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Explorations Gone Viral: A Comparative Study of Emergency Laparotomies in COVID-19 Positive vs COVID-19 Negative Patients at A Tertiary Care Hospital during the COVID-19 Pandemic

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Abstract

Aim: To compare the mortality in emergency laparotomy cases between those with COVID-19 infection to those without the infection and to identify predicting factors that would help in optimum management for the same.

Method: A prospective observational study was conducted in a tertiary care centre in Mumbai. Patients underwent exploratory laparotomy of which 20 were COVID-19 positive (Group A) while 20 were COVID-19 negative (Group B). Patient's details with blood investigations, radiological investigations, preoperative and postoperative stay were taken into consideration. All these parameters were studied and compared in detail.

Result: 40 cases that underwent emergency laparotomy for various causes were compared. Pulmonary complications were seen postoperatively in 45% patients of Group A and 15% patients of Group B. Mortality was seen in 40% cases of Group A of which 87.5% cases were due to postoperative respiratory complications due to COVID-19 infection. Group B had one mortality, due to septic shock. Mortality was significantly higher in Group A(p-value: 0.008). Comorbidities such as hypertension, diabetes mellitus and ischemic heart disease were seen to be associated with a higher incidence of mortality. Mortality was witnessed more in the age group above 40 years. High APACHE-II score and Computed Tomography severity index (CTSI) showed higher mortality. Antivirals did not show any effect on postoperative survival.

Conclusion: Emergency operations can be taken up in COVID-19 positive patients with adequate precautions. Postoperative complications are related to comorbidities, age and CTSI. High index of suspicion for pulmonary complications and aggressive postoperative management with steroids gives improved outcomes.

Keywords: COVID-19; Emergency laparotomy; SARS-CoV2; Postoperative mortality.

Introduction

The coronavirus disease 2019(COVID-19) pandemic has significantly affected health and aggravated the previously milder diseases. Declared as a pandemic since March 2020 by World Health Organization, COVID-19 has been added as an important epidemic alongside Spanish flu, Severe Acute Respiratory Syndrome (SARS) and avian flu [1]. Many aspects of

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this disease, as well as treatment protocol and risks, remain unclear [2]. The virus has an impact on the respiratory system and other organs, such as the gastrointestinal system. Reports of thromboembolic events in this group of patients has led to a new spectrum of clinical presentations [3,4]. Gastrointestinal complications such as hollow viscus perforation and obstructions requiring urgent surgical intervention have also been seen. These imbalances, in conjunction with the disease, cause increased risk of surgery and possibility of higher complications during the perioperative period. The second wave showed an increase in the number of cases as compared to the first wave. Escalation in cases after a period of time could be due to the highly infectious double mutant variant of SARS-CoV-2 or the negligent behaviour of population and relaxation of interventions [5]. Omicron variant brought in the virulent third wave which had a shorter incubation period and faster doubling time [6]. Few studies show a higher mortality rate in surgical cases who developed COVID-19 pneumonia during the perioperative period [7,8]. This requires additional support by larger case series in tertiary care hospitals. The present study aims to detect the mortality related to COVID-19 infection in emergency laparotomy cases and to identify predicting factors that would help in the further optimum management for the same.

Materials and Methods

A prospective observational study was conducted in a tertiary care hospital in Mumbai from April 2020 to March 2022 after taking approval of The Institutional Ethics Committee. This included the first wave (April 2020 to September 2020), second wave (February 2021 to May 2021) and the third wave(December 2021 to March 2022) of the pandemic in India. A study group (Covid-19 positive patients) was compared with a control group (Covid-19 negative patients). Pre-operative Computed Tomography (CT) scan was done for all the patients with respiratory complaints in both groups. The patient's demographics, presentation, APACHE-II scoring, blood investigations including on admission, CT findings, perioperative condition, type of anaesthesia administered and the need of ICU (Intensive Care Unit) stay were considered. The treatment for the SARS-CoV-2 virus was done as per the protocols as per the time of admission of the patient. Precautions were taken to prevent exposure, with personal protective equipment worn by the surgical and anaesthetic team during the surgery. All instruments were autoclaved before and after usage, with fumigation done after every surgery in the operation theatre. Mortality in both groups was compared and significance was checked with the help of chi square ($\chi 2$) test. Patient complaints and recovery were followed up for a period of one month after surgery, which included clinical history and examination. The study was done according to STROBE guidelines for observational studies. The $\chi 2$ test was used for categorical data for test of Significance. P-value of <0.05 was considered significant with a confidence interval of 95%..

