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Surgery Department during Coronavirus Disease 2019 Virus Lockdown: Multidepartment Experiences From Universitas Sebelas Maret

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Abstract

BACKGROUND: The coronavirus disease 2019 (COVID-19) pandemic has severely affected the provision of health-care services in hospitals around the world, including bringing challenges to those who perform surgical procedures. Multidepartment data analysis will reflect the pandemic's impact and challenges in managing surgical cases in various surgery departments.

AIM: This study aims to assess the impact of COVID-19 lockdowns on surgical cases carried out in eight tertiary care center surgery departments.

METHODS: Retrospective data from all patients in the eight surgery departments of Dr. Moewardi General Hospital, Surakarta, during the lockdown period due to COVID-19 were collected and compared to the period before the lockdown. Then, the data were analyzed regarding the effects of following the standard operating procedure for surgical services in the hospital during the lockdown period.

RESULTS: All the surgery departments involved in the study showed a significant reduction in the number of patients treated during the lockdown period than before the lockdown, with a total number of cases across all departments of 2432, a decrease from 4503 before the lockdown. In surgical patient care, several special measures during the COVID-19 pandemic were carried out in outpatient, intraoperative, and inpatient services to reduce the virus spread to patients and health workers.

CONCLUSION: The COVID-19 pandemic has severely affected the provision of health services in hospitals with a reduction in the number and types of patients in each surgery department, and the obligation to follow hospital protocols against COVID-19 has resulted in various treatments and services being delayed in all surgery departments.

Introduction

Coronavirus disease 2019 (COVID-19) is a disease caused by infection with severe acute respiratory syndrome coronavirus 2 and has become a global pandemic since it was first discovered in Wuhan, China, in December 2019 [1]. As of March 14, 2021, the WHO reported 119,218,587 confirmed cases and 2,642,673 deaths due to COVID-19 worldwide [2]. This pandemic has brought challenges to surgical procedures in hospitals around the world [3]. Despite the obvious implications for the infected patient management, this sudden change in the health system's administration raises several problems regarding the patients' management with incurable diseases other than COVID-19. Particularly, surgical patient management has been burdened by several problems relating to pre-operative, intraoperative, and post-operative care management. These include the timeliness of surgery for elective cases, management of cancer patients requiring surgery, the role of routine screening for patients scheduled for surgery, surgical management of suspected or confirmed cases of COVID-19, and arrangement of follow-up visits [4].

In this case, Dr. Moewardi General Hospital's surgery department serves surgical patients divided into eight subdepartments: Oncology surgery, digestive surgery, pediatric surgery, thoracic and cardiovascular surgery, plastic surgery, neurosurgery, orthopedics, and urology. Each of these subdepartments has its challenges, ranging from elective cases and emergency cases that cannot be postponed. Therefore, resetting surgical services management during the COVID-19 pandemic is a must to achieve efficient management. The researchers presented surgical patient data and analyzed the impact of this pandemic on the surgical cases' management in eight surgery departments of Dr. Moewardi General Hospital, Surakarta, Indonesia.

Methods

This retrospective study was conducted in eight surgery departments of Dr. Moewardi General Hospital in Surakarta, Indonesia. Data of all patients per surgery department during the lockdown phase (from April 10, 2020, to June 5, 2020) and from February 2020 to the start of the lockdown period were collected and then analyzed retrospectively. The collected data were in the forms of demographic details, disease history, diagnosis, results of investigations, COVID-19 status, details of the surgery, and complications.

Standard protocol for managing surgical patients

COVID-19 has caused many changes in the world. Various countries have implemented lockdowns to prevent the virus spread. In Indonesia, the lockdown was implemented on April 10, 2020, for 2 weeks, and after that, it was extended without interruption for consecutive phases of 2 weeks. During this period, the hospital's health services underwent many changes, with outpatient clinical protocols functioning on a limited basis and serving only severe and emergency cases, while all elective cases were postponed, and only emergency cases could undergo surgery.

Each hospital has its standard operating protocol (SOP) in the patient management during the pandemic, starting from triage of patients from their symptoms, admitting emergency patients to isolation areas, examining all patients treated with either the swab rapid antigen test or reverse transcription polymerase chain reaction (RT-PCR) for COVID-19, transferring COVID-19 negative patients to the main ward and handing them over to the relevant department for definitive management, and transferring COVID-19-positive patients to special wards for isolation or referring them to a COVID-19 referral hospital for further treatment.

The SOP also regulates personal protective equipment (PPE) facilities for all medical personnel, both on duty on the COVID ward and the general ward. PPE provision includes masks, protective goggles or face shields, sterile and non-sterile gloves, gowns, hazmat suits, headgear, and shoe covers.

