrence, initiation of adjuvant chemotherapy and survival. Delays in adjuvant therapy and their causes were also documented. The primary outcome measure was 30-day mortality, defined as death from any cause within 30 days of surgery or during the index hospitalization if post-operative stay exceeded 30 days. Secondary outcomes included operative duration, intraoperative blood loss, blood transfusion requirement, post-operative complications, hepatic decompensation, pancreatic fistula, post-operative haemorrhage, ICU stay, total hospital stay and long-term survival including 1-year and 2-year survival rates.

Statistical analysis:
Data were analysed using Microsoft Excel (Microsoft Corp., Redmond, WA, USA). Continuous variables were expressed as mean ± standard deviation or median with range, while categorical variables were expressed as frequencies and percentages. Survival outcomes were assessed using follow-up data available until 10 May 2026.

Results:
A total of 28 patients with chronic liver disease (CLD) underwent pancreaticoduodenectomy (PD). The mean age was 60.0 ± 10.7 years, with a median age of 60 years (range 31–75 years). There was a male predominance, with a male-to-female ratio of 4.6:1 (23 males and 5 females). The mean Charlson Comorbidity Index (CCI) was 4.0 ± 1.33 (range 2–7), with 11 patients (39.3%) having a CCI score ≥5. Common comorbidities included diabetes mellitus in 12 patients (42.8%), hypertension in 5 (17.8%), hypothyroidism in 2 (7.1%), coronary artery disease in 1 (3.5%) and chronic obstructive pulmonary disease in 1 (3.5%). Four patients (14.3%) had more than one comorbidity **(Table 1).** Chronic liver disease was identified preoperatively based on clinical, biochemical and radiological findings. According to Child–Pugh classification, 26 patients (92.9%) were classified as Child–Pugh class A and 2 patients (7.1%) as Child–Pugh class B. CLD was diagnosed preoperatively in 15 patients (53.6%), including 13 Child A and 2 Child B patients, while the remaining 13 patients (46.4%) were diagnosed intraoperatively or on histopathological examination. Among patients diagnosed preoperatively, CLD was recognized based on clinical history in 8 patients and radiological findings in 7 patients. Splenomegaly was present in 6 patients (21.4%), while thrombocytopenia with platelet counts below 100,000/mm³ was observed in 2 patients (7.1%). The mean preoperative SGPT (ALT) level was 66.39 U/L, with elevated levels (>56 U/L) observed in 12 patients (42.9%). The mean serum albumin level was 3.05 g/dL and hypoalbuminemia (<3.4 g/dL) was present in 22 patients (78.6%). Cholangitis was documented in 12 a patient (42.9%) for which Endoscopic retrograde cholangiopancreatography (ERCP) with biliary stenting was performed pre-operatively. The median duration of surgery was 420 minutes, with a mean operative time of 430 ± 80 minutes. Median intraoperative blood loss was 600 mL (range 300–1000 mL), with a mean blood loss of 620 ± 150 mL. Intraoperative blood transfusion was required in 6 patients (21.4%).Histopathological examination of the pancreaticoduodenectomy specimen's demonstrated T1 tumours in 6 patients (21.4%), T2 tumours in 6 patients (21.4%) and T3 tumours in 16 patients (57.1%). Liver biopsy findings revealed portal triaditis in 5 patients (17.8%), steatohepatitis in 1 patient (3.5%) and hepatic fibrosis in 5 patients (17.8%) **(Table 2)**. The mean ICU stay was 2.82 days and the mean total hospital stay was 16.25 days **(Table 2).** Hepatic decompensation occurred in 44.8% of patients and surgical site infection in 17.8%. Bile leak occurred in 14.3%, delayed gastric emptying in 13% and post-pancreatectomy haemorrhage and sepsis/cholangitis each in 10.7% of patients. Hepatic encephalopathy and ascites each occurred in 10%, jaundice in 20% and hepato-hydrothorax in 3% of patients. Grade A and Grade B pancreatic fistula occurred in 10.7% and 7.1% of patients, respectively; no Grade C fistula was observed. The mean time to oral liquids was 5.73 days. There were 3 in-hospital deaths (10.7%), all attributable to post-operative sepsis. Among the 25 patients discharged alive, 5 (20%) were lost to follow-up; therefore, long-term follow-up data were available for 20 patients. During follow-up, 7 patients (35%) required readmission and 7 patients (35%) completed at least three cycles of adjuvant chemotherapy. Initiation of adjuvant chemotherapy was delayed in 2 patients because of prolonged recovery from hepatic decompensation. As of 10 May 2026, among the 20 patients with available follow-up, 9 (45%) were alive and 11 (55%) had died. The causes of late mortality were tumour recurrence/progression in 4 patients, liver failure/hepatic decompensation in 4, myocardial infarction in 2 and acute kidney injury in 1. Including the 3 index-admission deaths, a total of 14 confirmed deaths occurred in the overall cohort; the subsequent vital status of the 5 patients lost to follow-up remained unknown. The mean survival duration was 472.2 days and the median survival duration was 309.5 days (range 39-4515 days). The 6-month, 12-month and 24-month survival rates were 70%, 55% and 50%, respectively. Kaplan-Meier analysis demonstrated a progressive decline in survival over time **(Table 3 and Figure 1).** Fourteen confirmed deaths occurred among the 28 patients. Three deaths occurred during the index admission because of post-operative sepsis, while 11 occurred during