Results

40 emergency laparotomy cases were studied out of which 20 were suffering from COVID-19 infection (Group A) during the surgery while 20 were not infected(Group B). Of the COVID-19 positive patients, 11 cases were from the first wave of the pandemic, while five cases were from the second wave and four from the third wave. The mean hospital stay was 26.2 days, with most patients taken for surgery within 12 hours of admission, barring a re-exploration taken up after six days of admission and a sigmoid colon mass perforation which occurred after 10 days of admission. Patients presented with similar abdominal complaints in both the groups. All patients complained of abdominal pain. Group A had symptoms such as vomiting (50%), fever (15%), abdominal distension (15%) and inability to pass stools (15%). Patients from Group B had complaints such as vomiting (50%), inability to pass stools (40%), fever (35%), and abdominal distension (5%). One patient in Group B also gave a history of foreign body insertion through rectum. Twelve patients had associated respiratory symptoms of breathlessness, cough, and sore throat from Group A while only one patient had complaints of breathlessness in Group B. This was seen to be statistically significant between the groups with a p-value of 0.0002. Comorbidities between the two groups were comparable (Table1).

Of the 20 cases in Group A, 12 were operated for perforation peritonitis, one for appendicular tip perforation, one for gall stone ileus, two for acute intestinal obstruction, one for superior mesenteric artery(SMA) thrombosis (Figures1&2), one for acute appendicitis, one for hemoperitoneum with sigmoid laceration and one for ruptured hepatic abscess. From Group B, seven patients were operated for perforation peritonitis, six cases for intestinal obstruction, one for anastomotic leak, two for burst abdomens (post appendicectomy and ileal perforation repair), one for a foreign body inserted in the rectum, one for emphysematous cholecystitis, one for SMA thrombosis and one for a perianal and intraabdominal abscess. All surgeries were done under general anaesthesia, other than an appendicectomy in Group A, which was done under spinal anaesthesia. Explanation was given to all about the possible complications of their respective surgeries and anaesthesia. The added risk associated with SARS-CoV-2 infection leading to pulmonary complications was also emphasised to the patients in Group A.

Intensive care was required for 55% (11 of 20) of Group A cases. In Group B, 60% (12 of 20) patients required ICU care postoperatively. Group A and B respectively had eight and nine patients requiring postoperative mechanical ventilation with an average stay in ICU of 1.5 and 3.18

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Table 1: Patient demographics and co-morbidities

	Group A		Group B	
Category	**N (%)**	**Mortality**	**N (%)**	**Mortality**
Sex				
Female	20%	75%(3 of 4)	15%	0%(0 of 3)
Male	80%	31.25%(5 of 16)	85%	5.8%(1 of 17)
Age				
>=39yrs	45%	22.22%(2 of 9)	50%	0%(0 of 10)
40-59yrs	45%	55.55%(5 of 9)	35%	0%(0 of 7)
60=<yrs	10%	50%(1 of 2)	15%	33.33%(1 of 3)
Co-morbidities				
Diabetes	25%	80%(4 of 5)	15%	33.33%(1 of 3)
Hypertension	15%	66.6%(2 of 3)	10%	0%(0 of 2)
Ischemic Heart Disease	10%	50%(1 of 2)	5%	0%(0 of 1)
Abdominal Symptoms				
Abdominal Pain	100%	40%(8 of 20)	95%	5.26%(1 of 19)
Fever	15%	100%(3 of 3)	35%	0%
Vomiting	50%	60%(6 of 10)	50%	0%
Constipation	5%	0%	20%	0%
Abdominal Distension	15%	66.66%	5%	0%
Respiratory Symptoms				
Cough	25%	60%(3 of 5)	0%	0%
Breathlessness	25%	20%(1 of 5)	5%	0%
Sore Throat	10%	0%(0 of 2)	0%	0%

Figure 1: Resected Gangrenous Bowel due to Superior Mesenteric Artery Thrombosis

Figure 2: Post-operative closure with ileostomy for a patient with SMA thrombosis with SARS CoV2 infection.

