RESEARCH ARTICLE

Clinical outcomes of hepato-pancreato-biliary surgical patients during COVID-19 pandemic

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Abstract

Objective: To determine the outcome of hepato-pancreato-biliary patients who were operated upon during the pandemic under a safety protocol devised to minimise the risk of coronavirus disease-2019 infection in patients and staff during the perioperative period.

Methods: The retrospective study was conducted at the Hepato-Pancreatico-Biliary (HPB) Unit of Bahria International Hospital Orchard, Lahore, Pakistan, in February 2021, and comprised data of all patients who were discussed in the multidisciplinary meeting of the Unit between May 1 and December 31, 2020. The coronavirus disease-2019 screening protocol was a negative polymerase chain reaction test just before admission and a second negative test 24-48 hours pre-surgery. All patients had computed tomography scan of chest to rule out atypical pneumonia due to coronavirus disease-2019 infection. Surgery was deferred for positive patients for at least 2 weeks until their test was negative. Surgeries were carried out with full personal protective equipment. Further testing was carried out if clinically indicated. Data was collected of 30-day coronavirus disease-2019-related morbidity and mortality. Data was analysed using SPSS 20.

Results: Of the 44 patients, 29(65.9%) were males and 15(34.1%) were females. Overall, 32(72.7%) patients were aged >40 years, 8(18.2%) were aged 20-40 years and 4(9%) were aged <20 years. Of the total, 7(15.09%) patients were found to be positive for coronavirus disease-2019 during preoperative screening. Among them, 5(71.4%) had successful surgery post-recovery, 1(14.3%) died without surgery due to pulmonary complications related to coronavirus disease-2019 and 1(14.3%) patient was lost to follow-up. Among the 42(95.5%) patients who underwent any procedure, 2(4.7%) patients turned positive for coronavirus disease-2019 in the postoperative period. There was 1(2.4%) mortality in the 30-day post-operative period which was not related to coronavirus disease-2019. Complications were seen in 5(11.90%) patients. Three (9.3%) out of 32 staff members were found to be asymptomatic carriers.

Conclusion: Hepato-pancreatico-biliary surgery could be safely carried out during coronavirus disease-2019 pandemic if strict safety protocols were followed.

Keywords: HPB surgeries, Covid-19 pandemic, Whipple's procedure. (JPMA 72: 2003; 2022)

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Introduction

The coronavirus disease-2019 (COVID-19) pandemic has considerably impacted surgical patients, especially cancer patients. Elective surgeries, including cancer surgeries, have been suspended during the pandemic as advised by medical leadership across the globe.[1] This certainly has adversely affected the outcome of surgical patients, especially those needing cancer surgery.[2]

One reason of suspending non-emergency surgeries was to reserve the hospital resources for COVID-19 patients.[3] The European Society of Medical Oncology (ESMO) has emphasised on the challenging need to manage cancer patients optimally during the pandemic as data from the United States, Canada, Spain and Italy revealed that in COVID-19-positive patients, 13-20% all-cause deaths were among patients having history of active cancer.[4-6]

Mortality and morbidity are considered high in COVID-19-positive patients undergoing emergency or elective surgeries during the pandemic.[7] An international (24 countries), multicentre (235 hospitals), cohort study showed that 30-day mortality was 23.8% in Covid-19-positive patients undergoing surgeries, and post-operative pulmonary complications rate was 51.2% with 38% mortality in these patients. Another study from Wuhan, China, showed that 34 COVID-19-positive patients underwent surgeries and all of them (100%) developed post-operative pneumonia, 44% required intensive care unit (ICU) admission and 20.5% died.[8]

All patients should be considered positive until proven otherwise because almost more than half of the patients positive for COVID-19 are asymptomatic. A study reported

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epidemiological data of 3,063 candidates who were tested for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) with reverse transcription polymerase chain reaction (RT-PCR) and 634 people tested positive. Of the 634 confirmed cases, almost half (51.7%) were reported to be asymptomatic.[9] Korkmaz et al. presented data of 3,000 people in northern Italy, concluding that from the great majority of people infected with COVID-19, 50-75% were asymptomatic, but represented "a formidable source" of contagion.[10]

