

NARRATIVE REVIEW

CORONA EXPERIENCE

Restarting elective surgery during the COVID-19 pandemic

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Abstract

In the early days of the Coronavirus disease 2019 (COVID-19) pandemic, several countries had policies to postpone elective surgical services. By reducing or suspending elective surgery, they aimed to maximize existing resources to deal with patients with COVID-19. However, the delay and/or termination of elective surgery created additional problems, both for patients and the healthcare system. Discontinuation of elective surgery can cause a risk of a backlog; increasing patient morbidity and mortality; poorer quality of life; affecting finances and hospital resources, as well as training and research programs. Based on all these considerations, elective surgery during the COVID-19 pandemic must be restarted with several requirements and provisions, which provide safety for the patients as well as the healthcare workers. The COVID-19-free pathway has been shown to minimize the risk of SARS-CoV-2 transmission in hospitals for patients undergoing elective surgery. We can use this strategy as a protocol in the future pandemics.

Key words: COVID-19; Pandemic; COVID-19-free pathway; Restarting elective surgery

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1. Introduction

The coronavirus disease 2019 (COVID-19) pandemic affects all health services, including elective surgical services. To minimize the risk of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) transmission to patients and healthcare workers (HCWs), and to divert all resources to dealing with COVID-19 patients, at the early stage of the COVID-19 pandemic, several countries stopped elective

surgical services.¹ At our hospital, in Banjarmasin, the capital of South Kalimantan Province, we suspended elective surgical services from April to September 2020. The discontinuation of elective surgical services could aggravate the condition of patients who were supposed to undergo surgical procedures. The new strategies and recommendations are needed for restarting elective surgical services during the COVID-19 pandemic that provide safety from the risk

of infection for patients and HCWs. This paper will discuss the impact of discontinuing elective surgery for patients and the adaptation of elective surgical services in our hospital during the COVID-19 pandemic.

2. Elective surgical services delays in early pandemic

After the World Health Organization (WHO) declared COVID-19 as a global pandemic, some countries implemented policies to suspend and discontinue elective surgical services. On March 12, 2020, the United States Centers for Disease Control and Prevention (CDC) recommended to postpone all elective surgery in Santa Clara County, California.² The American College of Surgeons (ACS) issued a similar recommendation to postpone or cancel elective surgery until the health infrastructure can address the service needs for patients with COVID-19.³ In England, the National Health Service (NHS) discontinued elective surgical services for 3 months starting from April 15, 2020.³ A similar policy was applied at our hospital. In our hospital, we stopped elective surgical services from April to September 2020 and only performed emergency surgery.

Surgical procedures during the COVID-19 pandemic pose a risk of virus transmission to the HCWs. For this reason, we need to screen patients who are going to undergo surgery with the reverse-transcriptase polymerase chain reaction (RT-PCR) test. If the patient status is not clear, it is recommended to perform surgery in a negative pressure operating room with all HCWs wearing level 3 personal protective equipment (PPE).⁵ At the beginning of the COVID-19 pandemic, not all hospitals had RT-PCR testing facilities. Likewise, the availability of level 3 PPE was very limited. By reducing or suspending elective surgery, we could maximize the existing resources for handling patients with COVID-19. This could prioritize the limited availability of PPE for the care of COVID-19 patients and could transform wards and intensive care rooms to cater to the spike in COVID-19 cases. In addition, it divert HCWs in the operating room to serve COVID-19 patients.¹

Surgery on COVID-19 patients is associated with increased patient morbidity and mortality. A study by COVIDsurg collaborative shows that surgery on

patients infected with SARS-CoV-2 increases mortality by 23.7% and some of these patients experience postoperative pulmonary complications.⁶ This study recommends postponing non-urgent surgical procedures in COVID-19 patients. Therefore, screening COVID-19 with the RT-PCR test is needed, especially in areas of high local transmission in order to prevent the risk of complications in patients with COVID-19, about to undergo surgery.