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days, amongst the patients who were discharged. There was no significant difference between the two groups regarding post-operative need for ICU (p-value: 0.75) and mechanical ventilation(p-value:0.34). Postoperative ICU stay in those who did not survive was seen to be less than two days in Group A and three days in Group B. High flow nasal oxygen was administered for one COVID-19 positive patient with SMA thrombosis and was started on Category-1 AKT for a pre-existing tubercular lesion. Antivirals were given to 12 patients of the 20 in Group A and showed no effect on mortality. CT Thorax was done and compared for the patients with respiratory complaints in both the groups. In Group A, 12 patients underwent CT thorax with all showing changes in the pulmonary fields and 11 patients having ground glass opacities. Bilateral pleural effusion was seen in six patients, patchy areas of consolidation in five patients and cavitatory lesions in two patients suggestive of Koch's infection, of which only one tested positive on sputum GeneXpert testing. CT Severity index (CTSI) calculated for the patients ranged from 4 to 12, with the average being 5.08. Amongst the mortalities in Group A, the average CTSI was 8.75. Hence, a higher CT Severity score showed a higher mortality. In Group B, one patient with respiratory complaints showed no abnormalities on CT. APACHE-II scoring was calculated preoperatively, ranging from 2 to 32. Amongst the eight postoperative mortalities in Group A, the average APACHE-II score was 14(ranging from 2 to 32), while that of the patients who survived in Group A was 5.33(ranging from 3 to 8). Two patients had an APACHE-II score of more than 30, with both experiencing a fatal outcome. In Group B the one mortality had a score of 10 whereas the patients who survived had an average score of 5.53(ranging from 2 to 8). Statistically, APACHE-II score showed no significant difference between Group A and B(p-value: 2.11) and lacked the sensitivity to predict eventual mortality. Postoperatively, three patients, all from Group A, underwent re-exploration. One underwent refashioning of prolapsed ileostomy stoma and the other two were taken up to for repair of burst abdomen (Figure3).

Pulmonary complications were seen postoperatively in 9(45%) patients in Group A as compared to three(15%) patients in Group B. Out of the nine patients in Group A, respiratory failure was seen in five patients, pneumonia in two patients. One of the patients who developed pneumonia was seen to develop respiratory failure as well. Out of the three patients in Group B, two suffered from pneumonia, of which one had respiratory failure and required a prolonged postoperative ICU stay. The remaining one patient of Group B had lung atelectasis and recovered in two days postoperatively (Table 2a &b). This showed a significant difference in pulmonary complications between the groups (P-value: 0.047), with it being greater in Group A.

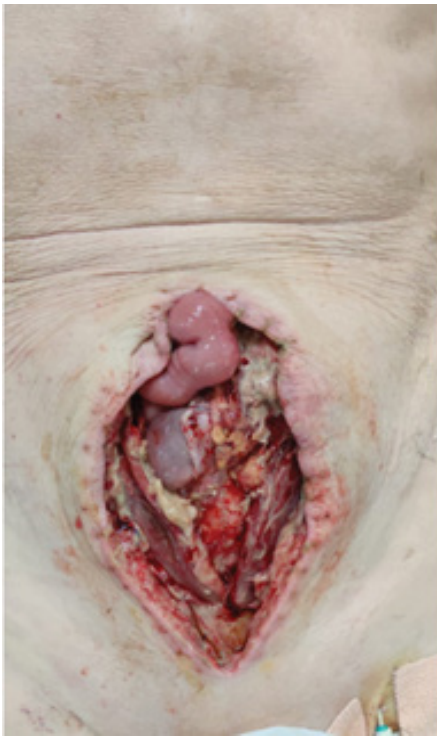

Figure 3: Post operative burst abdomen which needed re-exploration.

