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Delivery of digestive surgery services during the COVID-19 pandemic: Indonesian Society of Digestive Surgeons online survey

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Abstract

Introduction: During the coronavirus disease 2019 (COVID-19) pandemic, digestive surgery potentially exposes both health-care professionals and vulnerable patients to COVID-19. A survey was conducted with aim to determine the digestive surgery services provided during the COVID-19 pandemic, optimize safety for patients and clinicians, and safeguard health-care services.

Methods: An online survey was conceived and circulated to members of the Indonesian Society of Digestive Surgeons. The survey was conducted in two phases, in April 2020 and July 2020, to evaluate changes in response to the COVID-19 pandemic.

Results: Early in the pandemic (April 2020), the median number of major digestive surgeries performed monthly declined from 20 cases (range. 3-100 cases) to 1 case (range. 0-10 cases) ($P < .001$; Wilcoxon signed-rank test). Most of the cases in April 2020 addressed emergency problems, but more definitive surgeries were performed during the later period of the survey. The importance of screening for COVID-19 with polymerase chain reaction has increased over

time, and a more comprehensive screening methodology incorporating real-time polymerase chain reaction, chest CT, and rapid antibody test were evident in 31.37% of July 2020 responses.

Conclusion: Our survey has shown that surgeons adapted to the evolving pandemic and continue to do so only with appropriate safety assurances.

KEYWORDS

COVID-19, digestive surgery, online survey

1 | INTRODUCTION

The swift spread of coronavirus disease 2019 (COVID-19) has heavily affected health-care systems, as well as both patients with COVID-19 and patients in need of medical and surgical treatments unrelated to COVID-19. Digestive surgery is among many services affected by the COVID-19 pandemic. During the pandemic, digestive surgery service potentially exposes both health-care professionals and vulnerable patients to COVID-19. However, the inability to receive medical or surgical treatment presents an equal threat to many patients.

Many things have progressed since the Indonesian Society of Digestive Surgeons' (ISDS) position statement on digestive surgery services in the COVID-19 pandemic period was published in June 2020.¹ Therefore, this survey aimed to describe digestive surgery services during the COVID-19 pandemic, optimize safety for patients and clinicians, and safeguard health care services.

2 | MATERIALS AND METHODS

An online survey was conceived and circulated to members of the ISDS. The survey consisted of 49 questions about hospital conditions during the COVID-19 pandemic; the local impact of the pandemic on surgery services, including digestive surgical cases; and the availability and usage of personal protective equipment (PPE). Respondents identified themselves on the survey. The survey was conducted in two phases— in April 2020 and July 2020—to evaluate changes in response to the COVID-19 pandemic. To prevent overlap of members, respondents registered their name and city of practice. Variables were processed and analyzed using Microsoft Excel (Redmond, Washington) and SPSS (Statistics for Macintosh, Version 23.0. Armonk, NY: IBP Corp), and results were reported as frequency and percentages. The weekly volumes of surgery before and during the COVID-19 pandemic were compared using

the Wilcoxon signed-rank test for non-normally distributed variables.

3 | RESULTS

The first phase of the online survey was conducted from April 20 to May 2, 2020, and 200 ISDS members were invited to respond. Eighty-nine members (44.50%)—digestive surgeons from 10 of the 11 ISDS branches (Figure 1)—submitted their answers. (There were no responses from the Aceh branch.) Only 51 of the 89 surgeons (57.3%) responded to the second phase of the online survey.

Before the COVID-19 pandemic, the median monthly operative volume was 20 major digestive surgeries (range, 3-100 surgeries), 10 laparoscopic surgeries (range, 1-62 surgeries), and 10 endoscopy procedures (range, 1-30 procedures). Early in the pandemic (April 2020), the median number of major digestive surgeries per month declined from 20 case (range, 3-100 cases) to 1 case (range, 0-10 cases) ($P < .001$, Wilcoxon signed-rank test). Only 16.85% and 12.35% of respondents performed laparoscopic and endoscopic procedures, respectively.

