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Surgical Implications of COVID-19

Ishan M De Zoysa[1], Suranjith L Seneviratne[1], Visula Abeysuriya[2]

[1] Department of Surgery, Faculty of Medicine, University of Colombo, Sri Lanka.

[2] Nawaloka Hospital Research and Education Foundation, Nawaloka Hospitals, Colombo, Sri Lanka.

Abstract – At present, the world is in the midst of a COVID-19 pandemic. However, the incidence of surgically treated disorders remains the same. In many countries, resources which were otherwise available to surgical patients, have been allocated to COVID-19 patients. Therefore, surgical resources need to be prioritized for the most-needy surgical patients. Surgical and obstetric emergencies need to be attended to without delay. Urgent operations also need to be performed to save life or limb. Semi-elective operations including oncological surgeries need to be performed within 4 weeks, whilst many elective surgeries can be safely delayed. Regional anaesthesia is preferable to general anaesthesia during the epidemic as it carries a lower risk of disease transmission. Strict infection control measures should be adopted in the operating theatre. Although there were initial concerns about the safety of minimal access surgery, recent evidence indicates that it is safe during this epidemic. Lung transplantation has been performed successfully in a few patients with severe COVID-19 pneumonia but there is insufficient evidence to justify its more widespread use. Most pregnant COVID-19 women who delivered, did so successfully by caesarian section under spinal anaesthesia. Surgical care during this epidemic has to be customized to suit the individual setting.

Keywords – SARS-Cov-2; Covid-19; Surgery; Pregnancy.

I. INTRODUCTION

Infection with the SARS-Cov-2 virus leads to COVID-19 [1]. At present, there is a pandemic of this disease, affecting over 190 countries worldwide [2,3]. In spite of this pandemic, the incidence of most surgically treated diseases remains the same except for road traffic accidents in countries or regions where lockdowns or curfews have been imposed. In many countries, COVID-19 patients occupy surgical beds and surgical staff have been reallocated to manage COVID-19 patients. In countries with high disease prevalence, operating theatres are occupied by COVID-19 patients requiring ventilation for chronic pneumonia. These measures have imposed a severe strain on surgical resources in many countries. Surgeons of all subspecialties are faced with a series of clinical and ethical dilemmas relating to management of patients without, (or at least not suspected of having) COVID-19, who require surgery with varying degrees of urgency. Therefore, there is a dire need to prioritize surgical resources for the benefit the most-needy surgical patients. The vulnerability of a surgical patient to infection with COVID-19 during his/her hospital stay for a surgical condition should also be taken into account especially in countries of low prevalence, where there are adequate surgical resources.

NHS England has set out a classification of clinical urgency relating to surgical care [4]. This classification was initially designed for cancer patients although it can be used for all patients who require surgical treatment [5]. However, this classification is not sufficiently descriptive and does not include many of the commoner surgical entities. We have compiled a more comprehensive list of procedures (Table 1)

Corresponding Author: Ishan M De Zoysa

Emergency Surgery

All surgical emergencies (Table 1) have to be attended to without delay. These procedures should be performed within 24 hours and sometimes within 6 hours, to save life or limb.

Urgent Surgery

Some situations require urgent surgery within 72 hours (Table 1).

Semi Elective Surgery

In oncological surgery, there are patients in whom surgery should be performed within 4 weeks and with expectation of cure (Table 1). There is probably an added risk due to the pandemic that has to be balanced against the risk incurred by deferring surgery. For each type of cancer – colon, pancreas, oesogastric, hepatocellular carcinoma – morbidity and mortality rates should be compared with the oncological risk incurred by deferring surgery and/or the tumour doubling time. In general for T1-2, N0 colonic cancers, it is advisable to defer surgery. In advanced colonic lesions, it is better to administer neoadjuvant chemotherapy. For rectal cancers T3–4 and /or N+, chemo-radiotherapy is indicated. Short radiotherapy may be preferable to reduce time of exposure in the hospital and to reduce the risk of COVID-19 infections. Complex surgery with higher morbidity and mortality – oesophago-gastric, hepatic or pancreatic – is best deferred [6].

Elective Surgery

Elective surgical procedures could be safely deferred for 10-12 weeks without a negative outcome (Table 1). At one stage the United States [7] and the United Kingdom [8] banned all elective surgery.