Mortality was seen in 40% (8 of 20) cases in Group A, of which 87.5% (7 of 8) cases were attributed to postoperative respiratory complications due to COVID-19 infection and 12.5%(1 of 8) cases were due to septic shock due to peritonitis. The flaring up of COVID-19 infection after surgical and anaesthetic insult could be due to the added surgical stress, superadded abdominal infection, and postoperative respiratory compromise. In Group B, there was only one mortality which was due to post-operative septic shock. Hence, the mortality in Group A was seen to be significantly different (higher) with a P-value of 0.008. Amongst the mortalities in Group A, five of them had small bowel perforations; two had acute intestinal obstruction while one patient had SMA thrombosis. Of the eight mortalities, six (of 11 cases) were seen during the first wave while there was only one (of 5 cases) seen during the second wave and one (of 4 cases) in the third wave. Comorbidities were seen in nine patients from Group A and five patients from Group B. Amongst the nine from Group A, six (66.67%) developed postoperative respiratory complications while four of the 11(36.36%) patients without comorbidities suffered from the same. On comparing the mortality, in Group A, five of the nine (55.56%) patients with comorbidities had a fatal outcome compared to three of the 11(27.27%) patients without any. In Group B, two out of the five(40%) patients with comorbidities developed postoperative respiratory complications as compared to one out of the 15(6.67%) without comorbidities. There were no

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Table 2(a): Procedures done along with their pre and post-operative course in COVID-19 positive patients (Group A)

Diagnosis	Age in years	Details of procedure	Year	Co-morbidities	APACHE II Score	Mechanical ventilation and duration	CT Thorax findings (CTSI)	Postoperative complications
Perforation peritonitis	20	Modified graham's patch repair	2020	None	4	No	GGOs with bilateral pleural effusion and atelectasis (2)	Pleural effusion
Suspected appendicular abscess	50	Appendicectomy	2020	HTN, IHD	4	No	GGOs with bilateral pleural effusion and atelectasis (4)	Pleural effusion
Perforation peritonitis	22	Primary repair of ileal perforation with loop ileostomy	2020	None	3	Yes; 2 days	Not done	None
Perforation peritonitis*	50	Primary repair of ileal perforation and appendicectomy	2020	None	2	Yes; 6 days	GGO with bilateral pleural effusion (8)	Pneumonia, immediate ventilator >48hrs
Perforation peritonitis*	33	Ileostomy	2020	None	30	Yes; 5 hours	Consolidation and GGO in upper lobe. Calcified mediastinal nodes and bronchiectatic changes (7)	Post operative respiratory failure needing endotracheal intubation
Perforation peritonitis*	55	Primary repair of jejunal perforation	2020	DM, HTN	32	Yes; 2 days	Consolidation and cavitation in left upper lobe. GGOs in left lower lobe. Bilateral pleural effusion (8)	Post operative respiratory failure needing endotracheal intubation, immediate ventilator >48hrs
Acute intestinal obstruction*	66	Diversion loop colostomy	2020	DM, HTN	17	Yes; 2 days	Not done	Post operative respiratory failure needing endotracheal intubation, immediate ventilator >48hrs
Gall stone ileus*	45	Retrieval of gall stone from jejunum after enterotomy and primary closure of enterotomy	2020	DM	7	No	Not done	Post operative respiratory failure needing endotracheal intubation

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Superior mesenteric artery thrombosis*	54	Ileal resection and anastomosis with ileostomy	2020	DM, IHD	7	Yes; 10 days	Consolidation with cavity formation in bilateral upper lobes with GGOs (12)	Burst abdomen requiring re-exploration, immediate ventilator >48hrs
Perforation peritonitis due to stab injury	23	Primary repair of ileal perforation	2020	None	5	No	Lung atelectasis with bilateral GGOs (2)	None
Acute appendicitis#	57	Open appendicectomy with drainage of appendicular abscess	2020	None	6	No	Not done	None
Perforation peritonitis	30	Modified graham's patch repair	2021	None	5	No	Consolidation with GGOs in bilateral upper lobes and bilateral pleural effusion (1)	None
Perforation peritonitis*	52	Primary repair of ileal perforation	2021	None	8	Yes; 5 days	Not done	Pneumonia, post operative respiratory failure needing endotracheal intubation, immediate ventilator >48hrs
Perforation peritonitis in a case of diverticulitis	49	Peri-colic abscess drainage and transverse loop colostomy	2021	DM	4	No	Bilateral GGOs with subpleural fibrotic bands involving both the lower lobes (4)	None
Perforation peritonitis	26	Modified graham's patch repair	2021	None	4	No	Bronchiectactic changes with bilateral GGOs (4)	Superficial SSI
Acute obstruction with sigmoid colon mass	30	Transverse colostomy	2021	Abdominal Koch's, Retroviral disease	8	No	GGOs in the left lung (1)	None
Perforation peritonitis	60	Resection and anastomosis of ileum with proximal loop ileostomy	2022	Abdominal Koch's	5	No	Not done	Prolapsed stoma requiring re-exploration

