Surgical Services during Pandemic Era in the Most Remote Part in Indonesia

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ABSTRACT

The coronavirus disease 2019 (COVID-19) pandemic has brought unprecedented adaptations and changes in global healthcare management. The pandemic has created major dilemmas for health care workers in all health care areas including surgical services. To avoid any local transmission, the risk level of all surgical patients is evaluated before, or immediately after admission. Changes have been made based on the availability of the hospital resources, as best as possible, based on the protocol developed by WHO and the Ministry of Health Republic of Indonesia.

Keywords: COVID-19, pandemic era, surgical services

ABSTRAK

Pandemi penyakit *coronavirus 2019* (COVID-19) menyebabkan adaptasi dan perubahan manajemen pelayanan kesehatan di seluruh dunia. Pandemi ini telah menyebabkan dilema besar bagi pekerja kesehatan di semua bidang termasuk pelayanan bedah. Untuk mencegah transmisi lokal, semua pasien bedah dinilai tingkat risikonya sebelum, atau sesaat setelah di dalam rumah sakit. Beberapa protokol dan manajemen pelayanan kesehatan di Indonesia telah dibuat dan diterapkan berdasarkan tersedianya sumber daya di rumah sakit dan sedapat mungkin mengikuti protokol WHO dan Kementrian Kesehatan Republik Indonesia. **Heru Sutanto Koerniawan, Freda Halim, Prajnaariayi Prawira, Irene Waine. Layanan Bedah Saat Pandemi di Daerah Paling Terpencil di Indonesia**

Kata kunci: COVID-19, layanan bedah, pandemi

INTRODUCTION

COVID-19 is an envelope, positive single-strand RNA virus. It belongs to the Orthocoronavirus subfamily, with the characteristic "crown-like" spikes on the surfaces.[3] It is classified into beta-coronavirus genus, together with SARS-CoV, bat SARS-like CoV and others.[3]

The COVID-19 pandemic began in December 2019 in Wuhan, Hubei.[1,2] It is characterized by rapid droplet human to human transmission.[2,3] The COVID-19 disease spread to other countries such as Thailand, Japan, Republic of Korea, Vietnam, Germany, United States, Italy and Singapore, and created global pandemic.[3-6] The transmission of COVID-19 is via droplets or aerosol, but can also be via direct contact to contaminated surfaces or fomites.[6,7] Global transportation and especially tourism make COVID-19 a genuine threat to any country and popular tourism destinations.[3] WHO issued a public health emergencies of international concern alarm on January 30, 2020 due to the spread of COVID-19 that already reach global scale.[3]

COVID-19 can be found in nasal discharge, sputum, and sometimes blood or feces.[3] The virus has a mean incubation period of 5,2 days (95% CI, 4,1-7,0).[3,4] The initial clinical manifestations for COVID-19 are usually non-specific; majority of patients presented with fever and respiratory symptoms.[3] COVID-19 is a zoonotic disease with low to moderate mortality rate. Currently, there is no standard

Figure 1. Chronological list of 2019-nCOV global outbreak.[3]

Chronological list of 2019-nCoV global outbreak		
Year	Date	Event
2019	November?	Mysterious pneumonia in Wuhan, Hubei, China
	December 1	The first confirmed nCoV case Wuhan (no Huanan seafood market exposure)
	December 10	The first confirmed nCoV case Huanan seafood market exposure
	December 31	An epidemiological alert by local agency
2020	January 1	Huanan seafood market shut down
	January 13	The first nCoV case in Thailand (Wuhan CDC)
	January 15	A notifiable communicable disease (by Taiwan CDC)
	January 21	The first nCoV case in Taiwan (Wuhan history)
	January 30	Public health emergencies of international concern (PHEIC) alarm by WHO
	Feberuary 6	28,276 confirmed nCoV cases, 565 deaths, at least 25 countries involved

nCoV = novel coronavirus; CDC = center of disease control; WHO = the World Health Organization

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treatment for the disease and supportive treatment was the only strategy.