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follow-up. The principal late causes of death were tumour recurrence/progression and liver failure/hepatic decompensation, followed by myocardial infarction and acute kidney injury **(Table 4).** For mortality analysis, patients were classified according to documented outcome status as survivors (n=14) and non-survivors (n=14). Non-survivors comprised 3 patients who died during the index admission and 11 patients with confirmed deaths during follow-up. Patients lost to follow-up were not assumed to have died. Mortality was evaluated in relation to demographic characteristics, perioperative variables, post-operative complications, hepatic decompensation and performance status and tumour recurrence. Given the small cohort size, these analyses were exploratory. Exploratory analysis identified associations between mortality and age, Charlson Comorbidity Index, portal hypertension, intraoperative blood loss, ICU stay, severe post-operative complications, post-operative sepsis, hepatic decompensation, ECOG performance status and tumour recurrence **(Table 5).** Tumour recurrence/progression and liver failure/hepatic decompensation were the leading late causes of death. Post-operative sepsis accounted for all three index-admission deaths. Because of the small sample size, the mortality analyses should be interpreted as exploratory rather than confirmatory.

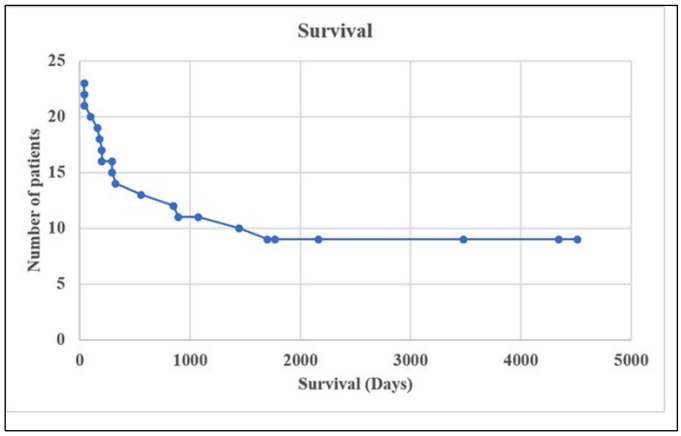


Figure 1: Survival in days

Table 1: Baseline cohort, comorbidities and pre-operative factors

Category	Variable	Value
Age	Mean ± SD	60.0 ± 10.7 years
	Median (Range)	60 years (31–75)
Age Group	< 40 years	1 (3.6%)
	40–59 years	11 (39.3%)
	60–69 years	11 (39.3%)
	≥ 70 years	5 (17.9%)
Sex	Male	23 (82.1%)
	Female	5 (17.9%)
	Male:Female ratio	4.6:1
Charlson Comorbidity Index	Mean ± SD (Range)	4 ± 1.33 (2–7)
	CCI ≥5	11 (39.3%)
Comorbidities	>1 comorbidity present	4 (14.3%)
	Hypertension	5 (17.8%)
	Diabetes mellitus	12 (42.8%)
	Hypothyroidism	2 (7.1%)
	Coronary artery disease	1 (3.5%)
	Chronic obstructive pulmonary disease	1 (3.5%)
Child–Pugh Classification	Child A	26 (92.9%)
	Child B	2 (7.1%)
Portal Hypertension	Present	4 (14.3%)
	Absent	24 (85.7%)
Splenic and Hematologic Findings	Splenomegaly	6 (21.4%)
	Platelet count <100,000/mm³	2 (7.1%)
Preoperative Serum Albumin	<3.4 g/dL	22 (78.6%)
	3.4–5.4 g/dL	5 (17.9%)
Preoperative SGPT (ALT)	<56 U/L	16 (57.1%)
	>56 U/L	12 (42.9%)
Preoperative Haemoglobin	<12 g/dL	19 (67.9%)
	12–18 g/dL	8 (28.6%)
Preoperative Biliary Intervention	ERCP with stenting	12 (42.9%)

