A Retrospective Analysis of Patients in Urgent Need of General Surgery during the COVID-19 Pandemic

COVID-19 Pandemisi Sırasında Acil Genel Cerrahi İhtiyacı Olan Hastaların Retrospektif Analizi

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ABSTRACT

Introduction: Various restrictions were adopted across the world in order to prevent the COVID-19 pandemic, and health systems were reorganized in order to cope with increasing COVID-19 patient numbers. The purpose of this study was to examine the effect of the COVID-19 pandemic on the number of patients presenting to our emergency department with emergency surgical diseases and requiring urgent general surgery.

Methods: This research examining the approach to emergency general surgery during the COVID-19 pandemic was planned as a retrospective, single-center, clinical study. Patients presenting to the emergency department of a tertiary training and research hospital between 11 March and 1 June, 2020 and requiring urgent general surgical evaluation constituted the study group. The control group consisted of patients presenting to the emergency department and requiring urgent general surgical evaluation during the same period in the previous year. We planned to compare the numbers of patients, their demographic data, the clinical findings, diagnoses, and surgical interventions between the two periods.

Results: A 12% decrease was observed in the numbers of patients presenting in the study group during the COVID-19 pandemic compared to the control group. Decisions to operate (p=0.001) and types of operation(p=0.004) differed significantly between the patient and control groups, but no significant difference was observed in terms of hospital presentation times, length of hospital stay, or mortality.

Conclusion: The COVID-19 pandemic has affected the management of patients requiring emergency surgery. In terms of the treatment regimen, fewer surgical methods were employed in the study group than in the control group. However, despite the preference for medical therapeutic methods, this did not eliminate the need for surgical treatment for appropriate indications.

Key words: Emergency Surgery, Emergency Medicine, COVID-19

ÖZET

Giriş: COVID-19 salgınını önlemek için dünya çapında birtakım kısıtlama önlemleri benimsendi ve COVID-19 hasta sayısındaki artışla başa çıkmak için sağlık sistemleri yeniden düzenlendi. Bu çalışmamızın amacı, COVID-19 pandemi döneminin, acil servisimize başvuran acil cerrahi hastalığı olan ve acil genel cerrahi müdahale gerektiren hasta sayısı üzerindeki etkisini incelemektir.

Yöntemler: COVID-19 pandemi sürecinde acil genel cerrahi yaklaşıma bakış açısını inceleyeceğimiz çalışmamız, retrospektif tek merkezli klinik bir çalışma olarak planlandı.11 Mart - 1 Haziran 2020 tarihleri arasında üçüncü basamak eğitim ve araştırma hastanesi acil servisine müracaat eden ve acil genel cerrahi değerlendirme ihtiyacı olan hastalar çalışma grubu olarak belirlendi. Kontrol grubu olarak ise bir önceki yılın aynı dönemi acil servise başvuran ve acil genel cerrahi değerlendirme ihtiyacı olan hastalar belirlendi. Her iki tarih aralığında çalışma ve kontrol grubundaki hastaların sayısı, demografik verileri, klinik bulguları, tanıları ve yapılan cerrahi müdahaleleri karşılaştırılması planlandı.

Bulgular: Çalışmamızda, kontrol grubu ile kıyaslandığında, COVID-19 salgın dönemi olan çalışma grubunda başvuran hasta sayısında %12 lik bir azalma söz konusuydu. Çalışma ve kontrol grubu arasında operasyon kararı (p=0,001), operasyon tarzı (p=0,004) istatistiksel olarak anlamlıydı, ancak hastaneye başvuru süreleri, hastanede yatış süreleri ve mortalite istatistiksel olarak anlamsızdı.

Sonuç: COVID-19 pandemisi, acil cerrahi ihtiyacı olan hastaların yönetimini etkilemiştir. Çalışma grubu kontrol grubu ile kıyaslandığında tedavi rejimi açısından daha az oranda cerrahi müdahale metodu içermekteydi. Ancak, her ne kadar medikal tedavi yöntemleri tercih edilse de, uygun endikasyonlarda cerrahi tedavi gerekliliğini ortadan kaldırmamıştır.