During the COVID-19 pandemic, "when the destructive effects of natural or man-made forces overwhelm the ability of a given area or community to meet the demand for health care",[1] it demands the best disaster/mass casualty incident response.[1] There is a need of massive budget and human resource to deliver intervention and mitigation. Strict control and precise management of human resource as well as logistic is critical to avoid resource exhaustion. Healthcare workers should consider the possibility of 2019-nCoV virus infection in persons with travel or exposure history with compatible incubation period and presenting symptoms. Unprotected hospital staff who exposed to patients' droplets or through contact are prone to be infected.[3] They should be highly alert and aware of appropriate infection prevention measures for suspected patients.[3] The use of surgical appliances must be well calculated and balanced. Infection and mortality of the staff must be avoided to preserve the ability to face surgical emergencies and associated activities that will continue to occur or even increase during Multiple Casualty Incidence (MCI).[1]

CHALLENGE AND ADAPTATION OF THE GLOBAL AND NATIONAL HEALTHCARE SYSTEM DURING PANDEMIC

The coronavirus disease 2019 (COVID-19) pandemic has brought unprecedented changes and adaptations in world healthcare management. The Covid-19 pandemic has created major dilemmas for health care workers in all areas of health care including surgical services. Shortage of protective equipment and knowledge regarding the virus are causing infections among healthcare workers.[1] Problems resulting in rationing of care has left patients and physicians feel frustrated and burned out.[1] Although surgeons are not frontline health workers, several series of infections emerged from operating theaters in China.[7] To avoid any local transmission, the risk level of all surgical patients are evaluated before, or immediately after, admission to hospital. All high risk patients, confirmed and suspected patients will be kept in a single room, and all the necessary disinfection and isolation measures were implemented.[7] Some changes of protocol in the OR in China were minimizing surgical vaporizing practice, avoidance of laparoscopy, use of PPE in isolated area and keep inside the isolated area while wearing PPE, sanitation and disinfection according to the regionalized zoning management system and epidemic classification, and different PPE use according to the working area.[7]

The airborne transmission in Wuhan occurred due to the healthcare worker's little knowledge of the virus;[7] and after applying strict management measures in operating theater, airborne transmission ceased.[7]

The first Italian case tested positive for COVID-19 has been reported in Codogno Hospital in Lombardy, Italy, then increased to 36 new cases within 24 hours.[6] A containment strategy with mobility restrictions was established. The exponential rise of ICU and standard hospital beds demand and the massive overload of patients in the emergency department exceeding each hospital capacity caused an enormous impact on activities affecting all specialties.[6] Surgical practice for elective procedure was abruptly stopped in mid-February to preserve health-care resources, gradually vacate hospital beds and prepare the departments for the increasing number of patients affected by the virus-induced acute respiratory syndrome.[5] The COVID-19 outbreak in Italy affected surgical community in different way: cancellation of unnecessary immediate surgery, shortage of blood components, shift of surgeons to other areas rather than operating theatre, outpatient clinic and patient care in the surgical wards, limited visitors, need to setup dedicated operating theaters for COVID-19 positive patients, creation of specific pathways for suspected COVID-19 positive patients with surgical needs, postoperative surgical care.[6]

The first case of COVID-19 in Indonesia was reported in Depok, West Java at early of March 2020. The government then started contact tracing, but the containment strategy was not started at the time. Within 2 weeks, the total number were 134.[8] The government setup a quarantine in the island dedicated for patient under observation. At March 13th, 2020 the first healthcare worker died due to COVID-19. At March 27th, 2020 The government publish first national protocol based on WHO recommendation for COVID-19 management and containment. To prevent further spread of COVID-19 infection, the government started applying city-wide large-scale social restrictions in some cities in Indonesia.[12] During early development of the pandemic, Indonesia did not have sufficient resources to do nation-wide PCR tests and even the rapid tests were not available until recently. Testing was accessible only for those who showed symptoms and have been in contact with confirmed case. That caused the screening process relied heavily on clinical pictures, dismissing the fact that many COVID-19 patients are asymptomatic and that identifying contact is difficult for asymptomatic carriers. It took some time for Indonesia before it finally could ramp up efforts to carry out mass PCR testing. Special protocol also has been made for health workers in all hospitals to protect them from COVID-19 infection.