Table 2: Intra-operative and post-operative parameters and complications

Parameter	Result
Duration of surgery	Median: 420 min (Mean ± SD: 430 ± 80)
Intraoperative blood loss	Median: 600 mL (Mean ± SD: 620 ± 150)
Intraoperative blood transfusion	6 (21.4%)
Tumour T Stage	
T1	6 (21.4%)
T2	6 (21.4%)
T3	16 (57.1%)
Post-operative Stay	
ICU stay (mean)	2.82 days
Total hospital stay (mean)	16.25 days
Post-operative Complications	
Bile leak	4 (14.3%)
Post-pancreatectomy haemorrhage	3 (10.7%)
Surgical site infection	5 (17.8%)
Sepsis / Cholangitis	3 (10.7%)
Hepatic Decompensation	13 (44.8%)
Hepatic encephalopathy	3 (10%)
Jaundice	6 (20%)
Ascites	3 (10%)
Hepato-hydrothorax	1 (3%)
Pancreatic Fistula	
Grade A	3 (10.7%)
Grade B	2 (7.1%)
Grade C	0
Post-operative Laboratory Parameters	
Serum bilirubin	2.63 mg/dL
Haemoglobin	10.26 g/dL
Serum albumin	2.57 g/dL
Time to oral liquids	5.73 days
Delayed gastric emptying	4 (13%)

Table 3: Follow-up and survival outcomes

Domain	Variable	Result
Study cohort	Total patients	28
	In-hospital mortality	3 (10.7%)
	Patients discharged alive	25 (89.3%)
Follow-up status	Lost to follow-up	5 (20%)
	Patients available for survival analysis	20 (80%)
	Readmission during follow-up	7 (35%)
	Adjuvant chemotherapy ≥3 cycles	7 (35%)
	Chemotherapy delay – hepatic decompensation	2
Overall survival	Deaths during follow-up	11 (55%)
	Alive at last follow-up	9 (45%)
Survival duration	Mean survival	472.2 days
	Median survival	309.5 days
	Range	39-4515 days
Time-specific survival	6-month survival	14 (70%)
	12-month survival	11 (55%)
	24-month survival	10 (50%)

Table 4: Causes of mortality and associated perioperative factors

Cause of Death	Number (%) of 14 confirmed deaths	Common Associated Perioperative Factors	Frequency of Associated Factor	Association
Index-admission mortality (30-day)	3 (21.4%)	Post-operative sepsis; severe complications	3/3 (100%)	Strong
Tumour recurrence/progression	4 (28.6%)	Advanced tumour stage; poor differentiation; delayed/incomplete adjuvant chemotherapy	Observed in late follow-up deaths	Strong
Liver failure/hepatic decompensation	4 (28.6%)	Advanced liver dysfunction; portal hypertension; hypoalbuminemia	Observed in late follow-up deaths	Strong
Myocardial infarction	2 (14.3%)	Comorbidity burden; advanced age	-	Moderate
Acute kidney injury	1 (7.1%)	Severe post-operative morbidity / multiorgan dysfunction	1/1 (100%)	Moderate-Strong
Total confirmed deaths	14 (100%)	Five patients lost to follow-up were not classified as deaths because subsequent vital status was unknown.	-	-

Table 5: Analysis of factors associated with mortality

Variable	Survivors (n=14)	Non-survivors (n=14)	p-value	Mortality within Group	Factor	Odds Ratio (OR)	Interpretation
Mean age (years)	54.2 ± 8.1	61.3 ± 9.4	0.04	—		—	Older age associated with increased mortality
Diabetes mellitus	5 (35.7%)	9 (64.3%)	0.12	—		—	Trend toward increased mortality
Charlson Comorbidity Index	3.1 ± 1.2	4.6 ± 1.5	0.03	—		—	Higher comorbidity burden associated
Child–Pugh B/C	1 (7.1%)	5 (35.7%)	0.05	—		—	Advanced liver dysfunction associated
Portal hypertension	4 (28.6%)	9 (64.3%)	0.04	9/13 (69.2%)		—	Significant association with mortality
Blood loss >500 mL	—	—	0.02	8/11 (72.7%)		—	Increased blood loss associated
ICU stay >3 days	3 (21.4%)	10 (71.4%)	0.01	—		—	Prolonged ICU stay strongly associated
Clavien–Dindo grade ≥III	2 (14.3%)	9 (64.3%)	0.006	9/11 (81.8%)		5.8	Independent predictor of mortality
Post-operative sepsis	2 (14.3%)	8 (57.1%)	0.01	8/10 (80%)		—	Major contributor to mortality
Delayed gastric emptying	1 (7.1%)	5 (35.7%)	0.08	—		—	Trend toward adverse outcomes
Hepatic decompensation	0	6 (42.9%)	0.003	6/6 (100%)		—	Strong predictor of mortality
ECOG ≥3	1 (7.1%)	7 (50%)	0.01	7/8 (87.5%)		—	Poor performance status associated
Tumour recurrence	2 (14.3%)	10 (71.4%)	<0.001	10/12 (83.3%)		7.1	Strong independent predictor