Surgical teams are at high risk due to surgical patients because of exposure to aerosols and body fluids.[11] Therefore, it is important to consider pre-operative testing of patients undergoing surgery with the gold standard test RT-PCR 24 hours before the procedure, followed by isolation until surgery.[12] Sensitivity of RT-PCR is around 70% while sensitivity of high-resolution computed tomography (HRCT) is >90%.[13]

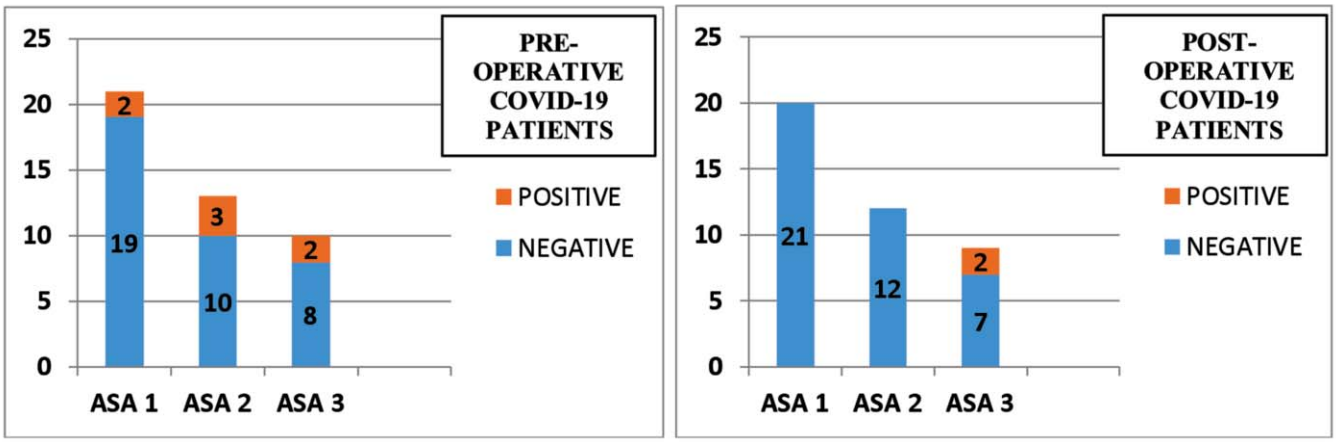
The current study was planned to determine the outcome of hepato-pancreato-biliary (HPB) patients who were operated upon during the pandemic under a safety protocol devised to minimise the risk of COVID-2019 infection in patients and staff during the perioperative period.

Materials and Methods

The retrospective study was conducted at the Hepatobiliary and Liver Transplant Centre (HLTC), Bahria International Hospital Orchard, Lahore, Pakistan, in February 2021, and comprised data of all patients who were discussed in the multidisciplinary meeting (MDM) of the Unit between May 1 and December 31, 2020. The sample was raised using consecutive non-probability sampling technique after obtaining exemption from the institutional ethics review board. The patients had been advised surgical treatment after their formal counselling and on furnishing informed consent. The patients during pre-operative workup were screened for COVID-19 with RT-PCR via deep nasal swabs and CT scan of chest.

Positive patients were first managed for COVID-19 infection according to their clinical need, and surgery was rescheduled post-recovery. The pre-operative COVID-19 screening protocol was one COVID-19 PCR- negative just before admission and a repeat negative COVID-19 PCR 1-2 days before the surgery. Patients' pre-operative anaesthesia risk was classified according to the American Society of Anaesthesiologist (ASA) guidelines,[14] and the performance status of patients was assessed using the Eastern Cooperative Oncology Group Performance Scale (ECOG-PS).[15] All surgeries were carried out with full personal protective equipment (PPE), including N95 masks and hazardous material (Hazmat) suits under the surgical scrubs. Post operatively, recovery was in the ICU without moving the patients to any other station till discharge in order to minimise the risk of infection. Only COVID-19 screened negative medical staff was involved in patient care in pre-operative, intra-operative and post-operative stay. Such staff was tested via COVID-19 PCR on a monthly basis. In case of development of clinical signs and symptoms of COVID-19 infection, the staff member was immediately isolated and PCR test was repeated. Outcome of patients was measured in terms of COVID-19 infection, its related post-operative complications and 30-day mortality.