	Number of person	
	Building A	Building B
March-April 15th 2020	2 confirmed	4 close contact
April 16th- May 2020	1 confirmed	No cases
Jun-20	No cases	No cases

No	Date Screened	Job	Sex	Age	Experience (years)	Symptoms Y/N	Category	Used PPE Level	Rapid	Swab
1	10-Apr-20	Anesthetic Nurse	F	30	18	Y	Confirmed	(unknown contact)	Reactive	Negative
2	13-Apr-20	Scrub Nurse	F	26	10	Y	Confirmed	(unknown contact)	Reactive	Negative
3	07-May-20	Scrub Nurse	M	29	2	Y	Confirmed	(unknown contact)	Reactive	Negative

Figure 2. Confirmed COVID-19 among operating theatre staff from March to June 2020.

Application of Protective Personal Equipment (PPE) is mandatory. There are three levels of PPE. PPE level 1 is for health workers at the ward and those who are in contact with normal patients. PPE level 2 is for those in the outpatient area. PPE level 3 is for medical personnel at the operating room and those who are in contact with infected patients.

The greater Jakarta known as "Jabodetabek" is a metropolitan city that serve as capital of the nation. As a capital, the capability of the city is supposed to represent the national capability in dealing with the pandemic; the logistical as well as budgetary constrain is not as difficult as in some of the most remote areas in Indonesia. To mitigate the spread of the disease, some hospital in the capital area such as Siloam General Hospital, apply a new screening and access measures:

1. All patients and hospital visitors need to get through a screening process which consists of a temperature reading and a short series of questions on COVID-19 symptoms, close contact, and travel history. Depending on the result, patients and visitors might be redirected to a separate area for further assessment.
2. Within the hospital settings, several strategies are implemented to facilitate physical distancing in the context of clinical care :
   - Zoning system is made within hospital and hospital area is divided into 3 zones: (1) strict limited zone where contact with COVID-19 patients is certain (red zone), (2) limited zone where contact with COVID-19 patients is possible (yellow zone), and (3) zone with no contact with patients (green zone).
   - Appropriate personal protective equipment (PPE) is also provided in each zone. Despite all these efforts, hospital transmission among healthcare workers still occurred during early period, partly due to limited access to testing.
3. In surgical cases, our initial policy was to cancel or postpone elective and non-urgent procedures as we dealt with low supply of protective equipment for healthcare workers and to reserve the protective equipment stock for confirmed COVID-19 patients.