Anahtar Kelimeler: Acil Cerrahi, Acil Tıp, COVID-19

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INTRODUCTION

A new coronavirus infection emerged in December 2019. Known as COVID-19, this infection then spread across the world, being declared a pandemic by the World Health Organization on 11 March, 2020 (1). During the pandemic, health systems and hospitals were obliged to adapt to new conditions in order to maintain the provision of basic health services (2).

This rapid spread of COVID-19 resulted in a further increase in presentations to hospitals already facing severe workloads. This increase in patient numbers revealed a need to review patient capacities (3). Although no health system was completely prepared for a pandemic on this scale, hospitals and health services began applying various measures to cope with increasing capacity requirements (4). Increasing the capacity of intensive care units and reducing clinical services entered the agenda during this process. A significant part of hospital resources was diverted to combatting COVID-19 in order to manage the rise in these patients (5). These changes naturally also affected surgical departments, and elective interventions were postponed in order to provide care for COVID-19 patients (5-7). Several national surgical associations and regional health institutions sought to design patient-specific guidelines based on a common aim for surgical practice (8-11). However, although the health system is heavily focused on combating the epidemic, the need for urgent evaluation and timely solutions to patients requiring emergency general surgery remains.

METHODS

Study Population and Design

This single-center, retrospective study investigated patients resenting to the emergency department and requiring urgent general surgical intervention during the COVID-19 pandemic. Approval for the study was granted by the local ethical committee (decision no. 2020/234) before the data scanning. Patients presenting to the emergency department of a tertiary training and research hospital between 11 March and 1 June, 2020, and requiring urgent general surgical evaluation constituted the study group. Patients presenting to the emergency department between 11 March and 1 June, 2019, and requiring urgent general surgical evaluation constituted the control group. The numbers of patients in the study and control groups, their demographic data, the clinical findings, diagnoses, and surgical interventions were compared between the two periods.

Study Protocol

Following receipt of the requisite ethical committee approval, emergency department presentations between 11 March, 2020, when the first case of COVID-19 was seen in Turkey, and 1 June, 2020, were examined retrospectively from the hospital records. Presentations to the emergency department between11 March and 1 June, 2019, were also examined at the same time from the hospital records. Patients presenting to the emergency department within these periods and requiring urgent general surgery after examination, tests, and diagnostic procedures based on their current clinical conditions were included in the study in the light of the inclusion and exclusion criteria.

All traumatic or non-traumatic patients aged 18 or over, presenting to the emergency department, evaluated as requiring urgent general surgery following an evaluation at the emergency department, and not meeting the exclusion criteria were included in the study.

Patients aged under 18, pregnant women, patients requiring urgent general surgery after evaluation in the emergency department but who died in the emergency department, and patients with missing information in the data recording system were excluded from the study.

The demographic data, presenting symptoms, diagnoses, surgical intervention procedures performed, clinical course, and length of hospital stay of the patients included in the study were recorded. The time elapsing to presentation to the emergency department was defined as the time between the onset of symptoms and presentation to the emergency department. Presentations to the emergency department made after 24 h were regarded as late presentations. The numbers of patients requiring urgent general surgical intervention, their diagnoses, the surgical procedures performed, and lengths of hospital stay were compared between the study and control groups.

The study endpoint was determined as a comparison of the emergency general surgical interventions performed during the COVID-19 pandemic with those performed during the same period one year previously.

Statistical Analysis

All statistical analyses were performed on Jamovi version 1.6 software (Jamovi Project Computer Software, version 1.6. Sidney, Australia). A type 1 error of 5% was adopted in all comparisons. Normal distribution of continuous variables was expressed as mean plus standard deviation, and non-normal distribution as the median and interquartile range (IQR). Categorical variables were expressed as frequency (n) and percentage (%). The normality of data distribution was evaluated using the Shapiro-Wilk test. The t test was applied in the comparison of continuous variables in case of normal distribution, and the Mann-Whitney U test in case of non-normal distribution. The chi-square test was used to compare categorical variables between the groups.