3. The impact of postponing elective surgery

Delays and termination of elective surgical services create additional problems, both for the patient and the healthcare system. The definition of elective surgery does not mean that surgery is an option, but perhaps not urgent to be done; it does not mean that is surgery in that patient is unnecessary.⁷ Delaying elective surgery in time-sensitive patients, such as cancer patients, leads to poorer morbidity and quality of life,¹ and in orthopedic patients, it can increase complaints of pain, disability and deformity.⁸

Discontinuation and delay of elective surgery can also result in accumulation of the number of electively scheduled patients. Using a Bayesian β regression model, the delay in surgery for 12 weeks in 190 countries resulted in an accumulation of patients that took a long time to complete the backlog. If one country increased surgical volume by 20% of normal volume after the pandemic, it would take 45 weeks to complete all delayed operations caused by discontinuation of surgical services.¹ Prior to the COVID-19 pandemic, during 2019, our hospital performed elective surgeries for 3,720 cases. If elective surgery at our hospital is restarted following the COVID-19 pandemic, there will be a large accumulation of elective surgical scheduling. This delay will also make a significant impact on patient prognosis, hospital finances, and resources, as well as on training and research programs.

4. Restarting elective surgery during the COVID-19 pandemic

Given the risk of backlogs, increasing morbidity, and mortality, elective surgical services during the

Table 1: Classification of surgical cases based on indication and level of urgency.⁷

Indication	Urgency	Sample case
Elective Urgency	< 2 weeks	<ul style="list-style-type: none"> ▪ Cardiothoracic or cardiovascular procedures ▪ Cerebral aneurysm repairs ▪ Vascular access devices ▪ Skin graft/flap/wound closure ▪ Scheduled searian surgery ▪ Closed fracture ▪ Spinal fracture and acetabular fracture
Elective (essential)	1-3 months	<ul style="list-style-type: none"> ▪ Cancer surgery and biopsy ▪ Subacute cardiac valve procedure ▪ Hernia repair ▪ Hysterectomy ▪ Reconstructive surgery
Elective (optional)	> 3 months	<ul style="list-style-type: none"> ▪ Cosmetic surgery ▪ Bariatric surgery ▪ Joint replacement ▪ Sport surgery ▪ Vasectomy or tubal ligase ▪ Infertility procedure

COVID-19 pandemic should be restarted by considering the capabilities of hospital facilities and providing safety for patients and HCWs from the risk of SARS-CoV-2 transmission. In a joint statement, the ACS, the American Society of Anesthesiologists (ASA), the Association of Perioperative Registered Nurses (APRN), and the American Hospital Association have provided guidelines for continuing elective surgery during the COVID-19 pandemic. In restarting elective surgery during the COVID-19 pandemic, it is mandatory to consider local daily cases of COVID-19, availability of ICU beds, wards, ventilators, COVID-19 testing facilities, and adequate supply of PPE and medicines. It is also essential to prioritize the patients undergoing surgery, applying health protocols for HCWs, patients and visitors; and

also re-evaluate and reassess policies and procedures that have been made.⁹

Based on the priority scale, elective surgery can be divided into 3 groups (Table 1). The urgency elective that must be done in less than 2 weeks, the essential elective that must be done in less than 3 months, and the optional elective that can be scheduled for over than 3 months.⁷

The hospital zones need to be divided into a COVID-19 and a COVID-19-free zone, which have separate pathways and each zone has its own HCWs. The COVID-19-free zone comprises wards, ICU and operating rooms. Non-COVID-19 patients use separate entrances and designated elevators. Non-COVID-19 patients, who undergo elective surgery, postoperatively are hospitalized in a COVID-19 free ward or ICU. Only HCWs assigned to a COVID-19-free zone can treat non-COVID-19 patients while in the hospital to minimize the risk of nosocomial transmission of COVID-19. This division of zones and pathways is known as the COVID-19-free pathway.^{10,11}

