

Review Article

Effect of delayed elective surgeries during COVID-19 pandemic

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ABSTRACT

The field of surgery has been greatly affected during the pandemic due to the shift of resources to manage the huge numbers of COVID-19 cases. In this study, we aim to review the effect of the COVID-19 pandemic and lockdown measures on elective surgeries and the subsequent complications, in addition to the previously announced preparations and precautions for performing surgeries whenever indicated. Preparations include the availability of resources and performing each surgery in separate rooms away from other wards within the hospital to prevent any possibility of nosocomial infections. Moreover, limiting the number of individuals within the operation room and wearing personal protective equipment should be done. Limiting hospital visits and reducing in-hospital stays is also recommended. Regarding cancer operations, malignant tumors that were indicated for surgeries cannot be postponed. However, other non-malignant ones can be delayed depending on the pathologist's perspective and the symptomatology of the tumor. Besides, other surgeries like plastic and reconstructive ones can be re-scheduled. Additionally, most surgeries like urologic, orthopedic, and neurological operations can be delayed unless they are associated with a life-threatening lesion that can only be healed by surgical interference. On the other hand, palliative surgeries aiming to manage obstructions of the gastrointestinal tract cannot be delayed.

Keywords: COVID-19, Pandemic, Surgery, Elective, Resources

INTRODUCTION

COVID-19, a global pandemic caused by severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), was first reported in late December 2019. Those first reports emerged from China and were linked to wet markets of

seafood in Wuhan.¹ The disease was first called the severe respiratory distress syndrome coronavirus or SARS-CoV-2 as it was reported to cause severe respiratory illnesses, which were similar to the illnesses that were reported with similar viruses within the same coronaviruses family that seemed to pose similar characteristics.^{2,3} In the following

months, and after the diseases spread to the whole world, reports indicated that COVID-19 manifestations included not only respiratory distress, but also other manifestations affecting the cardiovascular, nervous, hematological, gastrointestinal, and urinary systems.³ The mechanisms behind this wide spectrum of pathology have been related to the affinity between the virus and certain receptors as angiotensin receptors within the body.³

Most of the morbidities that are caused by COVID-19 infection have been linked with the severe status of the affected patients requiring them to be transferred to intensive care units.⁴ On the other hand, patients with pre-existing co-morbidities as hypertension, diabetes, and malignancies exhibited severe illnesses more than healthy patients, which may have been due to the exhaustion of the immune systems of the affected patients that may have led to severe reactions.⁴⁻⁶ As a result, resources should be re-concentrated to intervene against the development of such phenomena by decreasing the number of infections and by preparing the necessary equipment that is essential for the management of such severe illnesses. On the other hand, non-COVID-19 procedures may have been delayed as a result of many factors during the pandemic. For instance, lockdown measures, and shifting of resources to manage the severe cases have affected the routine procedures for other illnesses and may have impacted the prognosis of such illnesses.⁷ The diagnosis and mortality from cancer, as an example, have been hugely affected, and many mortality rate projections have been previously proposed.⁸⁻¹⁰

The field of surgery has been greatly affected during the pandemic due to the shift of resources to manage the huge numbers of the COVID-19 cases. Surgical departments are also facing many challenges in reducing the cross-infection within the hospitals, and on the other hand, in managing patients with other illnesses that have been indicated for surgeries. In the past few months, many guidelines have been developed to guide surgeons about the prioritization of urgent surgeries over elective ones. Some organizations have even suggested that all elective surgeries should be cancelled.¹¹

In this study, we aim to review the effect of the COVID-19 pandemic and lockdown measures on elective surgeries and the subsequent complications in addition to the previously announced preparations and precautions for performing surgeries whenever indicated.

METHODS

We performed an extensive literature search of the Medline, Cochrane, and EMBASE databases which was performed on 25 November 2020 using the medical subject headings (MeSH), and a combination of all possible related terms. Studies discussing the impact of COVID-19 on surgeries were screened for relevant data, with no limitation placed on date, language, or publication type.