Data was analysed using SPSS 20. Data was expressed as median with minimum-maximum range for skewed quantitative variables. For categorical variables, the frequencies and percentages were reported.



Y-Axis showing the number of patients. ASA: American Society of Anaesthesiologists. COVID-19: Coronavirus disease-2019).

Figure-1: ASA Score and its association with COVID-19 patients.

Table-1: Diagnosis of the patients.

Diagnosis	n (%)
Pancreatic Head/Periampullary Tumour	19(43.2)
Pancreatic Body Tumour	4(9.1)
CA Gallbladder	4(9.1)
Choledochal Cyst	1(2.3)
Pseudocyst Pancreas/Necrosis	2(4.5)
HCC	2(4.5)
CBD stones	1(2.3)
Liver Haemangioma	1(2.3)
Intra-abdominal Bleed	3(6.8)
Hydatid Cyst Liver	2(4.5)
Cholelithiasis	2(4.5)
Iatrogenic CBD Injury	1(2.3)
Wound Dehiscence	1(2.3)
Supra Renal Mass	1(2.3)

CA Carcinoma, HCC: Hepatocellular carcinoma, CBD: Common bile duct.

Table-2: Number of surgical procedures included.

Procedure	n (%)
Whipple's Procedure	15(35.7)
Distal Pancreatectomy	3(7.1)
Radical Cholecystectomy	4(9.5)
Bypass Surgery	3(7.1)
External Drainage	1(2.4)
Excision of Choledochal Cyst	1(2.4)
Liver Resection	3(7.1)
Adrenalectomy	1(2.4)
CBD exploration	1(2.4)
Laparotomy	4(9.5)
Cyst Excision	2(4.8)
Necrosectomy	1(2.4)
Lap Cholecystectomy	2(4.8)
Hepatico-Jejunostomy	1(2.4)
Total	42

Common Bile Duct (CBD).

Results

Of the 44 patients, 29(65.9%) were males and 15(34.1%) were females. Overall, 32(72.7%) patients were aged >40 years, 8(18.2%) were aged 20-40 years and 4(9%) were aged <20 years. Majority of the patients 19(43.2%) were diagnosed with pancreatic head/periampullary tumours (Table-1). Surgery was carried out in 42(95.5%) cases; the majority being Whipple's procedure 15 (35.7%) (Table-2).

Of the total, 7(15.09%) patients were found to be positive for COVID-19 during pre-operative screening; 6(85.7%) on RT-PCR and 1(14.3%) on CT chest. Surgeries in all these cases were deferred and they were first managed according to their clinical needs. Among these patients 9(14.3%) patients had pre-admission COVID-19 PCR negative status and turned positive post-admission, leading to cancellation and interval surgery after 2 weeks. Among these patients, 5(71.4%) had successful surgery post-recovery, 1(14.3%) died without surgery due to pulmonary complications related to COVID-19 and 1(14.3%) patient was lost to follow-up.

Among the 42(95.5%) patients who underwent any procedure, 2(4.7%) turned positive for COVID-19 in the post-operative period. Both these patients belonged to

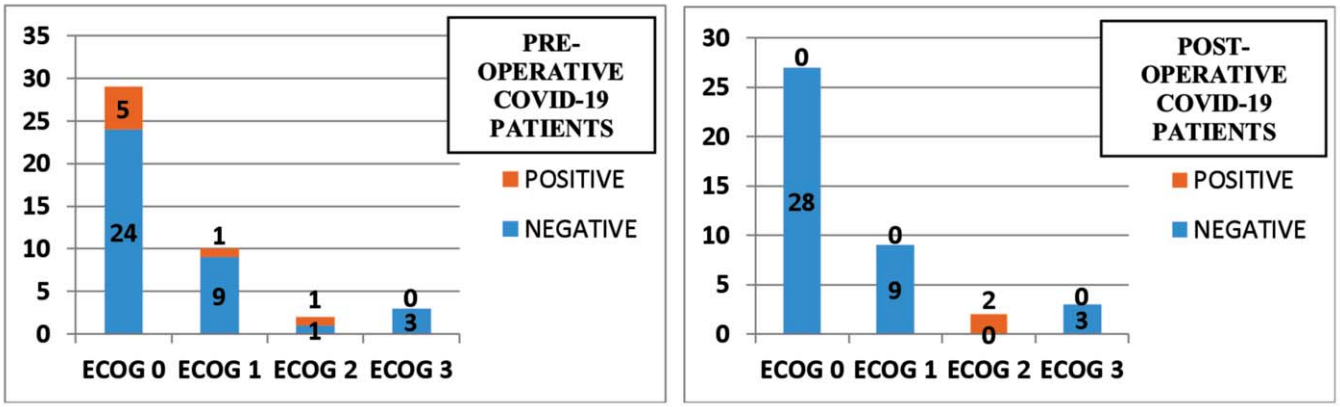
Table-3: Outcomes of patients.