The strategy of restarting elective surgery with the COVID-19-free pathway during the COVID-19 pandemic has shown to provide a low risk of SARS-CoV-2 transmission in orthopedic and cancer patients.^{10,11} A study that evaluated risk of SARS-CoV-2 transmission 30 days after surgery in 512 patients who underwent elective urgent surgery procedures with COVID-19-free pathway at the beginning of the pandemic, identified 7 cases (1.4%) who had COVID-19 and one of them died. The risk of nosocomial infection and mortality is low by using the COVID-19-free pathway, allowing to restarting elective surgery during a pandemic.¹²

5. A new adaptation of elective surgical services at Ulin Hospital

Our hospital is a tertiary care hospital in Banjarmasin that provides services for COVID-19 patients. It has a total bed capacity of 635. Since the beginning of the COVID-19 pandemic to date, 160 beds are used as COVID-19 isolation wards, 40 beds are used for quarantine rooms for patients undergoing elective surgical procedures, and 435 beds for non-COVID-19

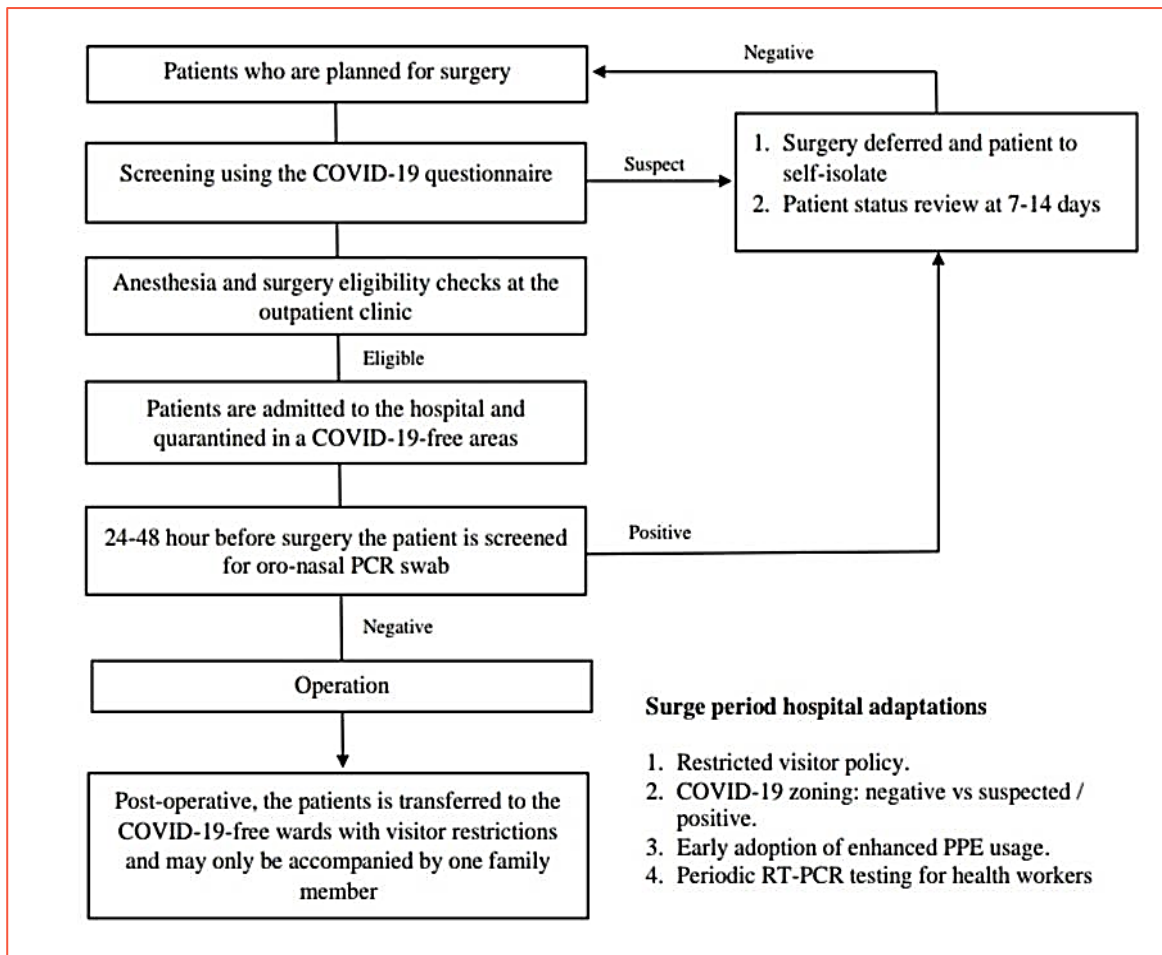


Figure 1: Elective surgical services bundle during COVID-19 pandemic at Ulin Hospital, Banjarmasin, Indonesia

patients. To minimize the risk of SARS-CoV-2 transmission in hospitals, our hospital is divided into COVID-19 (red zone) and non-COVID-19 (green zone) zones. We also separate the entry of patients who will be hospitalized. Referral for COVID-19 patients from other hospitals will go through a special COVID-19 corridor and will be hospitalized in the red zone. Patients with suspected COVID-19 will go through a transitional isolation room and will be hospitalized in that room until the RT-PCR results are obtained.

Adopting elective surgical guidelines during the COVID-19 pandemic by the ACS, ASA, APRN, and the American Hospital Association, our hospital has made adjustments to the workflow of elective surgery (Figure 1).

We prioritize patients scheduled to undergo elective surgery for urgent and essential elective cases. Patients