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Perforation peritonitis*	16	Primary repair of ileal perforation	2022	Abdominal Koch's	9	Yes; 3 days	Not done	Septic shock
Hemoperitoneum	56	Resection and anastomosis of sigmoid colon with diverting ileostomy	2022	None	8	No	Not done	Acute renal failure needing dialysis
Ruptured hepatic abscess with peritonitis	27	Evacuation and drainage of intraperitoneal pus	2022	None	8	No	Bilateral pleural effusion with atelectasis (8)	Burst abdomen requiring re-exploration

*: Mortality

#: Done under Spinal anaesthesia (Others were done under General anaesthesia)

DM: Diabetes mellitus

HTN: Hypertension

IHD: Ischemic heart disease

CT: Computed tomography

CTSI: Computed tomography severity index

GGO: Ground glass opacities

SSI: Surgical site infection

Table 2(b): Procedures done along with their pre and post-operative course in COVID-19 negative patients (Group B)

Diagnosis	Age (years)	Details of procedure	Year	Co-morbidities	APACHE II Score	Mechanical ventilation and duration	CT Thorax findings (CTSI)	Postoperative complications
Anastomotic leak post Resection and anastomosis for carcinoma sigmoid colon	73	Redo resection and anastomosis with transverse Colostomy	2020	None	5	Yes; 4 days	Not done	Septic Shock, Pneumonia, Post operative Respiratory Failure needing Endotracheal Intubation, Immediate Ventilator >48hrs
Perforation peritonitis	18	Modified Graham's patch repair	2020	None	2	No	No abnormalities (0)	None
Burst abdomen in an operated case of appendicectomy	40	Right hemicolectomy with ileotransverse anastomosis and proximal loop ileostomy	2020	None	8	No	Not done	Post operative bleeding needing transfusion

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Perforation peritonitis	33	Worm retrieval and Modified Graham's patch repair	2020	None	4	No	Not done	None
Acute intestinal obstruction	44	Ileal segment resection and anastomosis with Proximal ileostomy	2020	None	6	No	Not done	None
Acute intestinal obstruction	44	Adhesiolysis	2021	None	3	No	Not done	None
Perforation peritonitis	20	Primary Repair of Ileal Perforation	2021	None	2	No	Not done	None
Perforation peritonitis	42	Primary repair of sigmoid perforation with Ileostomy	2021	Abdominal Koch's and retroviral disease	7	No	Not done	SSI(Burst Abdomen)
Perforation peritonitis	63	Modified Graham's patch repair	2021	None	6	No	Not done	Renal Insufficiency
Foreign body insertion per rectum	27	Enterotomy with retrieval of foreign body	2021	None	5	No	Not done	None
Perforation peritonitis	22	Modified Graham's patch repair	2022	None	4	No	Not done	None
Acute intestinal obstruction with colon mass	26	Extended right hemicolectomy with ileostomy	2022	None	6	Yes; 1 day	Not done	Post operative bleeding needing transfusion
Perforation peritonitis*	65	Adhesiolysis with Primary repair of jejunal perforation(Previous roux-en-y surgery)	2022	Diabetes Mellitus	10	Yes; 1 day	Not done	Septic Shock
Acute intestinal obstruction	40	Segmental ileal resection and anastomosis with proximal loop ileostomy	2022	None	5	No	Not done	None

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SMA thrombosis with ileal necrosis	35	Ileal resection with double barrel stoma	2022	Hypertension	7	Yes; 2 days	Not done	Immediate Ventilator <48hrs
Emphysematous cholecystitis with liver abscess	58	Subtotal cholecystectomy with drainage of liver abscess	2022	Diabetes Mellitus, Hypertension	8	Yes; 2 days	Not done	Septic Shock
Acute intestinal obstruction	32	Right hemicolectomy with ileotransverse anastomosis and proximal loop ileostomy	2022	None	7	Yes; 1 day	Not done	Post operative bleeding needing transfusion
Burst abdomen in an operated case of primary repair of ileal perforation	32	Segmental ileal resection and anastomosis with loop ileostomy	2022	None	8	Yes; 1 day	Not done	Septic Shock, Post operative bleeding needing transfusion
Intra-abdominal and perianal abscess	59	Drainage of intra-abdominal and perianal abscess	2022	Diabetes Mellitus, Ischaemic Heart Disease	7	Yes; 1 day	Not done	Superficial SSI, Septic Shock, Pneumonia
Acute intestinal obstruction	27	Right hemicolectomy with ileotransverse anastomosis and proximal loop ileostomy	2022	None	5	Yes; 1 day	Not done	Post operative bleeding needing transfusion