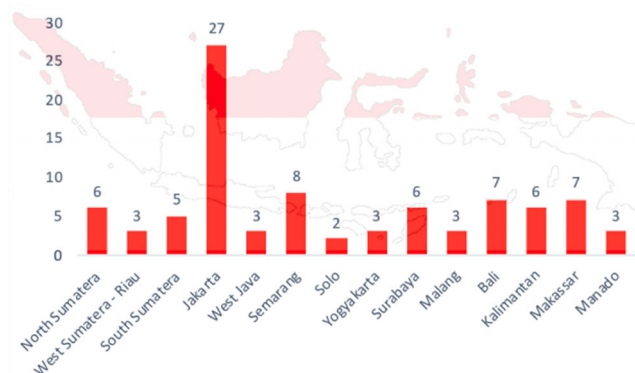


FIGURE 1 Distribution of respondents by branch of the Indonesian Society of Digestive Surgeons

3.1 | Hospital preparedness

According to the April 2020 survey, the proportion of hospital beds designated for COVID-19 was 47.19%. At that time, 39.3% of respondents indicated that the capacity for non-COVID-19 cases had decreased by 50%; by July 2020, 47.06% of respondents indicated as such. Also, 56.86% of respondents indicated that the proportion of intensive care unit (ICU) beds reserved for COVID-19 cases had increased by 5% to 49%. Most respondents—88.76% in April and 82.35% in July—reported that hospital management was responsive to the COVID-19 pandemic.

Digestive surgery services and surgical procedures reported by respondents are shown in Figure 2 and Table 1. The screening procedure and availability of a dedicated COVID-19 ward are presented in Table 2.

Table 3 describes the management of digestive cancers, including colorectal cancer and hepatopancreatobiliary cancers, during the COVID-19 pandemic. The reasons for the postponement of surgery are shown in Figure 3.

Adherence to using PPE was generally good among respondents, with more than 90% using PPE level 3 for surgery in patients who are COVID-19 positive. Variations were seen in outpatient department, where 36.4% of respondents wore hazmat suits, 45.5% wore operative gowns, 77.3% wore N95 masks, 97.5% wore protective goggles, and 68.2% wore surgical masks.

4 | DISCUSSION

Around the world, COVID-19 has continued to be a major problem in many countries, including Indonesia. Indonesia reported its first confirmed case of severe acute respiratory syndrome coronavirus 2 infection on March

2, 2020, and as of October 2020, there were 340 622 COVID-19 patients across the archipelago.^{2,3} No country was sufficiently prepared for this pandemic, creating many uncertainties, especially in health-care services. In the field of surgery, the availability of surgical services has been reduced, with only urgent and emergency procedures taking place. Postoperative pulmonary complications occur in half of patients (51.2%) with perioperative severe acute respiratory syndrome coronavirus 2 infection, and the complications are associated with high mortality (23.8%). Thresholds for surgery during the COVID-19 pandemic should be higher than during normal practice, particularly in men aged 70 years and older. Consideration should be given to postpone non-urgent procedures and promote non-operative treatment to delay or avoid the need for surgery.³

Our survey's first phase in April 2020 showed a marked reduction of up to 20% in surgery volume. The reductions in laparoscopic and endoscopic surgery were even greater, mainly because of uncertainty regarding the risk of aerosol viral transmission during procedures. ISDS's position statement suggests the use of laparoscopy only when the recommended standards can be fulfilled; the use of a smoke evacuation system integrated into the laparoscopic apparatus should also be strongly considered.¹ With the accumulation of evidence about the safety of minimally invasive surgery, the second phase of the survey saw an increase in the percentage of laparoscopic (16.85% vs 68.83%) and endoscopic (12.36% vs 35.29%) surgery, as well as an increase in the use of smoke evacuation systems during laparoscopic surgery (6.74% vs 52.94%). Laparoscopic surgery is generally considered advantageous because of the low risk of transmission and early postoperative recovery, as long as safety precautions, such as a smoke evacuator, are properly used.⁴