High-risk procedures

There is substantial evidence to show that the disease is spread by aerosols [9]. Some procedures have a very high risk of aerosol generation ie airway instrumentation and otolaryngology procedures, airway surgery, sinus surgery, dental procedures, bronchoscopies, and upper gastro-intestinal endoscopic procedures [7]. The threshold for these procedures should be higher than for other low risk procedures.

Anaesthesia

The choice of anesthetic technique depends on the procedure and the patient. However, preventing transmission of COVID-19 through aerosolization is a major consideration during this pandemic. Local or regional anesthesia (eg spinal or epidural anaesthesis, Biers block, nerve blocks) with minimal or no sedation is preferred as it is better to avoid airway instrumentation which causes aerosol generation, thereby increasing the risk of airborne transmission. The patient should wear a surgical mask during the procedure. Administration of high-flow supplemental oxygen should be avoided due to the risk of aerosolization. Supplemental oxygen may be provided through nasal cannula using low flows if needed [7].

The anaesthetic technique should ensure the safety of the patient as well as health care workers. Universal precautions to prevent droplet infection should be adhered to in all patients as the disease can be spread by asymptomatic carriers although the risk is lower compared to symptomatic patients [9].

Infection control and operating theatre management

A study funded in part by the Anaesthesia and Patient Safety Foundation recommends an evidence based 8-step process for infection control in the operating room during the COVID-19 pandemic [10]. It includes the use of alcohol hand rubs and double gloves, placement of contaminated instruments in a zip closure plastic bag, decolonizing patients pre-operatively with chlorhexidine wipes and nasal povidone iodine, use of a closed lumen IV system, 12 hour staff shifts to reduce the use of surgical masks and staff exposure, to perform only one operation a day in a operating room and to recover the patients in the operating room without sending them to a recovery area [11]. In addition, operating theatres should have laminar flow ventilation to minimize dissemination of the virus.

Minimally invasive or open surgery

In the initial part of the pandemic there were concerns about the safety of laparoscopic surgery due to concerns about aerosolization of viral particles via the pneumoperitoneum. However, no studies have identified SARS-CoV-2 viruses in surgical smoke [12]. In addition although viral RNA has been detected in blood, blood borne transmission of COVID-19 has not been documented [13]. Minimal access surgery (MAS) carries the benefit of shorter hospital stay resulting in a lower risk of transmission of COVID-19 to the patient. Therefore, there appears to be no justification to avoid laparoscopic surgery during this pandemic [12].

Surgery for treatment of COVID-19 pneumonia

Critically ill patients with the COVID-19 infection including those receiving maximal medical support are known to progress to irreversible fatal respiratory failure due to pulmonary fibrosis. Lung transplantation (LT) as the sole therapy for end-stage pulmonary fibrosis related to acute

respiratory distress syndrome and it is considered as the ultimate rescue therapy for these patients although there is a considerable risk of severe sepsis due to the need to administer immunosuppressive medication following transplantation. In a limited study 2 out of 3 patients who had illness durations of over 1 month, survived and underwent rehabilitation after LT [14].

Obstetrics in COVID-19 patients

There are two studies on a total of 18 pregnancies with COVID-19. All patients were infected in the third trimester, and clinical findings were similar to those in non-pregnant adults. Fetal distress and preterm delivery were seen in some cases. All but two pregnancies were cesarean deliveries, and testing for SARS-CoV-2 was negative in all babies [15]. Another study showed that spinal anaesthesia was safe in COVID-19 patients who underwent cesarean section [16].

Table 1 Clinical Treatment Priority

Category	Surgical Problem
Emergency	Massive bleeding, leaking abdominal aortic aneurisms, intestinal perforation, strangulated hernias, acute limb ischemia, generalized peritonitis, necrotizing fasciitis, testicular torsion and obstetric emergencies
Urgent	Intestinal obstruction, bleeding, localized infection, Inflammatory Bowel Disease (IBD) failing to respond to medical treatment. Surgery may also be required to prevent permanent injury/harm, e.g .spinal cord compression.
Semi - Elective	Urgency based on need to prevent progression of disease beyond operability, prevent imminent development of complications (e.g. impending obstruction or perforation). NB use of interventional radiology, e.g. stents should be considered to allow surgery to be deferred in selected cases
Elective	Hernias, surgery for uncomplicated IBD, reversal of stomas, joint replacement, varicose vein surgery, revascularization for claudication, “small” or asymptomatic aortic aneurysms, creation of arterio-venous fistuli for dialysis, carotid endarterectomy for asymptomatic patients and surgery for benign gynaecological conditions eg fibroids, endometriosis and utero-vaginal prolapse.

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