*: Mortality

CT: Computed tomography

CTSI: Computed tomography severity index

SSI: Surgical site infection

mortalities amongst the patients without comorbidities in Group B, as compared to one amongst the five (20%) with comorbidities. The age groups between 40-59 years had the highest mortalities, with five of the nine mortalities within this age group and from Group A. Six of the eight (75%) deaths from Group A were above 40 years of age, while two (25%) deaths were below 40 years of age. The p-value was calculated to compare Group A and B with respect to age, pulmonary complication, and mortality. There was no significant difference between the two groups with regards to pulmonary complications. Group A patients were seen to have a significantly greater mortality in the age groups between 40-60 years compared to Group B(p-value:0.017). Group B had one mortality which was above 60 years of age. All 31 discharged patients (12 from Group A and 19 from Group B) were followed up after one month. Complaints were reviewed, and patients examined (Table 3a and b). Two patients from Group A had mild breathlessness on exertion, relieved on taking rest. No patients from Group B had any respiratory complaints and no respiratory compromise was seen in any of the discharged patients after one month. Three patients (one from Group A and two from Group B) had a postoperative surgical site infection which was treated with daily dressings.

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Table 3(a): One month Follow Up in Group A Patients

Diagnosis	Respiratory complaints	Abdominal complaints	Examination	Co-morbidities
Prepyloric Perforation	None	None	Normal	None
Appendicular tip Perforation	Breathlessness on exertion	None	Normal	Hypertension, Ischaemic Heart Disease
Ileal Perforation	None	None	Normal	None
Ileal Perforation due to Stab injury	None	Abdominal Pain	Normal	None
Acute Appendicitis	None	None	Normal	None
Prepyloric Perforation	Breathlessness on exertion	None	Normal	None
Peri-colic abscess secondary to diverticulitis	None	None	Normal	Diabetes Mellitus
Prepyloric Perforation	None	Surgical site wound	Surgical site infection	None
Sigmoid Colon Adenocarcinoma with Metastasis	None	None	Normal	Abdominal Koch's, Retroviral disease
Distal Ileal Obstruction with Ileal Perforation	None	None	Normal	Abdominal Koch's
Hemoperitoneum with Sigmoid colon laceration	None	None	Normal	None
Ruptured hepatic abscess	None	Abdominal Pain	Normal	None

Table 3(b): One month Follow Up in Group B Patients

Diagnosis	Respiratory complaints	Abdominal complaints	Examination	Co-morbidities
Anastomotic leak post Resection and Anastomosis	None	None	Normal	None
Prepyloric Perforation	None	None	Normal	None
Burst Abdomen post appendicectomy	None	None	None	None
Duodenal perforation with worm infestation	None	None	Normal	None
Acute Intestinal obstruction	None	None	Normal	None
Acute Intestinal obstruction	None	None	Normal	None
Ileal Perforation	None	None	Normal	None
Sigmoid Perforation	None	Surgical site wound	Surgical site infection	Abdominal Koch's, Retroviral disease
Prepyloric Perforation	None	None	Normal	None
Foreign body insertion per rectum	None	None	Normal	None
Prepyloric Perforation	None	None	Normal	None
Adenocarcinoma of transverse colon	None	None	Normal	None
Acute Intestinal obstruction	None	None	Normal	None
SMA thrombosis with ileum necrosis	None	Abdominal Pain	Normal	Hypertension
Emphysematous cholecystitis with liver abscess	None	Abdominal Pain	Normal	Diabetes Mellitus, Hypertension
Acute Intestinal obstruction	None	None	Normal	None
Burst abdomen post Primary repair of Ileal Perforation	None	None	Normal	None
Intra-abdominal and perianal abscess	None	Surgical site wound	Surgical site infection	Diabetes Mellitus, Ischaemic Heart Disease
Acute intestinal obstruction	None	None	Normal	None