DISCUSSION

Preparations and precautions for performing surgeries during the pandemic

Previously published studies during the era of the COVID-19 pandemic have demonstrated the need to perform each surgery in a separate room that would be specified for COVID-19 patients that are indicated to have any surgical operation for fear of spreading the infection.¹²⁻¹⁶ Besides, these operating theaters should have a negative interior pressure, unlike the routine surgical rooms, which are usually set at positive pressure, to prevent spreading the disease outside the room. Additionally, it has been recommended that areas designated for COVID-19 patients should be solely situated away from other operation theaters specified for the public to prevent any contact, and potential spread of infection, between COVID-19 patients and other personnel, visiting or working at the hospitals. Doors to the operating rooms ought to be closed during the whole time of the procedure and prevent unnecessary personnel from entering these rooms and restrict the interior numbers to the performing crew only.¹⁴ In the same context, all of the tools should be provided within the room before the start of the operation and before the patients enter the room.^{12,14,16} It should also be noted that the consumed instruments should be disposable once used.¹² Furthermore, extra equipment should be provided before the start of the procedure for limiting the frequency of individuals coming in and out of the operation theatre.¹⁴ Previous studies also showed that using appropriate personal protective equipment (PPE) for the operating patients is very effective in preventing the spread of infection among these personnel.¹²⁻¹⁷ Such equipment includes disposable gloves, gowns, caps, N95 masks, and face shields. Moreover, powered air-purifying respirator (PAPR) should also be applied intraoperatively for further protection of the operating crew.¹⁶ This equipment should be applied whenever dealing with a COVID-19 case, whether during the operation or preoperatively. Studies also showed that training and checking of PPE applications should be conducted for individuals at risk.^{18,19} Besides, patients should be directly moved to the operation room without having to wait in a hall or awaiting court, in addition to being able to complete the paperwork and consent electronically before the operation with the proper procedures that insure preventing the spread of the infection.^{12,16} It is also recommended that surgeons with the highest experiences should be assigned for these operations as they are less likely to catch the infection based on their experience.¹² Additionally, intraoperative application of electric and laser instruments should be limited as much as possible to prevent unnecessary fumes, which should be executed using specific suction instruments.¹² After the operation has finished, the extubation process should also be held in the operation theater with further restriction of visits and limitation of the number of individuals in the operating room and the adjacent ones to it.^{12,14,15} Visits should be restricted and replaced with electronic approaches using

face to face and telephone meetings and calls.¹⁶ Full decontamination should be done after each procedure, and doctors are recommended to have their PPE changed for each case to prevent any spread of the infection.^{12,16} Moreover, for reducing the time of stay for patients after the procedure, studies showed that the application of improved recovery programs is an effective measurement for reducing the hospital time of stay and reducing any potential infections.^{11,20}

Complications and scheduling of operations during COVID-19 pandemic

Complications of surgical operations

No specific complications have been significantly associated with surgical approaches during the pandemic. However, many complications as a shock, arrhythmias, cardiac injuries, acute respiratory distress syndrome (ARDS), and even death have been reported.^{21,22} It has also been estimated that COVID-19 patients are more liable to develop severe complications. Therefore, the above mentioned preventive measures should be strictly applied to prevent the spread of the infection and the subsequent surgical complications that may harshly consume the healthcare resources and fasten its collapse.^{21,22} COVID Surg collaborative, an international cohort study, reported a rate of 23.8% for 30-day-in-hospital mortality for COVID-19 patients that underwent surgeries. Moreover, pulmonary complications were also found in 51.2% of the included patients and 38% of them died. The reported factors that were associated with the risk of mortality included being male, over 70 years of age, undergoing a malignancy surgery, or a major one, and having a 3-5 grading classification according to the American society of anesthesiologists.²³ These results indicate the fact that certain precautions should be applied for COVID-19 patients indicated for surgery for fear of developing severe complications and death.

Effect of the pandemic on elective surgeries

There is no doubt that surgical scheduling has been an issue during the past few months due to the increasing demands of resources to face the increasing number of severe COVID-19 cases. Managing traumas and emergencies are prioritized among other surgeries without any delays to save lives, unlike other operations which can be delayed for another time. Since the pandemic was declared, many preventive measures were taken and as a result, many hospitals and healthcare facilities have postponed or cancelled many non-surgical and elective operations. These actions were taken to decrease the healthcare resources and re-directing it to face the huge burden of the coronavirus cases, and to decrease the possibility of cross-infection between the patients and other hospital visitors or residents.²⁴ The COVIDSurg collaborative study included 71 countries in their Bayesian β -regression analysis and found that a rate of 23.4%-77.1% cancellation of cancer surgeries was recorded during a 12-week lockdown

