

Minimal impact of COVID-19 outbreak on the postoperative morbidity and mortality following emergency general surgery procedures: results from a 3-month observational period

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ABSTRACT

Aim The outbreak of the COVID-19 pandemic has had a major impact on the delivery of elective, as well as emergency surgery on a world-wide scale. Up to date few studies have actually assessed the impact of COVID-19 on the postoperative morbidity and mortality following emergency gastrointestinal surgery. Herein, we present our relevant experience over a 3-month period of uninterrupted provision of emergency general surgery services in George Eliot Hospital NHS Trust, the United Kingdom.

Methods We performed a retrospective analysis of a prospective institutional database, which included the operation types, paraclinical investigations and postoperative complications of all patients undergoing emergency general surgery operations between March –May 2020.

Results The occurrence of a 5% overall respiratory complication rate postoperatively, with 3% infection rate for COVID-19 was found; no patient had unplanned return to intensive care for ventilator support and there was no mortality related to COVID-19 infection.

Conclusion When indicated, emergency surgery should not be delayed in favour of expectant/conservative management in fear of COVID-19-related morbidity or mortality risks.

Key words: emergency, SARS-CoV-2, surgery

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INTRODUCTION

Following the initial infection wave from COVID-19 in China in 2019, the European health services started to become affected during the first months of 2020, altering in many aspects the delivery of emergency medical and surgical care (1). With respect to the provision of acute care surgery, the options of delaying the definitive operative management can lead to dramatic increase of the morbidity and mortality, in contrast to elective operations, most of which can be postponed with relatively low risk for the patients (2). During these last months, most of the main scientific bodies and surgical societies have issued relevant guidance regarding the aspects of provision of acute care surgery, focusing on patient and personnel safety (3,4). With the scientific community still in the process of understanding the disease process and its system-specific implications, acute care surgery services inevitably have to continue to function; therefore, it is of paramount importance to assess the true impact of the COVID-19 pandemic on the emergency surgery postoperative outcomes. Up to date, there are only few clinical studies and case series addressing the impact of the COVID-19 infection on the emergency surgery postoperative outcomes with variable results (5,6).

Aim of this study was to present our experience relating to COVID-19-associated postoperative morbidity and mortality after emergency gastrointestinal surgery over a 3-month period, between March-May 2020, during which our centre provided continuous emergency general surgery services.

PATIENTS AND METHODS

Patients and study design

We reviewed retrospectively all general surgery emergency operations performed between 01 March– 31 May 2020 in George Eliot Hospital NHS Trust using the relevant software from our dedicated emergency theatre.

A total of 103 patients were identified, of which three patients were excluded from the outcome analysis, as they were still inpatients at the time of the analysis (all three tested negative via RT-PCR on admission for COVID-19, with no respiratory complications to date). Our final sample consisted therefore of a total of 100 patients.

We reviewed the patients' demographics, type of

performed surgery, the overall in hospital length of stay, the duration of hospitalisation and possible readmission to intensive care, as well as the occurred postoperative complications and assessed the existence of potential correlation between those parameters and suggested infection from COVID-19. Our study did not influence the patient care, hence no approval from our institutional ethical committee was required.

Methods

Screening for COVID-19 infection on the acute surgical admissions depended on the presence of concurrent symptomatology, as well as the current institutional guidance at the time of patients' admissions, which was updated at least twice per month. Our policy to assess the COVID-19 patient status included a combination of oropharyngeal swabs, which was analysed with real-time polymerase chain reaction (RT-PCR), and uncontrasted computed tomography (CT) of the chest.

All patients that clinically were likely to undergo a laparotomy and require postoperative admission to our Intensive Care Unit, had a completion CT chest along with the performance of abdominopelvic CT that was requested during the diagnostic workup for their presenting acute surgical pathology. Those additional thoracic CT scans were performed and reported by a Consultant Radiologist within our institution and the analysis of RT-PCR specimens was performed in our institution as well, with average time of results release fluctuating between 48 – 72 hours from admission.

RESULTS

A total of 100 patients were analysed, of which 56 (56%) were females and 44 (44 %) males, with an age span between 17-88 years (mean age 55.6 years). With respect to the type of surgery performed, out of 100 patients, 32 underwent a laparoscopic procedure, 65 had upfront open surgery and 3 were laparoscopic converted to open cases. In detail, the following procedures were undertaken: 26 appendicectomies (24 laparoscopic, 2 laparoscopic converted to open), 22 emergency laparotomies, 14 open hernia repairs (9 inguinal, 2 umbilical, 1 obturator, 1 femoral, 1 Spigelian), 10 cholecystectomies (9 laparoscopic, 1 open), 25 abscess requiring drainage under general anaesthesia (13 anorectal, 12 on trunk), 2 examinations of the anorectum under general anaesthesia with no additional procedure and fi-

Table 1. Characteristics of the 11 patients with non-respiratory postoperative complications*

Primary procedure	Type of complication	Management	Overall LOS (days)	ITU LOS (days)
Laparoscopic converted to open appendicectomy	Intra-abdominal collection	Antibiotics	24	0
Laparotomy and adhesiolysis (no resection)	Urinary tract infection	Antibiotics	12	0
Laparoscopic converted to open appendicectomy	Intra-abdominal collection	Antibiotics	5	0
Laparotomy and right hemicolectomy	Pulmonary embolism	Therapeutic anticoagulation	10	2
Open suture repair of obturator hernia	Central line and wound infection	Antibiotics	14	2
Laparoscopic appendicectomy	Urinary tract infection	Antibiotics	2	0
Open suture repair of inguinal hernia	Acute coronary syndrome	Therapeutic anticoagulation	8	1
Laparoscopic cholecystectomy	Intra-abdominal collection	Antibiotics	4	0
Open mesh repair of Spigelian hernia	Pulmonary embolism	Therapeutic anticoagulation	3	0
Laparotomy & Hartmann's procedure	Wound infection / Intra-abdominal collection	Antibiotics	21	3
Laparotomy and defunctioning ostomy	Cardiac arrhythmia / Intra-abdominal collection	Medical therapy, antibiotics	14	0

*Mean overall LOS 10.6 days, mean ITU LOS 0.6 days LOS, length of stay; ITU, Intensive Therapy Unit

nally 1 diagnostic laparoscopy, which was converted to open right hemicolectomy.