Sr. No.	Diagnosis	No. of cases	Pre-op COVID-19 Status		Post-op COVID-19 Status		Procedure	Complication/s	Outcome
			+ve	-ve	+ve	-ve			
1	Pancreatic Head/ Periampulary Tumour	19	4	15	0	18*	15 Whipple's 3 Bypass 1 No surgery	2 x Postop bleeding 1 x Wound dehiscence 1 death	13 x adjuvent 3 x palliative chemo
2	CA Gallbladder	4	1	3	0	4	4 x Radical cholecystectomy	Nil	4 x Discharged
3	HCC	2	0	2	0	2	2 x Liver resections	Nil	2 x Discharged
4	Pancreratic Body tumour	4	1	3	0	3**	3 x Left sided Pancreatectomy	1 x Postop bleeding	3 x Satisfactory follow up
5	Pseudocyst pancreas/ pancreatic necrosis	2	0	2	1	1	2 x Necrosectomy & drainage	1 x asymptomatic Covid-19 infection, recovered quickly	2 x Discharged
6	Supra renal mass	1	1	0	1	0	1 x Adrenalectomy	1 x pneumonia (not related to COVID)	1 x Discharged
7	Others	12	0	12	0	12	Different surgeries	Nil	12 x Discharged
	Total	44	7(15.9 %)	37 (88.1%)	2	40	42 surgeries		

NA: Not applicable, CA: Carcinoma, HCC: Hepatocellular carcinoma, CBD: Common bile duct, COVID-29: Coronavirus disease-2019.

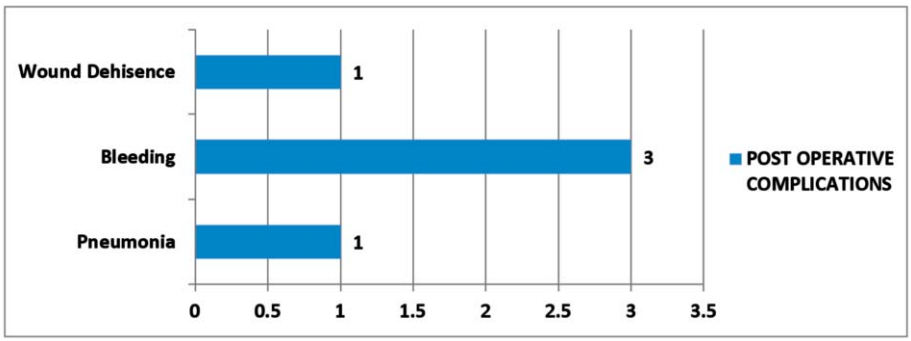
* One patient died before surgery.

**One patient lost to follow up.



Y-Axis showing the number of patients. ECOG PS: Eastern Cooperative Oncology Group Performance Scale. COVID-19: Coronavirus disease 2019.

Figure-2: ECOG PS and its association with COVID-19 patients.



X-Axis showing the number of patients.

Figure-3: Post-operative complications.

comparatively poor ASA score (Figure-1) and ECOG-PS score which in majority cases was 0 (Figure-2). Besides, 1(50%) of them had history of international travel just before the scheduled surgery.

Smooth recovery was noted in 37(88%) cases. There was 1(2.4%) mortality in the 30-day post-operative period which was due to myocardial infarction (MI) and was not related to COVID-19. Complications were seen in 5(11.90%) patients (Figure-3). In 1(2.4%) case with COVID-19 recurrence, there was development of right-side pneumonic patch which required high-flow oxygen. Three (9.3%) out of total 32 staff members were found to be asymptomatic COVID-19 PCR-positive during routine screening and were quarantined.