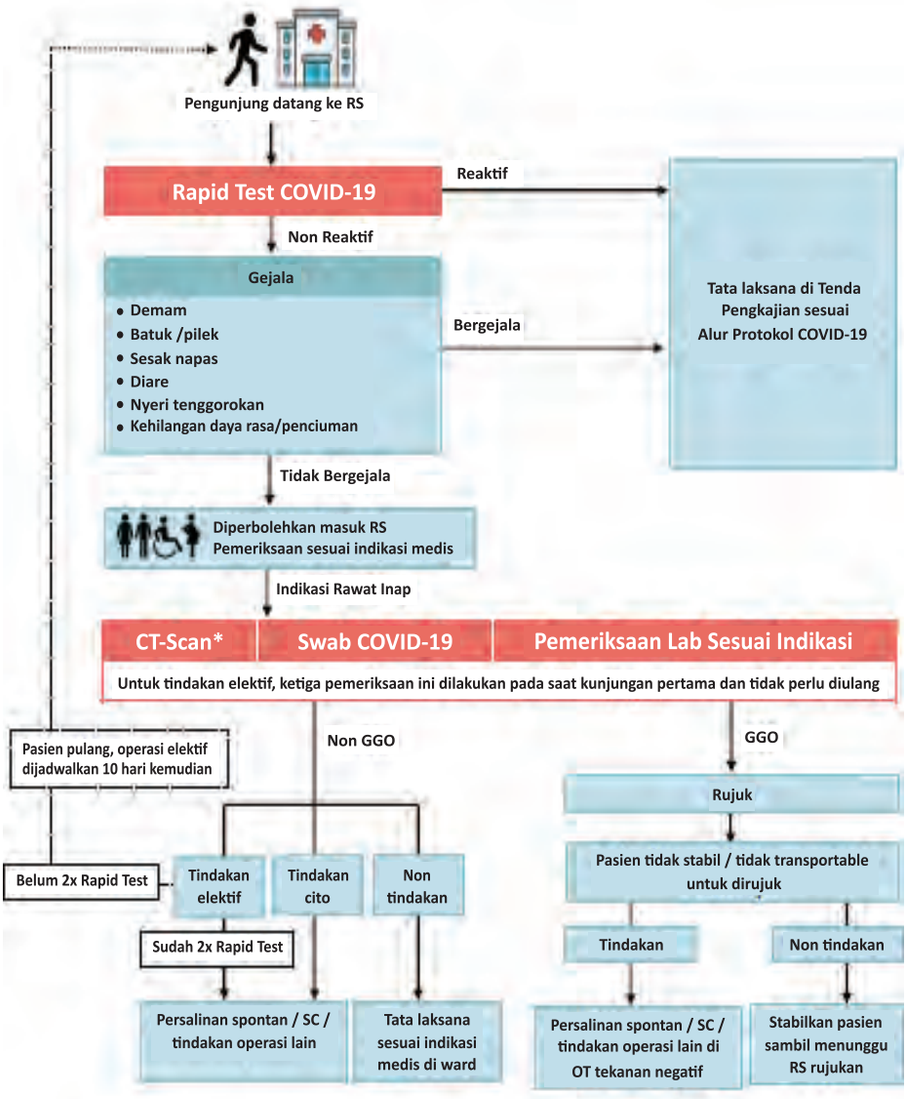

Figure 3. Screening diagram for elective surgery patient in Siloam General Hospital from mid April to May 2020[15]

The policy turned out have a substantial impact on patient care. Many elective cases became urgent and surgery was no longer avoidable. In cancer cases, delaying elective surgery may lead to deteriorating health status due to disease progression and increased complexity of the procedure. This conditions drove the healthcare system to think of strategies to get back to normal levels of surgical activity without compromising or sacrificing the healthcare workers' safety and hospital resources.

Almost all big hospitals with plenty of resources applied clean hospital concept; all individuals were identified as COVID-19 or non-COVID-19 and treated them separately with different access. Hospital could be considered 'clean' as non-COVID-19 patients would not be in contact with COVID-19 patients.

All elective surgical cases in the hospitals in the capital area such as Siloam General Hospital are managed with some protocols, including:

1. All patients would be screened for symptoms and PCR-tested for COVID-19 before proceeding to surgery. Unfortunately, PCR test is expensive and not all hospitals have easy access to PCR testing. As an alternative, some hospitals used combination of antibody-based rapid tests and chest CT scan for preoperative screening. Ten days prior to surgery, the patient is scheduled for

a COVID-19 rapid test. One day prior to surgery, another rapid test and chest CT scan are conducted. Patients with two non-reactive rapid test results and clear chest CT scan are considered "clean" and will be treated as non-COVID-19 patients.[16]

2. This screening procedure is also applied to all the maternal cases who undergo elective caesarean surgery or even normal delivery, using low dose Chest CT and abdominal protective shield.
3. Healthcare workers who take care of non-COVID-19 patients in ward and operating room could use the level 1 and level 2 PPE respectively. [15]
4. Emergency surgery patients who cannot undergo all testing due to time limitation is considered a suspected COVID-19 and all of the healthcare workers who take care for the patients wear level 3 PPE (Hazmat coverall suit outside the usual surgical gown, medical goggles, N-95 mask, double gloves) during procedures.[15]
5. In all procedures (emergency/elective), doctors and all OT staff are required to wear level 3 PPE although the patients are considered clean.[15]

The rationale behind this screening model is based on the fact that sometimes the antigen-antibody is not readily detected in rapid test, thus need to be re-tested within 10 days period.[16,17] Moreover, the accuracy of even 2 rapid tests is still not high, it needs to be combined with Chest CT which have high sensitivity (>90%) but lower specificity (70%).[18]

In clean hospital concept, tele-consultation also being practiced using Zoom™ platform, and the medicines as well as other health supplies are home-delivered, thus making zero contact between patient and health workers.