receive explanations about aspects of their medical care that may change due to the current health emergency and must also be able to understand that although minimal, the risk of COVID-19 infection during surgery and hospitalization remains a possibility. Despite all the precautions taken by the hospital to avoid COVID-19 infection during surgery and/or hospitalization, we cannot rule out the risk of infection by 100%. Therefore, the patients must have undergone surgery in these conditions and perform preoperative screening. If there is any suspicion or confirmation of COVID-19 after the preoperative screening, the surgery should be postponed.¹³

The preoperative assessment is carried out in an outpatient clinic which includes an examination of COVID-19 symptoms, clinical and preoperative laboratory examinations, also chest X-rays. If the clinical symptoms of COVID-19 are not found and the

patient's condition is optimal for the surgical procedure, the patient will receive a surgical schedule. Two days before the schedule, we advise the patient to undergo quarantine at the hospital.

During quarantine at the hospital, patients who can carry out activities independently are not accompanied by their families. Whereas for children and adults whose activities are limited, we only allow one attendant and must maintain social distancing and use a surgical mask. This policy was carried out because the patient's companions were not subjected to RT-PCR examinations. The absence of RT-PCR examinations on the attendants during quarantine is in accordance with our government policy, where people who do not show clinical symptoms with a suspicion of having COVID-19 are not subjected to RT-PCR examinations. However, we ensure that the patient companions are in good health and we screen them using the COVID-19 screening tool.

On the next day, the patient will undergo an RT-PCR test. If the result is negative for COVID-19, the patient will undergo a surgical procedure the next day. Patients who are positive for COVID-19 at the time of screening will undergo isolation and receive further treatment and will be re-evaluated by the pre-operative assessment team within 14 days. Post-surgery patients are hospitalized in a COVID-19 free ward or ICU and are monitored for any clinical symptoms of the risk of exposure to SARS-CoV-2 during hospitalization. During postoperative hospitalization, we strictly limit the family accompanying the patient and the number of visits until the patient is discharged.