The SOP also regulates health workers who are accidentally exposed to positive patients with COVID-19. If accidentally exposed, these health workers must undergo self-isolation for 2 weeks, and if tested positive for COVID-19, they must undergo treatment at a designated COVID-19 referral hospital.

Dr. Moewardi Regional General Hospital is located in the province of Central Java, a type A hospital in Indonesia, and designated by the government as a tertiary referral hospital. Dr. Moewardi Regional General Hospital has supporting facilities for handling COVID such as intensive care unit, isolation ward for patient with infectious diseases, tertiary referral hospital, and the main academic affiliated hospital of the Sebelas Maret University, Faculty of Medicine, Surakarta. The hospital provides a high volume of health-care services for a wide range of many cases [5].

Results

Table 1 shows the number of operations carried out during the lockdown period in various departments. When comparing the data on the number of cases from February 2020 before the lockdown implementation with the first 55 days of lockdown, there was a decrease in the number of cases in the eight surgery departments from 4503 to 2432. The most significant reduction in the number of cases was in the surgical oncology department, 592 cases, from 1149 to 557 cases (51.5%). Meanwhile, the smallest decrease was in the urological surgery department, namely, 51 cases, from 342 to 291 cases (15%). For the number of men and women comparison, it was almost the same, which was 36:37. Furthermore, checking the status of COVID-19 was carried out for operational purposes during the lockdown.

Table 2 exhibits the various surgical cases in each department during the lockdown period and compares them with the same cases before lockdown. In this study, the three most common disease diagnoses in each department were taken. All types of cases in each surgery department showed a reduction during the lockdown period. The largest decrease was in breast cancer cases in the oncology department, which decreased by 251 cases. Meanwhile, the smallest decrease was in the acute case of testicles in the urology department, which decreased three cases.

Table 3 displays various departments' specific actions in managing patients according to hospital SOPs regarding health services during COVID-19 pandemic. All measures taken aimed to limit the number of patients admitted during outpatient and inpatient care without refusing to treat patients who came with severe symptoms and required immediate treatment.

There were similarities to the specific actions taken in each department. Neither of the eight departments performed elective case surgery during the lockdown period. The difference was that only the oncology, pediatric, and plastic surgery departments provided telemedicine services. Besides, laparoscopic procedures were only performed in the oncology, digestive, pediatric, and urology surgery departments, so specific laparoscopic procedures were only mentioned in these departments.

Table 1: Comparative profile of operations performed during the lockdown in various surgery departments at Dr. Moewardi General Hospital

DEPARTMENT	Number of cases after lockdown (April 10, 2020–June 5, 2020) and the first 55 days	Men and women comparison	Number of cases before lockdown starting February 2020	The average number of cases performed surgically before lockdown starting February 2020	COVID-19 status checking for operations during lockdown	Any complications related to COVID-19
Oncology surgery	557	4:12	1149	804	(before SOP) 67 patients were not tested. (12.04%) (after SOP) 461 COVID-19-negative patients (82.76%) 29 COVID-19-positive patients (5.2%)	Nothing
Digestive surgery	296	5:7	673	342	(before SOP) 31 patients were not tested. (10.47%) (after SOP) 237 COVID-19-negative patients (80.06%) 28 COVID-19-positive patients (9.46%)	Nothing
Pediatric surgery	166	3:4	341	123	(before SOP) 23 patients were not tested. (13.8%) (after SOP) 127 COVID-19-negative patients (76.5%) 16 COVID-19-positive patients (9.63%)	Nothing
Cardiovascular thoracic surgery	201	5:3	472	289	(before SOP) 44 patients were not tested. (21.9%) (after SOP) 128 COVID-19-negative patients (63.68%) 29 COVID-19-positive patients (14.42%)	Nothing
Plastic surgery	276	7:3	394	166	(before SOP) 28 patients were not tested. (4.86%) (after SOP) 532 COVID-19-negative patients (92.36%) 16 COVID-19-positive patients (2.7%)	Nothing
Neurosurgery	198	3:2	445	206	(before SOP) 25 patients were not tested. (12.62%) (after SOP) 154 COVID-19-negative patients (77.7%) 19 COVID-19-positive patients (9.6%)	Nothing
Orthopedics and Traumatology	447	7:5	687	365	(before SOP) 39 patients were not tested. (8.72%) (after SOP) 384 COVID-19-negative patients (85.9%) 24 COVID-19-positive patients (5.36%)	Nothing
Urology	291	2:1	342	224	(before SOP) 32 patients were not tested. (10%) (after SOP) 260 COVID-19-negative patients (81%) 29 COVID-19-positive patients (9%)	Nothing
Total	2432	36:37	4503	2519	2462	–

COVID-19: Coronavirus disease 2019, SOP: Standard operating protocol.