In Siloam General Hospital, Tangerang, the health precautions and preoperative screening was considered a success because it successfully reduced the rate of COVID-19 among health workers and staff from mid April to end of May 2020 into almost zero **(Figure 2)**.

SYSTEM IN REMOTE AREA

In the remote area in Indonesia, logistical and geographical as well as budgetary constrain make the arrangement of COVID-19 setup difficult to meet the standards of developed country, even to meet the Indonesia big urban region standard such as Jakarta or Surabaya. Papua, one of the most remote region in Indonesia applied strict lockdown compared to the other part of Indonesia, but still has quite number of cases.

Team in the District Hospital in Oksibil, Pegunungan Bintang, Papua arranged and setup a dedicated COVID-19 facilities to screen all patients who come to the hospital or was referred from the primary health care in the region; the facilities include COVID-19 triage area, fever clinic, and special isolation room in separate building in the hospital compound. The hospital also setup some basic key-points / protocol for surgical service according to the available resources such as:

1. Basic screening using clinical examination including temperature screening for all patients and rapid COVID-19 Antibody Diagnostic Test if there is indication e.g. history of contact or travelling from red COVID-10 area, performed in the front gate.
2. Physical distancing of 6 feet in waiting area as well as in the clinic.
3. In urgent clinical surgery case, the suspected COVID-19 patient and the family member have to wear mask. The consultation will be done in the special COVID-19 area in the ER.