Examination of COVID-19 test results from outside our hospital cannot be accepted to avoid possible manipulation of test results by patients.¹⁴ Also, quarantine after a COVID-19 test will minimize patient contact with other people who may be exposed to COVID-19. Our hospital screening for COVID-19 tests uses RT-PCR or GeneExpert. It is considered the test results are valid for 48 hours before surgery. To minimize the risk of SARS-CoV-2 transmission among HCWs, our hospital implements a policy of restricting unnecessary interactions with fellow HCWs such as: maintaining distance, using surgical masks while on duty, alternating meal times, and returning immediately after work. To minimize the risk of transmitting SARS-CoV-2 from HCWs to patients, COVID-19 screening is routinely carried out on all

HCWs in operating rooms and wards. Routine RT-PCR examination for HCWs was carried out every 8 weeks. If there are HCWs with a positive result for COVID-19, they will undergo self-isolation. However, HCWs who experience symptoms with suspicion of COVID-19, will be subjected to RT-PCR test as soon as possible. If a positive COVID-19 result is obtained, then HCW in a team or have a history of close contact with infected HCW will be contact tracing. Since the resumption of elective surgical services at our hospital, there have been 9 operating room medical personnel who have been confirmed as COVID-19; one person during routine RT-PCR, 3 people experienced symptoms of SARS-CoV-2 infection, and 5 people were tested for RT-PCR because they had a history of close contact with their family who was confirmed COVID-19. Meanwhile, there were 2 HCWs on duty in the postoperative ward who were confirmed COVID-19 through routine RT-PCR examinations. So far we have not found any SARS-CoV-2 transmission among HCWs, or have not found any clusters within the hospital.

Wearing PPE in the operating room and during surgical procedures is necessary to avoid the risk of transmitting the SARS-CoV-2 among HCWs and from HCWs to patients. The standard PPE used during surgical procedures is a surgical mask, N95 mask, face shield/goggles, and gloves. Anesthetists and nurse anesthetists should wear an N95 mask and face shield/goggles during intubation and extubation procedures that are at risk of causing aerosols. During intubation and extubation procedures, the surgical team and other nurses are staying outside the operating room. The entire team during surgery for procedures with risk of causing aerosols (airway surgery, endoscopy/retrograde cholangiopancreatography (ERCP), thoracic surgery, surgery with regional anesthetic techniques that may be converted to general anaesthesia) should wear N95 masks and face shields/goggles. For surgical cases with low aerosol risk with regional anaesthesia techniques, standard surgical PPE can be used.¹⁵

Routine operating room disinfection is carried out as soon as surgery is completed. The operating room cleaning procedure is carried out on all surfaces of the room, starting from the clean surface to the dirtiest areas using a soap solution, then followed by using a 0.1% chlorine solution.¹⁶ The surface of the anesthesia

machine and patient monitor is also cleaned. The cleaning process is then followed by a disinfection process using ultraviolet (UV) irradiation for 30 min. Combined disinfection with surface cleaning and UV irradiation can reduce viral and bacterial contamination¹⁷

From October 2020 to February 2021, our hospital has scheduled 662 elective surgery cases. Forty four patients had their surgery canceled due to being positive for COVID-19 during preoperative screening with the RT-PCR/GeneXpert test and 24 patients were delayed due to the patient's medical condition and other reasons. On postoperative evaluation of all patients during hospitalization until discharge, none of them had had symptoms of COVID-19. However, we cannot rule out whether the patient was exposed to SARS-CoV-2 or not during hospitalization because we did not perform the RT-PCR/GeneXpert test when the patient was discharged.

Since the beginning of February 2021, our country has been providing vaccinations, but the provision of this vaccine is limited to HCWs. And in March, vaccination was carried out in the elderly group. So we have not received data on the effectiveness of this vaccines in reducing COVID-19 cases in Banjarmasin.

6. Conclusion

The decision to postpone all elective surgery results in a backlog. The delays also affect patient prognosis, hospital finances, and resources, as well as training and research programs. We should reduce this impact by restarting elective surgical services during the COVID-19 pandemic with several considerations that provide safety for patients and HCWs from the risk of SARS-CoV-2 transmission and in accordance with the capabilities of the hospital facilities.