Table 2: Common types of surgical patient cases during and before lockdown

Department	Most common disease diagnosis	Number of cases 3 months before lockdown (%)	Number of cases at 3 months of lockdown (%)	Effect of number of cases due to lockdown
Oncology surgery	Ca Mammae	471 (10.45)	220 (9.05)	↓↓↓
	Ca thyroid	301 (6.68)	157 (6.45)	↓↓
	Soft-tissue tumor	189 (4.19)	106 (4.35)	↓
	Others	188 (4.17)	74 (3.04)	↓↓
Digestive surgery	Appendicitis	196 (4.35)	90 (3.70)	↓↓
	Cholestasis	176 (3.9)	67 (2.75)	↓↓
	Ileus	190 (4.22)	83 (3.41)	↓↓
	Others	111 (2.46)	56 (2.30)	↓
Pediatric surgery	Hernia	104 (2.30)	71 (2.91)	↓
	Congenital megacolon	77 (1.7)	26 (1.06)	↓
	Atresia ani	72 (1.6)	32 (1.31)	↓
	Others	88 (1.95)	37 (1.52)	↓
Cardiovascular thoracic surgery	Costae fracture	176 (3.90)	98 (4.02)	↓
	PAD	108 (2.40)	45 (1.85)	↓
	DVT	93 (2.06)	23 (0.94)	↓
	Others	95 (2.10)	35 (1.43)	↓
Plastic and esthetic Reconstructive surgery	Burns	156 (3.46)	132 (5.42)	↓
	Maxillofacial trauma	104 (2.30)	71 (2.91)	↓
	Cleft	76 (1.68)	39 (1.06)	↓
	Others	58 (1.28)	34 (1.39)	↓
Neurosurgery	Head injury	194 (4.30)	66 (2.71)	↓↓
	Spinal cord injury	104 (2.30)	60 (2.46)	↓
	Brain tumor	80 (1.77)	41 (1.68)	↓
	Others	67 (1.48)	31 (1.27)	↓
Orthopedics and traumatology	Limb fracture	346 (7.68)	237 (9.37)	↓↓
	OA	165 (3.66)	93 (3.82)	↓
	Bone malignancy	105 (2.33)	83 (3.41)	↓
	Others	71 (1.57)	34 (1.39)	↓
Urology	BPH	124 (2.75)	102 (4.19)	↓
	Vesicoureteral lithiasis	113 (2.51)	99 (4.07)	↓
	Acute testicles	62 (1.37)	59 (2.42)	↓
	Others	43 (0.95)	31 (1.27)	↓
Total		4503	2432	

Table 3: Special measures for COVID-19 in various surgery departments at Dr. Moewardi General Hospital

Measurement	Department							
	Oncology surgery	Digestive surgery	Pediatric surgery	Cardiovascular thoracic surgery	Plastic surgery	Neuro surgery	Orthopedic	Urology
Online registration	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limiting the number of outpatients triaging	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Whether an elective case is carried out	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Limiting the number of emergency surgery patients	No	No	No	No	No	No	No	No
Limiting the number of patients surgically	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Emergency case	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Rapid test before hospitalization	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
PCR test before any surgical intervention	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Availability of PPE/N-95 mask/face shield/ protective goggles	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Telemedicine services	Yes	No	Yes	No	Yes	No	No	No
Separating facilities for COVID-19-positive patients and COVID-19-negative patients	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
The working hours of health workers are divided into working shifts.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Actions during laparoscopic surgery	Yes	Yes	Yes	–	–	–	–	Yes
Lowering insufflation pressure	+	+	+	+	+	+	+	+
Desulfation with trocar suction	+	+	+	+	–	–	–	+
Use of filters	–	+	–	+	+	+	+	+
Collection of specimens after desulfation	+	+	–	–	+	–	–	+
Use of a smoke evacuator	–	–	–	–	–	–	–	–
Limited use of energy devices	+	+	+	+	+	+	+	+
Reactive PCR on operating room	–	–	–	–	–	–	–	–

PCR: Polymerase chain reaction, COVID-19: Coronavirus disease 2019.