Given the potential of COVID-19 to spread among patients and health-care workers, the gradual reintroduction of postponed elective surgery should follow rigorous measures to avoid greater collateral damage.⁵ This so-called transitional stage, which requires identifying a variety of issues related to health-care services,⁶ began with an understanding of the epidemiological condition—that is, an understanding of “where we are in the pandemic curve.”⁷ It is better to prolong the emergency stage and postpone elective surgery when the number of infections is still rising. Many hospital resources, including staff, PPE, and COVID-19 screening tools, are better allocated to the COVID-19 services and help otherwise maintain the quality of treatment and patient and health-care worker safety.^{5,8,9}

Çolakoğlu et al suggested that hospital or health-care systems experience four phases of the COVID-19 pandemic:

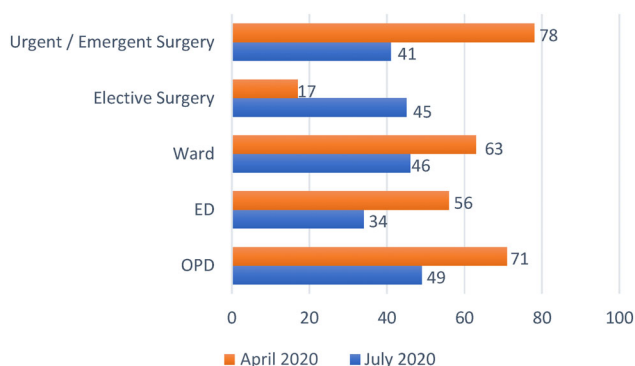


FIGURE 2 Distribution of digestive surgery services during the coronavirus disease 2019 pandemic. ED, emergency department; OPD, outpatient department

TABLE 1 Surgical procedures during the COVID-19 pandemic

	April 2020 (n = 89)		July 2020 (n = 51)	
	n	%	n	%
Number of major elective digestive surgeries				
0	39	43.82	4	7.84
1-3	43	48.31	31	60.78
>3	4	4.49	14	27.45
Type of major elective digestive surgery				
Upper GI	9	10.11	23	45.10
Hepatopancreatobiliary	29	32.58	39	76.47
Colorectal	41	46.07	46	90.20
Number of minor elective digestive surgeries				
0	43	48.31	4	7.84
1-3	32	35.96	27	52.94
>3	8	8.99	18	35.29
Type of minor elective digestive surgery				
Appendectomy	36	40.45	38	74.51
Hernia	18	20.22	34	66.67
Hemorrhoid	13	14.61	31	60.78
Perianal procedure	15	16.85	30	58.82
Laparoscopic procedure				
Yes	15	16.85	35	68.63
No	74	83.15	15	29.41
Smoke evacuation system during laparoscopy				
Yes	6	6.74	27	52.94
Endoscopic procedure				
Yes	11	12.36	18	35.29
No	75	84.27	32	62.75
Type of endoscopic procedure				
Upper GI	3	3.37	14	27.45
Lower GI	9	10.11	20	39.22
ERCP	4	4.49	6	6.74
Number of emergency digestive surgeries				
0	11	12.36	5	9.80
1-3	56	62.92	38	74.51
>3	19	21.35	4	7.84

Abbreviations: COVID-19, coronavirus disease 2019; ERCP, endoscopic retrograde cholangiopancreatography.

- Phase 0 (unaffected): There are no COVID-19 patients, and the hospital works properly.
- Phase 1 (semi-urgent): There are few COVID-19 patients, hospital resources are not exhausted, the institution still has ICU ventilator capacity, and the COVID-19 trajectory is not in the rapid escalation phase.
- Phase 2 (urgent): There are many COVID-19 patients, ICU and ventilator capacity is limited, and operating room (OR) supplies are limited.
- Phase 3 (emergent). All hospital resources are routed to COVID-19 patients, there is no ICU or ventilator capacity, and OR supplies are exhausted.⁵

TABLE 2 Preoperative screening and dedicated postoperative COVID-19 ward

	April 2020 (n = 89)		July 2020 (n = 51)	
	n	%	n	%
Preoperative screening				
No screening	28	31.46	0	0.00
Only swab PCR	2	2.25	10	19.61
Only rapid antibody test	23	25.84	19	37.25
Only chest CT	1	1.12	0	0.00
Rapid + chest CT	20	22.47	6	11.76
Swab PCR + rapid + chest CT	15	16.85	16	31.37
Dedicated postoperative COVID-19 ward				
Yes	39	43.82	39	76.47
No	15	16.85	4	7.84
No COVID-19 cases	25	28.09	8	15.69

Abbreviations: COVID-19, coronavirus disease 2019; PCR, polymerase chain reaction; rapid, rapid antibody test.