procedure during the first wave. A much higher rate (71.2%-87.4%) was also estimated with other non-cancer surgeries, while cancellation of obstetric surgeries accounted for 17.4%-37.8%. Moreover, they predicted that returning to normal would require performing the cancelled surgeries at a rate of 20% since normalization and up to 45 weeks.²⁵ Regarding cancer operations, malignant tumors that were indicated for surgeries cannot be postponed. However, other non-malignant ones can be delayed depending on the pathologist's perspective and the symptomatology of the tumor. Besides, other surgeries like plastic and reconstructive ones can be re-scheduled. Additionally, most surgeries like urologic, orthopedic, and neurological operations can be delayed unless they are associated with a life-threatening lesion that can only be healed by surgical interference. On the other hand, palliative surgeries aiming to manage obstructions of the gastrointestinal tract cannot be delayed. Regarding the conditions of vascular approaches like catheterization and dialysis in renal failure patients, phlegmasia, and deep venous thrombosis, in addition to management of any ruptured arterial aneurysms, these should be immediately performed. In contrast, other procedures as peripheral artery diseases and/or occlusion and other lymphatic and venous surgeries can be postponed whenever possible.²⁶ These procedures would always be recommendations only and cannot be obligatory as we believe that each department from each hospital should define their protocols based on the hospital resources and the evaluation of their cases. For instance, the division of head and neck surgery, department of otolaryngology, Stanford University defined classified the urgency of their operations into four stages: 1 - urgent that requires an immediate surgical approach, 2 - less urgent that can be delayed for >30 days, 3 - less urgent that can be postponed for 30-90 days, and 4 - management of case-by-case approaches.²⁴ Although this strategy of delaying elective surgeries might be beneficial in managing the morbidity and mortality of COVID-19 infection, it can negatively impact the condition of the patients that are indicated for such surgeries. Previous studies estimated the risks for delaying such procedures in colo-rectal patients during the COVID-19 pandemic.²⁷ Additionally, many guidelines were also constructed to guide surgeons all over the world. These include the joint statement (17 April 2020) announced by the American college of surgeons, the Association of perioperative registered nurses, the American society of anesthesiologists, and the American hospital association. Besides, a manual for resuming these previously postponed surgeries was published by the American college of surgeons.^{11,28} No doubt postponing these surgeries has affected thousands of patients, and therefore, we stress the fact that each hospital should assess their conditions and capacities based on their resources.

Effect of the pandemic on emergency surgeries

Defining emergency surgeries have always been a controversial point even before the COVID-19 pandemic and the current concepts of selectivity. Although many

approaches have been introduced to define these operations, case-by-case evaluation by the performing surgeons will always be the most conclusive decision and definition of these surgeries. For overcoming this issue, previous guidelines aimed to put definitive criteria for the surgeons to help them choose whether the surgery is emergent or not. For instance, acute emergent admissions are to be evaluated in the presence of at least two expert surgeons on whether the surgical procedures should be proceeded with or delayed and to determine other suitable interventions in case of postponing it.^{12,24,27,29} Soltany et al previously summarized the most common emergency surgeries in a comprehensive systematic review.¹¹ Although it is now clear that the pandemic has affected the performance of these procedures, no previous studies have estimated the burdens following these events.¹¹ Additionally, such lack of evidence may have led to various mispractices involving the random cancellation and postponing of necessary operations, which may have increased the morbidity and mortality from these prospective illnesses.^{27,30}

Surgeries of cancer patients have raised many controversial points themselves as the increasing trends of managing COVID-19 cases have led to many challenges regarding the management of cancer patients, especially those with malignant ones.³¹ Additionally, based on the low immunity status of cancer patients, they are more prone to catch the infection, which may worsen their conditions and develop complications that may require other invasive procedures.³²⁻³⁴ Therefore, it is necessary to limit the frequency of hospital visits for cancer patients for any procedure, especially any invasive one, unless necessary.³⁵⁻³⁶ On the other hand, a previous study stated that cancer patients that are indicated for any type of surgery are not subjected to mortality during the COVID-19 pandemic.³⁴ Previous studies demonstrated that some types of cancer operations could be delayed and replaced with other supportive measurements until a suitable time was indicated.^{36,38} Other studies showed that any delay in the management and excision of some tumors may lead to severe complications.³⁹⁻⁴¹ Robinson et al also expressed the fact that some patients may become more anxious about any delay in their surgeries.⁴² Overall, many factors as the cancer stage, patients' perspective, and availability of resources should be considered in decision-making regarding such operations.^{30,43-47}

CONCLUSION

A huge reduction was noticed in performing surgical operations in cancer patients and other non-cancer operations. On the other hand, obstetric surgeries were not hugely affected. Moreover, elective surgeries should be evaluated based on the status of the patients and the availability of other supportive measures. Life-saving operations cannot be postponed while surgical and constructive ones can be. Whenever an operation is indicated, protective measures should also be considered

as nosocomial infections may lead to severe complications for patients undergoing surgery.

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