Discussion:

Pancreaticoduodenectomy (PD) in patients with chronic liver disease (CLD) remains a major surgical challenge because portal hypertension, coagulopathy, thrombocytopenia, impaired hepatic reserve and increased susceptibility to infection can significantly worsen perioperative outcomes. Despite advances in hepatopancreatobiliary surgery and perioperative care, cirrhotic patients continue to represent a high-risk subgroup undergoing PD. In the present study, however, most patients had Child–Pugh class A disease, which likely contributed to the acceptable operative and post-operative outcomes observed in our cohort. Our median operative time of 420 minutes and mean intraoperative blood loss of 620 mL suggest that PD can be technically performed safely in selected CLD patients at experienced high-volume centres. Nevertheless, intraoperative blood transfusion was required in 21.4% of patients, reflecting the haemostatic challenges commonly associated with chronic liver disease. These findings are consistent with previous studies demonstrating increased blood loss, transfusion requirement and perioperative complexity in cirrhotic patients undergoing pancreatic surgery **[7-9, 11 and 12]**. The overall post-operative morbidity rate in our series was 51.9%, which remains substantial but comparable to morbidity rates reported in standard pancreaticoduodenectomy series. The most notable finding was the high incidence of post-operative hepatic decompensation (44.8%), including hepatic encephalopathy, jaundice, ascites and hepato-hydrothorax. These findings emphasize that liver-related complications remain a major determinant of post-operative recovery in CLD patients, even when pancreas-specific surgical complications are controlled. Ray *et al.,* in their institutional experience from the same broad clinical setting, reported outcomes of pancreaticoduodenectomy in four patients with CLD, including one 30-day mortality in a Child–Pugh class B patient and another death within one year due to liver decompensation following chemotherapy **[11].** Although their series was small, their findings support our observation that outcomes are significantly better in carefully selected Child–Pugh class A patients, whereas Child–Pugh class B disease is associated with substantially higher post-operative risk. In the present study, in-hospital mortality was 10.7% (3/28) and all three index-admission deaths were attributable to post-operative sepsis. During follow-up, 11 additional confirmed deaths occurred among the 20 patients with available long-term follow-up. These findings are comparable with previously reported increased perioperative risk in cirrhotic patients undergoing pancreaticoduodenectomy **[7, 8]**. The severity of hepatic dysfunction and portal hypertension appears to be clinically important in determining post-operative risk. Importantly, pancreas-specific complications in our cohort were not excessively high compared with standard PD series. Clinically relevant post-operative pancreatic fistula (Grade B) occurred in 7.1% of patients, delayed gastric emptying in 13% and post-pancreatectomy haemorrhage in 10.7%. These observations are consistent with previous studies suggesting that the increased risk in cirrhotic patients is more closely related to impaired physiologic reserve, susceptibility to infection and hepatic decompensation rather than failure of the pancreatic anastomosis itself **[7, 8 and 10]**. Long-term survival was acceptable in this selected high-risk cohort. Median survival was 309.5 days, with 1-year and 2-year survival rates of 55% and 50%, respectively. Only 35% of patients completed at least three cycles of adjuvant chemotherapy and treatment delays were mainly related to hepatic decompensation. Previous studies have likewise reported acceptable oncological outcomes after