Discussion

The COVID-19 pandemic has affected the medical practices worldwide and cancer patients have seriously suffered because of the risk of their disease progression. According to the American College of Surgeons, triage guidance for cancer patients is presented in three phases. In the general phase, one describes a semi-urgent setting where resources and ICU capacity are not exhausted. During this phase, surgery is recommended in patients likely to have compromised survival if surgery is not performed within three months.[3] As the HLTC had a long list of cancer patients waiting for surgeries, it was decided to triage the patients accordingly.

Ideally, all patients should be screened with the gold standard RT-PCR test 24 hours before the procedure with or without an antibody test followed by isolation until surgery.[12] Nahshon C. et al. presented data of 64 surgical patients from 4 different studies, who were asymptomatic and not tested for COVID-19 pre-operatively. Of them, 51(80%) patients were found COVID-19-positive post-operatively. Mortality rate was very high (27%) in these patients, with significant morbidity, mainly pulmonary complications.[16] In another study of 46 patients with acute post-operative symptoms requiring chest imaging, 8(17%) patients were ultimately diagnosed with COVID-19. Among them, 5(62%) required mechanical ventilation and 2(25%) died.[17]

In the current study, all patients had been screened for COVID-19 infection twice during the pre-operative workup with the help of deep nasal swabs for RT-PCRs and CT chest, and 7 of the 44 patients turned out to be positive. The policy of two negative PCRs and CT chest was adopted in order to cover for the 30% false negative (FN) rate due to any reason and incubation period.[18]

Due to the highly contagious nature of the virus and its spread through fomites, it is necessary to have designated operating theatres (OTs) for COVID-19 or suspected patients undergoing surgery.[19] All the surgeries in the

current study were performed in one designated OT. One team of anaesthesia and one team of surgeons were involved in all the surgeries. There was a separate area for donning and doffing. The purpose of all this was to minimise the exposure of patients and staff to contagious and droplet infection.

A single large district general hospital with 1200 beds in the United Kingdom presented its data of 621 elective cancer surgeries, from a range of specialties, but not HPB. According to the results, none of the patients were positive for COVID-19 post-operatively, using RT-PCR testing.[20] In a study done in Wuhan, 25 cases were identified COVID-19-positive in the thoracic surgery ward. Among them, 13 were post-operative patients and 12 were healthcare staff.[21] A study in Turkey presented data of 40 operated cancer patients. Two of them had pancreas cancer and 12 had liver metastases (colorectal cancer). All patients were followed for 30 days post-surgery. No patient had COVID-19 positivity or respiratory symptoms.[22]

Hospital asymptomatic staff can be a potential source of infection to patients. In the current study, 2 patients turned out to be COVID-19-positive post-operatively. One of them was the patient who was pre-operatively COVID-19-positive and was operated upon when he turned negative. After right-side adrenalectomy, he developed COVID-19 infection again 2 weeks post-discharge. The second patient developed COVID-19 after surgery, but recovered quickly. He had international travel just before surgery and perhaps was in the incubation period when he was tested before the surgery.

HPB surgery can be associated with major morbidity and significant mortality. For the past 5 years, the American College of Surgeons-National Surgical Quality Improvement Programme (ACS-NSQIP) has gathered robust data on patients undergoing HPB surgery. According to its findings, overall post-operative complication rate in HPB surgeries is 28.4% and peri-operative mortality is 2.7%.[23] In the current study, post-operative complication rate was 11.9% and 30-day mortality rate was 2.3%. Performing surgeries in COVID-19 pandemic with full precautions, as such, was found to be safe for patients and staff with no associated increase in morbidity or mortality in HPB patients.

Conclusion

Surgical patients should be prioritised and triaged according to defined hospital protocols during the COVID-19 pandemic. Pre-operative COVID-19 screening should be a must for all surgical patients which will ultimately help in making decisions related to further treatment plans. HPB surgeries can be safely performed without any additional risks to patients or staff if strict COVID-19 safety protocols are followed.

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Conflict of Interest: None.

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