COVID-19-free pathway strategy; separating non-COVID-19 patients who will undergo elective surgical procedures since admitted to the hospital, conducting screening tests with RT-PCR or GeneExpert, using health protocols and wearing PPE while in the operating room, and postoperative care in COVID-19-free wards have been proven to minimize the risk of nosocomial transmission of SARS-CoV-2 for patients undergoing elective surgery. And to ensure that patients do not become infected with SARS-CoV-2 during hospitalization, we recommend performing an RT-PCR test while the patient is discharged. This

strategy is useful and can become a protocol in dealing with other potential pandemics in the future.

7. Conflict of interest

Not applicable

8. Authors' contribution

MPA: Concept, Literature search, Manuscript writing

BFR: Literature search, Manuscript editing

AS: Literature search

EH: Manuscript editing

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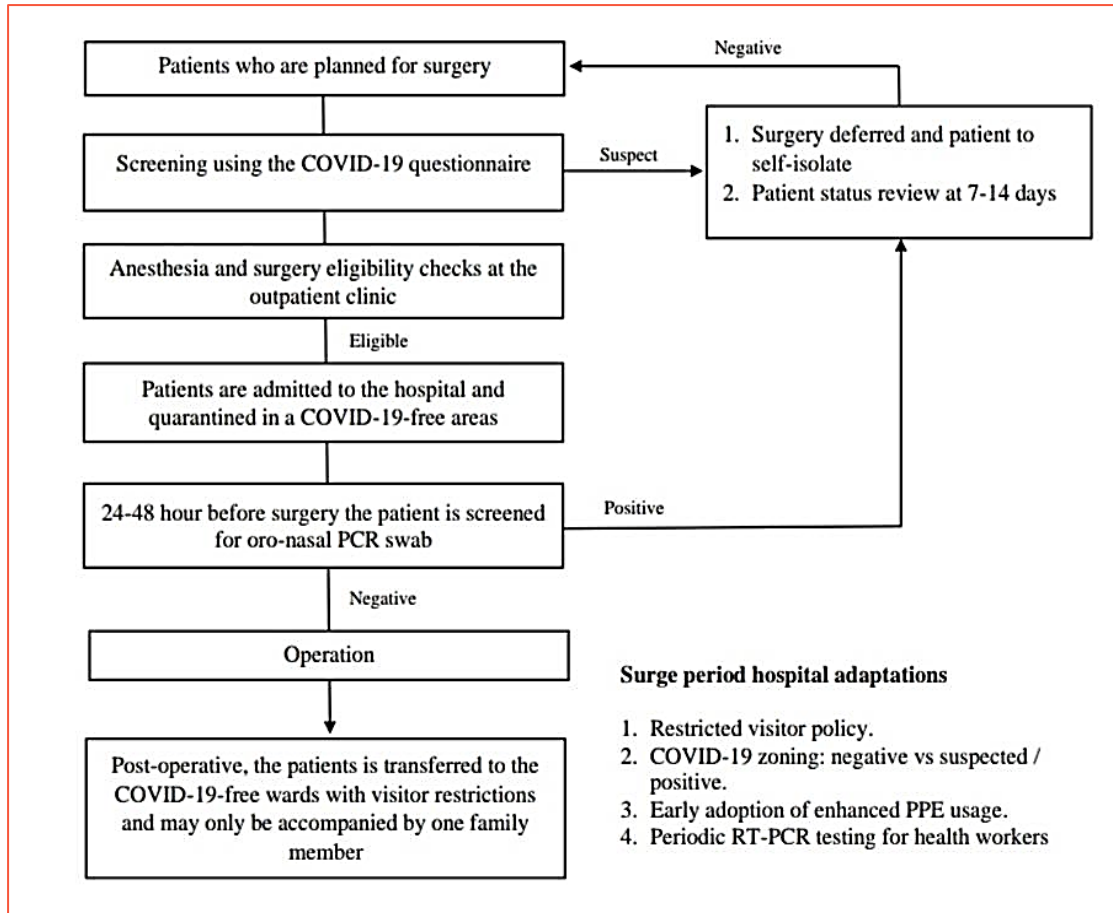


Figure: Elective surgical services bundle during COVID-19 pandemic at Ulin hospital, Banjarmasin, Indonesia.