Surgeons and hospital management should review their hospital status from time to time to determine their phase.

A study by Gammeri et al shows the importance of a COVID-19-free environment, either a separate wing inside a hospital or a dedicated hospital for non-COVID-19 patients, for resuming elective surgery during the pandemic.⁸ Strategies are urgently required to minimize in-hospital transmission and mitigate the risk of postoperative pulmonary complications in infected patients in whom delaying surgery is not an option.³

Screening for COVID-19 is an essential aspect of conducting surgeries. By preventing the introduction of COVID-19-positive patients into the hospital, preoperative screening benefits surgical care in stopping nosocomial spread and reducing the use of scarce PPE.^{10,11} Screening with polymerase chain reaction (PCR) has improved over time, with more than half (50.98%) of the second phase's respondents reporting the use of real-time PCR (RT-PCR). All respondents indicated there was a screening policy, whereas in the first phase, 31.46% reported that there was no screening policy at their institution. Among second phase respondents, 31.37% described using a more comprehensive screening methodology incorporating RT-PCR, chest CT, and rapid antibody test.

Many studies have recommended RT-PCR before a surgical procedure.¹²⁻¹⁹ Puylaert et al suggested that RT-PCR alone had a higher yield of positive results than chest CT alone (0.7% vs 1.1%).¹⁰ Moreover, the positive output of RT-PCR increased with increased community prevalence, whereas the yield of CT did not. Fields et al recommended COVID-19 testing 24 to 48 hours before

surgery and proceeding with elective surgery only if the test is negative.²⁰ To further increase safety precautions, Xu et al suggested that all patients who pass the screening should be admitted to the hospital but should first stay in a single observation room for 72 hours to monitor for any possible symptoms.¹⁶

Al-Muharrraqi recommended a combination screening methodology incorporating RT-PCR and an antibody screening.²¹ When performed in all surgical units, these tests can be part of a pandemic suppression campaign to move the current crisis closer to the ideal situation, especially in the absence of therapeutics or vaccines. If patients have positive PCR test results, they are isolated, the national COVID-19 public health protocols (including protocols for exposed staff) are followed, and the surgery is postponed. If patients have negative PCR results but are positive for the antibody, they will not require further testing during their hospital stay. If patients have negative PCR and antibody results, a PCR test is administered weekly during their stay and on discharge.

In colorectal and hepatobiliary-pancreatic cancer surgery, there was a shift toward returning to more "normal" procedures according to the second phase survey. In April 2020, most cases involved emergency problems, but the July 2020 survey, more definitive surgeries were observed. However, any plans to offer surgery should be made with the understanding that an immediate return to a high volume may not be possible.¹⁸

Increases in chemotherapy treatments were observed in colorectal cancer management, especially in April 2020, when surgery was limited to urgent and emergent cancer cases. Postponement of therapy for non-emergent cases was also observed both in colorectal and

	April 2020 (n = 89)		July 2020 (n = 51)	
	n	%	n	%
Colon cancer without obstruction				
Chemotherapy	16	17.98	4	7.84
Surgical resection	35	39.33	42	82.35
Stoma procedure	1	1.12	1	1.96
Referral	2	2.25	0	0.00
Postpone	35	39.33	4	7.84
Rectal cancer without obstruction				
Chemotherapy	16	17.98	5	9.80
Surgical resection	30	33.71	36	70.59
Stoma procedure	6	6.74	2	3.92
Radiation therapy	6	6.74	4	7.84
Referral	3	3.37	0	0.00
Postpone	28	31.46	4	7.84
Colorectal cancer with obstruction				
Endoscopic stenting	1	1.12	1	1.96
Surgical resection and anastomosis	23	25.84	15	29.41
Stoma procedure	63	70.79	35	68.63
Referral	1	1.12	0	0.00
Postpone	1	1.12	0	0.00
HPB cancer without jaundice				
Chemotherapy	12	13.48	6	11.76
Ablation therapy	4	4.49	4	7.84
Surgical resection	16	17.98	25	49.02
Referral	4	4.49	1	1.96
Postpone	53	59.55	15	29.41
HPB cancer with jaundice				
Surgical resection	3	3.37	5	9.80
PTBD	35	39.33	10	19.61
ERCP	16	17.98	16	31.37
Cholecystostomy	30	33.71	12	23.53
Postpone	5	5.62	8	15.69