pancreaticoduodenectomy in carefully selected Child-Pugh A patients **[9, 10]**. Our findings are additionally supported by recent pooled evidence. Hajibandeh *et al.,* in a 2024 systematic review and meta-analysis involving more than 18,000 patients, demonstrated that cirrhosis was associated with increased post-operative mortality, major complications, grade B and C pancreatic fistula, blood loss and longer hospital stay following PD **[12].** Nevertheless, the authors concluded that pancreaticoduodenectomy remains feasible in selected cirrhotic patients when performed in experienced centres with careful perioperative management. Recent population-level evidence also shows increased in-hospital mortality and prolonged hospitalization among patients with cirrhosis undergoing pancreaticoduodenectomy, reinforcing the need for careful selection and perioperative risk mitigation **[13]**. Contemporary guidance on reducing pancreaticoduodenectomy complications further emphasizes systematic prevention, early recognition and multidisciplinary management of post-operative morbidity **[14]**. The present study advances current knowledge by providing contemporary real-world data on both perioperative and long-term outcomes after pancreaticoduodenectomy in patients with chronic liver disease. While previous reports have largely emphasized the overall operative risk associated with cirrhosis, our findings indicate that post-operative hepatic decompensation and infective complications are important determinants of adverse outcome, whereas pancreas-specific complications were not disproportionately increased. These observations further support careful selection of patients with preserved hepatic reserve and highlight the importance of focused perioperative prevention and early management of hepatic decompensation and sepsis. This study has limitations including its retrospective design, small sample size, single-centre setting and loss to follow-up in five patients. Detailed analysis according to the aetiology of chronic liver disease was not possible. The findings should therefore be interpreted as exploratory and hypothesis-generating. Pancreaticoduodenectomy is feasible in carefully selected patients with chronic liver disease, particularly those with preserved hepatic reserve. Post-operative hepatic decompensation and infective complications remain important sources of morbidity and mortality, emphasizing careful patient selection and perioperative management.

Conclusion:

Pancreaticoduodenectomy can be performed in carefully selected patients with chronic liver disease, particularly those with preserved hepatic function, although it carries substantial morbidity and mortality. In our series of 28 patients, post-operative hepatic decompensation occurred in 44.8%, while in-hospital mortality was 10.7%, with sepsis accounting for all early deaths. Long-term outcomes were influenced by hepatic dysfunction and tumour recurrence, with a median survival of 309.5 days and a two-year survival rate of 50%. Careful pre-operative assessment, appropriate patient selection and early recognition and management of hepatic and infective complications are essential to improving outcomes.

References:

[1] Narayanan S *et al. J Surg Res*. 2018 **231**:304. [PMID: 30278945]
[2] Giuliano K *et al. Chin Clin Oncol*. 2017 **6**:64. [PMID: 29156887]
[3] Nicoll A. J *Gastroenterol Hepatol*. 2012 **27**:1569. [PMID: 22694313]
[4] Kaltenbach MG & Mahmud N. *Hepatol Commun*. 2023 **7**:e0086. [PMID: 36996004]
[5] Bhangui P *et al. J Hepatol.* 2012 **57**:874. [PMID: 22634123]
[6] Millwala F *et al. World J Gastroenterol.* 2007 **13**:4056. [PMID: 17696222]
[7] Warnick P *et al. Pancreatology*. 2011 **11**:24. [PMID: 21336005]
[8] El Nakeeb A *et al. World J Gastroenterol.* 2013 **19**:7129. [PMID: 24222957]
[9] Regimbeau JM *et al. J Surg Oncol.* 2015 **111**:776. [PMID: 25663324]
[10] Fuks D *et al. Hepatogastroenterology.* 2012 **59**:881. [PMID: 22469737]
[11] Ray S *et al. Surg Res Pract.* 2021 **2021**:4848380. [PMID: 34901381]
[12] Hajibandeh S *et al. Ann Surg Open*. 2024 **5**:e454 [PMID: 39310359]
[13] Nevarez NM *et al. HPB (Oxford).* 2024 **26**:251. [PMID: 37867083]
[14] Karpes JB *et al. Cancers (Basel).* 2026 **18**:630. [PMID: 41749883]
[15] Futagawa Y *et al. J Hepatobiliary Pancreat Sci.* 2019 **26**:310. [PMID: 31017730]
[16] Butler JR *et al. HPB (Oxford).* 2019 **21**:301. [PMID: 30269948]
[17] McKittrick H *et al. BJS.* 2025 **112**:znaf128.167. [DOI: 10.1093/bjs/znaf128.167]
[18] Nandy K *et al. Langenbecks Arch Surg.* 2026 **411**:43. [PMID: 41359182]
[19] Simon R. *Surg Clin North Am*. 2021 **101**:865. [PMID: 34537148]
[20] Robertson RH *et al. Cochrane Database Syst Rev*. 2025 **3**:CD014792. [PMID: 40084692]
[21] https://pubmed.ncbi.nlm.nih.gov/32809582/
[22] Gao P *et al. Surg Endosc.* 2023 **37**:1166. [PMID: 36151394]

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