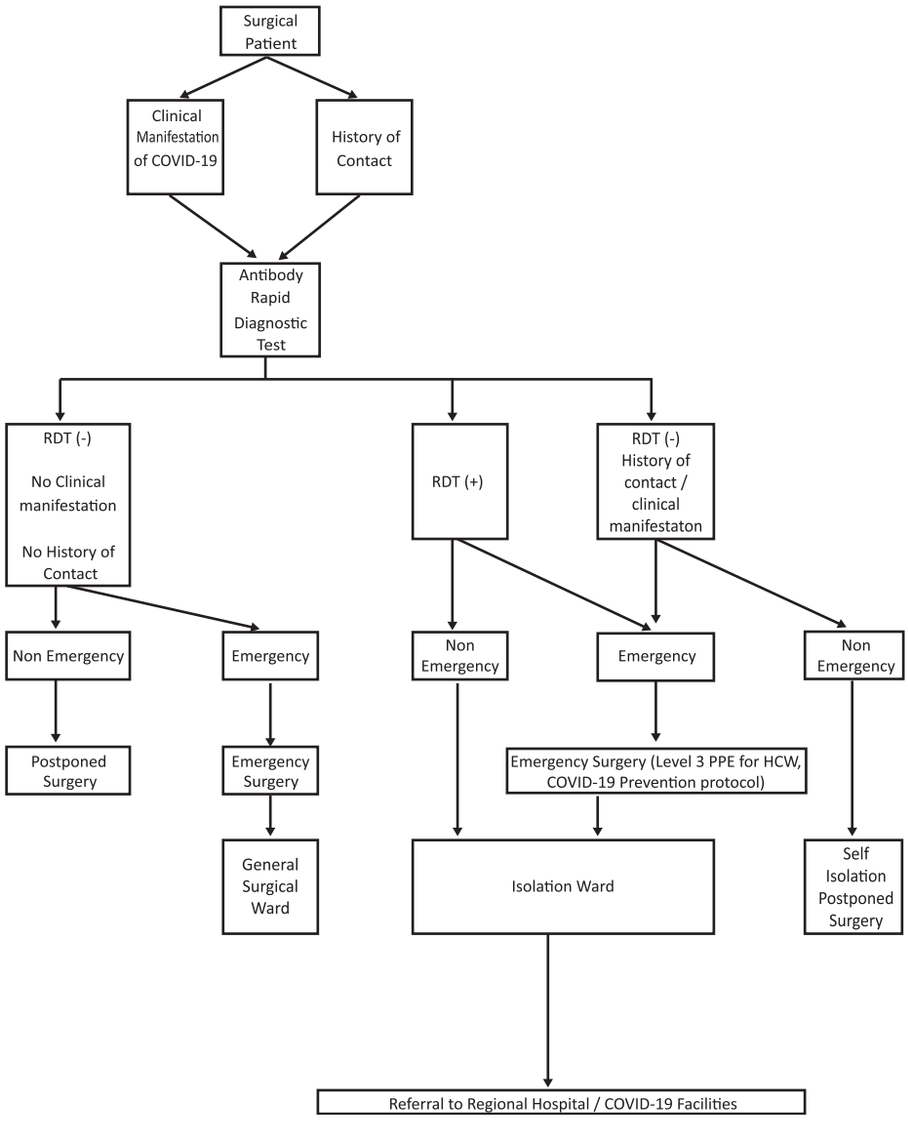

Figure 4. Pathway for the management of surgical procedure patients in Oksibil District Hospital, Regency of Pegunungan Bintang, Province of Papua, Indonesia **approved** by the management. RDT, Rapid Diagnosis test; COVID-19, coronavirus disease 2019; PPE, personal protection equipment; HW, healthcare worker.

4. The patient and ONLY 1 family member are allowed to attend clinic appointment
5. Only health workers using PPE AND N95 mask will examine patient.
6. Routine examination of COVID-19 antibody rapid diagnosis test for patients requiring admission.
7. Limitation of elective surgical cases. The use of Elective Surgery Acuity Scale by American College of Surgery to determine elective general surgery plan[9]
8. Patients have to wear surgical masks and caps on before entering the OR
9. Wear of PPE for all health workers in the buffer zone. Full protection with PPE level 2 for all health workers handling confirmed non COVID-19 patient[10] Full protection with PPE level 3 for all health workers handling suspected of confirmed COVID-19 patient[10]
10. Standard hand hygiene and use of double gloves technique during doffing of PPE.
11. Engineering the airflow by putting exhaust fan in the OR to minimize risk of infections;
12. Careful handling of clinical documentation (limiting paper needs in OR);
13. Limiting personnel entrance/exit to and from the OR during the procedure and 3 hours after procedure[10,11]
14. Established protocol for cleaning of OR, equipments (UV Sterilization) including cleansing with detergent and water followed by use of 1000 ppm bleach solution for all surfaces in the OR, disinfection time more than 30 minutes, and 2-hour span time between procedure.
15. An extensive and strict use of checklists and step by step instructions;
16. A detailed description of transfer of patient to/from OR.
17. Limitation of non emergency referral.

In emergency surgical cases, rapid identification with basic screening is mandatory. As there is no radiological facility at the moment, we rely on basic clinical examination and Rapid COVID-19 Antibody Diagnostic Test for pre operative screening. Postoperative observation was performed meticulously even if the patient were deemed COVID-19 free. Any mild respiratory related symptom such as desaturation or tachypnea will be urgently managed in our facilities. Tight observation of vital signs is mandatory.

Simple surgical pathways, checklist, protocol and training model in dealing with new disease was set up under management of the local surgical community based on the available resources to prevent local transmission in the hospital.[6] The availability of diagnosis tools including COVID-19 diagnostic laboratory and basic radiology is very important to mitigate the spread of the disease in the hospital as well as minimize the risk to healthcare workers.

Oksibil District General Hospital which located at the one of the most remote area in Indonesia often experiences chronic problem regarding the distribution of health care supply. The hospital doesn't even have basic radiology facility. With limited resources, the hospital still requires to deliver the health care services including surgical service without endangering the healthcare workers. The problem will put the health care system in constant threat during pandemic as it could collapse any time. The hospitals have to adapt and try its best to protect the healthcare workers from the disease based on the available resources.

CONCLUSION

The corona virus disease 2019 (COVID-19) pandemic has brought unprecedented adaptations and changes in global healthcare management. The lack of basic diagnostic facility in some hospital in Indonesia especially in the remote area, put the healthcare system in the area on constant threat. As there is a big gap in term of the accessibility and the availability of resources, there are different protocol in screening the surgical patients among hospitals at the various regions at Indonesia. The protocol has to be strictly developed based on the minimum standard according to Covid-19 management guideline issued by Ministry of Health Republic of Indonesia. The objectives are to protect and prevent any local transmission among health workers as well as patients based on the available resources.

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