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Discussion

COVID-19 is known to cause a number of complications such as acute respiratory distress syndrome, gastrointestinal disturbances, acute cardiac injury, acute kidney injury and secondary infections [9]. The increase in reactive oxygen species and activation of the renin–angiotensin–aldosterone system causes insulin resistance and hyperglycaemia. There is an increase in fibrinogen and D-Dimer, increasing the blood viscosity and vascular endothelial damage and, hence, the associated cardiovascular events, thromboembolism and disseminated intravascular coagulation [10]. The present study determines the difference in outcomes in patients undergoing emergency laparotomy with SARS-CoV-2 infection compared to those unaffected. Infected patients had a significantly higher (p-value: 0.008) number of preoperative respiratory complaints as compared to those without the infection. Although there was no significant difference between patients with or without the infection for the requirement of postoperative ventilation(p-value:0.34) or ICU care(p-value:0.75), pulmonary complications were significantly higher in patients with COVID-19 infection(45%) as compared to those without the infection(15%) and undergoing emergency laparotomies(p-value:0.047). The study showed that patients with comorbidities such as DM and hypertension had a worse outcome compared to those without them. There was a higher incidence of postoperative complications (COVID-19 positive: 66.67% vs 36.3% and COVID-19 negative: 40% vs 6.67%) and mortality (COVID-19 positive:55.56% vs 27.27% and COVID-19 negative:20% vs 0%) in those with comorbidities in both groups. The use of antivirals did not correlate to a reduction in postoperative mortality. APACHE-II score, for indicating postoperative outcomes, was not sensitive as scores ranged between 2 to 32 in the patients with eventual mortality. It did not show a significant increase in COVID-19 positive patients as well (p-value: 2.11). However, despite lacking sensitivity, all patients with an APACHE-II score of more than 30 had a fatal outcome.

Postoperatively, respiratory complaints increased which signified a possible subtle presentation which flared up after surgical and anaesthetic trauma. Mortality was most commonly due to respiratory failure in cases with COVID-19 infection (87.5%) as compared to those not infected(0%). This also corresponded to the higher CTSI in the patients with mortalities. The mortality in COVID-19 positive patients was also seen to be significantly higher (p-value: 0.008). As we progressed onwards with our experience with COVID-19 emergencies and improved knowledge about the disease we could see an improvement in outcomes of the patients. This was confirmed with the decrease in mortality as seen in the second and third wave. Initial high mortality rates could also be due to delayed presentations to the hospital due to lack of transportation and referral facilities during the peak of lockdown imposed around our district. As these facilities were made available later, patients were able to report to facilities promptly and get the necessary treatment. Aggressive use of steroids also helped with decreasing mortality over the months. Few studies have been done to detect the effect of SARS-CoV-2 on surgical procedures and its increased morbidity and mortality associated with it. A study by COVIDsurg collaborative was done on mortality and pulmonary complications in patients undergoing surgery with perioperative SARS-CoV-2 infection during the first wave of the pandemic [11]. This cohort study covered 235 hospitals with 1128 patients who had undergone surgeries, of which 373 had undergone gastrointestinal surgeries like the present study. It showed that emergency surgeries had a higher incidence of mortality compared to elective surgeries (25.6% [214 of 835] vs 18.9% [53 of 280]). The present study showed similar results with a high mortality seen in the patients operated on emergency basis for exploratory laparotomy with COVID-19 infection as compared to patients without the infection (40% vs 5%). Pulmonary complications related to COVID-19 infection such as pneumonia, pleural effusion and ventilatory requirement was recorded in both studies as well. Handaya et al conducted a study consisting of four cases that underwent emergency laparotomy surgeries in COVID-19 positive patients with gastrointestinal emergencies [5]. All the patients underwent emergency laparotomy, received postoperative care, and were discharged from the hospital. After one month follow-up, one patient had no complaints, two patients had surgical site infections, and one patient died because of acute respiratory distress syndrome due to lung metastasis. Compared to the present study the mortality was seen to be less. With similar follow up periods, surgical site infections were seen in both studies. Acute respiratory distress, however, was not seen as a delayed presentation in the present study. Antiviral treatment has been studied extensively with multiple trials attempting to bring about better outcomes. It has been seen that antiviral medication, alone or in combination with other medications, did not show an increase in survival. However, increased survival has been associated with low molecular weight heparin and tocilizumab [12]. The effect of antivirals or additional medications required perioperatively in emergency surgeries in COVID-19 needs further research. The present study involved the enrolment of consecutive cases in a single centre which provided results of a consistent and uniform management protocol. This helped in reducing the varied outcomes due to different surgical techniques practiced in different set ups. At the same time the evolving concepts of COVID-19 infection management brought a heterogeneity in the management of the cases over the months. The limitation of the study was loss to follow up of the patients beyond a