Discussion

The first case of COVID-19 in Indonesia was on March 2, 2020 [6]. As of March 14, 2021, positive confirmed cases in Indonesia reached 1,414,741 cases with 38,329 deaths. Indonesia ranked second in Southeast Asia after India with the most positive cases [2]. This infectious disease has high airborne transmissibility due to aerosols, which are thought to persist in the air [7]. Therefore, the COVID-19 pandemic has created several problems in the management of surgical patients. These patients may be a high-risk group because of the increased risk of nosocomial infection and the stress effects of surgery and anesthesia [4]. Elective surgery should not be done immediately because no indication threatens life or disability, in contrast to emergency surgery. During this pandemic, there have been many considerations for postponing planned operations. One of them concerns that surgical procedures could increase the virus's exposure time in hospitals for health care workers, especially in the operating room. Data from the Center for Disease Control and Prevention (CDC) are also a consideration for delaying planned operations. According to CDC data, about 25% of people who contracted COVID-19 did not show any symptoms [6], [8].

Various countries and institutions have developed their rules/protocols regarding elective and emergency operations [3]. According to the American College of Surgeons, case selection decisions should be based on the local incidence of COVID-19 cases, regular staff and patient testing of COVID-19, proper use of PPE, and distancing practice. The selection of surgery cases should also be based on the urgency of the patient's needs, the availability and health status of health workers, and hospital beds' capacity [9]. The American College of Surgeons has divided surgical procedures into several levels, depending on the urgency of surgery; they recommended delaying all operations from Tier 1a to Tier 2b and not delaying surgery in Tier 3a and 3b cases, such as surgery for high-risk cancer patients and surgical patients with severe symptoms [10].

According to hospital service protocols, all cases requiring surgery must undergo a test for COVID-19 before surgery, either with RT-PCR or rapid antigen swabs. After that, if the patient's test is negative, he can undergo surgery with caution according to the surgical protocol. Meanwhile, if positive, he must be isolated in a special COVID-19 ward and operated on tertiary protective measures. In this study, all eight surgery departments had undergone the protocol, followed the American College of Surgeons and the hospital SOP [11]. A study conducted by Setyono *et al*. observed neurosurgery department in Moewardi Hospital found that the number of inpatients, neurosurgical patients, and outpatients decrease compares with 2019 and 2020 [5].

Surgical procedures are teamwork; all health workers involved have a role in carrying out an operation, from registration, outpatient consultation, hospitalization, radiological investigations and examinations, anesthetic procedures, definitive surgery, post-operative care, and sanitation and disinfection measures for this virus. Therefore, special measures must be taken in each section to reduce the virus's exposure and spread. These range from restrictions on registration, where the number of patients is limited to those who have symptoms, imposing PCR tests or coronavirus antigen rapid swabs and other tests and using self-protection measures or tools according to patient risk groups [3]. All these specific measures were performed by the eight surgery departments in the study (Table 3).

Most hospitals have limited their outpatient clinics, and only emergency and life-threatening cases

undergo surgery. To overcome this, telemedicine services have become an option and have increased during the pandemic. This service is carried out to provide health-related advice to patients in need without the need to crowd the hospital. However, only medical advice can be given through this medium; patients are advised to come to the hospital if other interventions/actions are needed [12], [13]. In this study, out of eight surgery departments, only three provided this service.

The current study data revealed a significant reduction in the number of patients in each surgery department during the lockdown period. It was due to the delay in carrying out operations on elective cases and a reduction in emergency cases.

Moreover, trauma patients are a group of patients who need immediate treatment even though they have COVID-19 status. However, in this study, the number of trauma patients decreased, and they still received prompt treatment according to guidelines [14]. Cancer surgery, on many occasions, cannot be postponed because of concerns about its growth, spread, and risk of death. It should concern the risk of virus transmission to cancer patients, where their immune conditions are compromised. All tumor surgeries were performed semi-emergently, and the hospital stay was kept as short as possible to reduce overall exposure to the virus [15], [16].

In addition, the average number of men and women who underwent surgery during this period did not differ significantly. Besides, in this study, there were no complications related to COVID-19 in all surgical departments.

Due to health service protocols, surgical intervention services have been delayed due to having to carry out a COVID-19 test before intervention for all patients. As such, this global pandemic has changed hospitals' dynamics and the number and nature of cases. The eight surgery departments involved in this study were limited by lockdowns and SOPs/protocols in their patient care.

There is limitation in this study. This study was only carried out in one hospital and might not reflect the condition in other health-care facilities. The future studies may focus on this aspect.

Conclusion

COVID-19 has dramatically affected the provision of health services in hospitals by reducing the number and types of patients receiving treatment at each surgery department, and the obligation to follow hospital protocols against COVID-19 has resulted in various treatments being delayed.

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