Overall, 35% of the admitted patients had pre-operatively a chest CT scan, with none suggestive of typical COVID-19 related changes. In the postoperative period, chest CT scans were requested for four patients, with only one demonstrating changes in consistency with COVID-19 infection (the particular patient had an initially negative swab for COVID-19 and during the hospitalisation, was re-tested positive).

With respect to swabs for RT-PCR, pre-operative swabs were taken in 49% of emergency admissions and all were reported as negative. Postoperative swabs were taken in seven (7%) patients upon development of suspicious respiratory symptomatology, with only three (out of seven) being positive (two patients with initially negative swab re-tested positive and one patient who was not tested with swabs on admission, subsequently tested positive).

Regarding the postoperative outcomes, mortality rate was 1%, with this single death occurring due to decompensated organ failure on the first postoperative day after emergency laparotomy for intestinal obstruction, with the patient having substantial cardiac comorbidities and frailty. It has to be noted that the patient was not tested for COVID-19 either with swab or CT chest, as this was not the protocol at the time of her admission (first week of March). Our overall morbidity rate was 16%, with 11 (out of 16) patients who had non-respiratory postoperative complications (Table 1). Concerning the five patients who developed respiratory postoperative complications, two (out of five) had swabs positive for COVID-19 in the post-operative period (admissions swabs negative) and the one patient who had a positive swab postoperatively was minimally symptomatic from the respiratory aspect (no pre-operative swab taken) (Tables 2, 3).

No re-operation was required for any of the patients and there was no unplanned re-admission to our in-

Table 2. Characteristics of the five patients with respiratory postoperative complications*

Primary procedure	Type of complication	Management	Swab for COVID	Chest imaging	Overall LOS (days)	ITU LOS (days)
Incision and drainage of back abscess Known COPD patient / NIV at home	Respiratory failure	Planned non-invasive ventilation on ward & antibiotics	Not tested pre/post-operatively	No essay performed	6	0
Laparoscopic cholecystectomy	Respiratory tract infection	Antibiotics	Pre-op swab negative, post-op swab after symptoms positive	Pre-op CT chest: non-specific changes Post-op CXR: B/L infiltrates, in consistency with COVID-19	22	0
Laparoscopic cholecystectomy	Respiratory tract infection / Pulmonary embolism	Antibiotics / Therapeutic anticoagulation	Pre-op swab negative, post-op swab after symptoms positive	Pre-op CXR: non-specific changes Post-op CT chest: B/L infiltrates, in consistency with COVID-19	26	0
Laparotomy & Hartmann's procedure	Respiratory tract infection	Antibiotics	Pre-op swab negative, post-op swab after symptoms negative	Pre-op CT chest: negative Post-op CXR: non-specific changes	16	4
Laparotomy and repair of perforated duodenal ulcer	Respiratory tract infection	Antibiotics	Not tested pre/post-operatively	Pre-op CXR: negative Post-op CXR: non-specific changes	18	2

Mean overall LOS 17.6 days, mean ITU LOS 1.2 days LOS, length of stay; ITU, Intensive Therapy Unit; COPD, chronic obstructive pulmonary disease; CXR, chest X-ray; B/L, bilateral; NIV, non-invasive ventilation

tensive care unit for ventilator support. Although we had only 3% patients who were tested positive for COVID-19, these patients had a longer duration of hospitalisation compared to the entire cohort as well as when compared to the subgroup of patients with postoperative morbidity (Tables 1, 2).

DISCUSSION

The impact of COVID-19 pandemic has drastically led to a substantial change of the prioritisation with respect to elective general surgery procedures, mainly through application of local protocols allowing only the performance of operations that need by default to be performed on expedited basis, such as for cases of gastrointestinal malignancies. In the elective context though, since the procedure and perioperative care can be planned in advance, the patients can follow self-isolation protocols and screening for COVID-19 can be performed at convenient stage, allowing the surgical teams to amend the admission and care plans if the patients test positive for COVID-19 and minimise associated postoperative risks (7). On the contrary, when it comes to emergency general surgery, even if the patients get screened for COVID-19 during their admission time, these results usually get released 48-72 hours later, fact which obliges the acute care surgeons to make judgment calls about operative versus conservative treatment of these patients without evidence regarding their COVID-19 infection status (8).

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Our unit during the 3-month study period provided acute care surgery services in an uninterrupted manner to our catchment area, with our medical and intensive care units admitting and treating patients with suspicion or confirmation of COVID-19 infection, in a similarly continuous service during the study period. Evaluating postoperative morbidity and mortality outcomes after emergency gastrointestinal surgery during a 3-month observational period, we reported absence of major respiratory complications despite the COVID-19 pandemic outbreak.

To the best of our knowledge, our study is the first in the international literature to address the overall prevalence of COVID-19 infection and its potential impact on the postoperative morbidity and mortality in an unselected cohort of patients undergoing emergency general surgery operations over an extended time period. Based on our experience, we advise acute care gastrointestinal surgeons that, whenever indicated, emergency surgery should not be delayed in favour of non-operative management in anticipation of COVID-19-related morbidity or mortality risks.

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TRANSPARENCY DECLARATION

Conflicts of interest: None to declare.