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month after discharge. This caused a difficulty in recording any delayed presentations of the cases. It was seen in the present study that patients with comorbidities like DM, hypertension and ischemic heart disease (IHD) were at a higher risk for mortality in patients operated for exploratory laparotomy with COVID-19 infection. It was seen that the surgical and anaesthetic insult in COVID-19 infected individuals can cause unfavourable results and high risk of mortality compared to non-infected individuals undergoing emergency laparotomy. As our understanding of the disease improved the percentage of mortality decreased in the second and third wave as compared to the first wave.

Conclusion

Emergency operations can be taken up in COVID-19 positive patients with adequate precautions, after judging the benefits of surgery, due to increased chances of postoperative pulmonary complications and mortality. Patients with comorbidities like DM, hypertension and IHD are at a higher risk of having adverse postoperative outcomes. Radiological studies such as CT are helpful in detecting the severity and the mortality. Antivirals may not have an effect in the treatment for these patients. High index of suspicion of pulmonary complications helps in early detection. This predisposes to early introduction of steroid and aggressive management that helps in the reduction of mortality.

Conflict of Interest: None

References

1. Rafiq D, Batool A, Bazaz MA. Three months of COVID-19: A systematic review and meta-analysis. Rev Med Virol 30 (2020): 2113.
2. Agnes A, Greca ALA, Tirelli F, et al. Duodenal perforation in a SARS-CoV-2-positive patient with negative PCR results for SARS-CoV-2 in the peritoneal fluid. Eur Rev Med Pharmacol Sci 24 (2020): 12516-12521.
3. Mehrabi Nasab E, Heidarzadeh S, Yavari B, et al. Acute upper limb ischemia in a patient with COVID-19: A case report. Ann Vasc Surg 77 (2021): 83-85.
4. Parminder Kaur, Sahitya Posimreddy BS, Firas Qaqa, et al. COVID-19 Presenting as Acute Limb Ischaemia. Eur J Case Reports Intern Med 7 (2020): 001724.
5. Handaya AY, Andrew J, Hanif AS, et al. Covid-19 mimicking symptoms in emergency gastrointestinal surgery cases during pandemic: A case series. Int J Surg Case Rep [Internet] 77 (2020): 22-27.
6. Singhal T. The Emergence of Omicron: Challenging Times Are Here Again! Indian J Pediatr [Internet] 89 (2022): 490-496.
7. Lei S, Jiang F, Su W, et al. Clinical characteristics and outcomes of patients undergoing surgeries during the incubation period of COVID-19 infection. EClinicalMedicine [Internet] 21 (2020): 100331.
8. Aminian A, Safari S, Razeghian-Jahromi A, et al. COVID-19 Outbreak and Surgical Practice: Unexpected Fatality in Perioperative Period. Ann Surg 272 (2020): 27-29.
9. Chaolin Huang, Yeming Wang, Xingwang Li, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 395 (2020): 497-506.
10. Lim S, Bae JH, Kwon HS, et al. COVID-19 and diabetes mellitus: from pathophysiology to clinical management. Nat Rev Endocrinol [Internet] 17 (2021): 11-30.
11. Bhangu A, Nepogodiev D, Glasbey JC, et al. Mortality and pulmonary complications in patients undergoing surgery with perioperative sars-cov-2 infection: An international cohort study. Lancet 396 (2020): 27-38.
12. Guglielmetti L, Aschieri D, Kontsevaya I, et al. Treatment for COVID - 19- a cohort study from Northern Italy. Sci Rep [Internet] 11 (2021): 19-22.

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