TABLE 3 Changes in the pattern of digestive cancers management during the COVID-19 pandemic

Abbreviations: COVID-19, coronavirus disease 2019; ERCP, endoscopic retrograde cholangiopancreatography; HPB, hepatopancreatobiliary; PTBD.

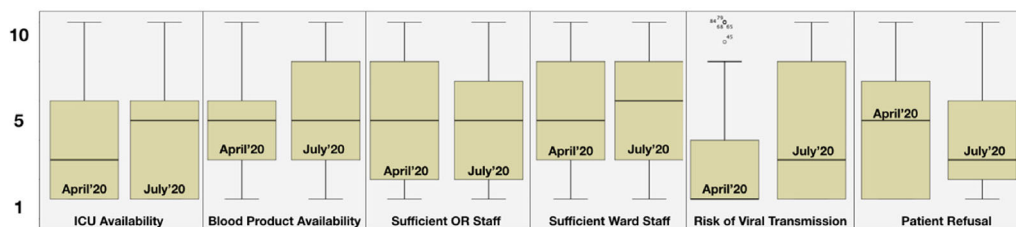


FIGURE 3 Reason for postponement of surgery during the coronavirus disease 2019 pandemic. Respondents rated the importance of the reason for postponement on a scale from 1 (most important) to 10 (least important). ICU, intensive care unit

hepatobiliary cancers, but this gradually decreased in the second part of the survey.

The availability of the ICU and the risk of viral transmission were the two most important reason for rescheduling surgery in April 2020, but by July 2020, only the risk of viral transmission was still considered one of the most important considerations. The need for the ICU after surgery during the COVID-19 pandemic has been addressed in some studies.^{18,22,23} Any effort to reopen elective surgery should consider the availability of the ICU and its staff. All aspects of surgery and perioperative care, including the possibility of viral transmission, should be discussed with patients and their family and written in the informed consent document.^{5,6,22} Interestingly, we found that patient refusal in July 2020 was higher than in April 2020. This may be because awareness of COVID-19 in the community was increasing and many recognized that the pandemic was far from over.

The availability of adequate PPE for all hospital personnel, not only surgical staff, is necessary. Standardized essential measures, including the use of PPE, are necessary to control disease transmission and avoid unwanted complications.²⁴ A survey by An et al suggest that surgeon fears of getting infected were particularly associated with current PPE shortages.²⁵ Given the increasing burden on hospitals, health-care workers' fears about having sufficient PPE are warranted. Prakash et al considered wearing COVID-19-appropriate PPE in the OR to be good, but most of their respondents reported discomfort and visibility disturbances with the use of their protective eyewear.²⁶

The present survey was limited by the small number of respondents and the online nature of the survey. However, it was collected from multiple regions across the Indonesian archipelago.

In conclusion, our survey has shown that surgeons have adapted to the evolving pandemic and will continue to do so only with appropriate safety assurance. A standardized national preoperative screening procedure with RT-PCR within 72 hours before surgery should be implemented, and efforts should be made to increase the capacity of a dedicated non-COVID-19 unit supported by adequate staff and PPE. Last but not least, all surgeons should remember that we are all in this pandemic together, hand in hand.

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AUTHOR CONTRIBUTIONS

All the authors read and approved the final manuscript.

CONFLICT OF INTEREST

The authors have no conflicts of interest to declare.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

ETHICS STATEMENT

Informed consent was obtained for publication of this report. Ethics committee approval was not required for this report.

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