RESULTS

The patients' demographic data and symptoms are shown in Table 1. The study population consisted of 267 patients fulfilling the inclusion and exclusion criteria, 125 (46.8%) in the study group and 142(53.2%) in the control group. A 12% decrease was observed in the number of patients in the study group presenting during the COVID-19 pandemic compared to the control group. The patients included in the study were similar in terms of age and gender distributions in the two periods. The most common cause of presentation in both periods was abdominal pain, with a decrease of approximately 22% being observed in the study group.

Operation decisions, times to hospitalization, lengths of hospital stay, types of operation, and mortality rates in the study and control groups are summarized in Table 2. Significant differences were determined between the patients in the study and control groups were statistically significant in terms of decisions to operate (p=0.001) and types of operation (laparoscopic surgery, open surgery, interventional radiological methods, and endoscopic procedures) (p=0.004). A bar chart for decisions to operate in the study and control groups is shown in Figure 1. However, no significant differences were observed in terms of time to hospitalization (p=0.569), length of hospital stay (p=0.053), or mortality (p=0.394).

Table 1. Patients' Demographic Data and Symptoms

	2020 (Study Group)	2019 (Control Group)
Gender (n)	125 (46.8 %)	142 (53.2 %)
Male	72 (57.6 %)	79 (55.6 %)
Female	53 (42.4 %)	63 (44.4 %)
Age (years)	54 (IQR 39-69)	57.5 (IQR 40-67)
Symptoms (n)		
Ambominal pain	83 (66.4 %)	107 (75.4 %)
Nausea-Vomiting	15 (12.0 %)	16 (11.3 %)
Diarrhea	1 (0.8 %)	0 (0 %)
Fever	2 (1.6 %)	1 (0.7 %)
Chest pain	1 (0.8 %)	0 (0 %)
Constipation	9 (7.2 %)	4 (2.8 %)
Purulent Discharge	2 (1.6 %)	7 (4.9 %)
Hematemesis	1 (0.8 %)	0 (0 %)
Hematochezia	5 (4.0 %)	2 (1.4 %)
Hematoma	1 (0.8 %)	0 (0 %)
Vehicular traffic accident	3 (2.4 %)	3 (2.1 %)
Non-vehicular traffic accident	0 (0 %)	1 (0.7 %)
Fall	2 (1.6 %)	1 (0.7 %)

IQR: *Interquartile Range*
Note: *Normally distributed data are expressed as mean ± SD (Min.-Max.) and abnormally distributed data as median values (IQR 25-75)*

Table 2. Relationships between the Study and Control Groups in terms of Decisions to Operate Decision, Length of Hospital Stay, Types of Operation, Time to Hospitalization, and Mortality

	2020 (Study Group)	2019 (Control Group)	Statistical Test
Decision to operate (n)	57 (%45.6)	93 (%65.5)	**p=0.001**
Length of hospital stay (n)			p=0.569
Normal	109	127	
Late^	16	15	
Type of Operation (n)			**p=0.004**
Laparoscopic	6	11	
Open surgery	33	67	
Interventional radiology	1	3	
Endoscopic	11	6	
Local surgery	6	5	
Time to Hospitalization (days)	3 (IQR 2-6)	4 (IQR 3-7)	p=0.053
Mortality (n)	6 (%4.8)	4 (%2.8)	p=0.394

^: Presentations to the emergency department 24 hours after the onset of the clinical manifestation of the disease.
***IQR:** Interquartile range*
***Note:** Normally distributed data expressed as mean ± SD (Min.-Max.) and abnormally distributed data as median values (IQR 25-75)*

DISCUSSION

Health systems across the world have been reorganized in order to cope with the COVID-19 pandemic and to maintain the provision of basic health services (2). The American College of Surgeons (ACS) made a number of recommendations for the management of acute surgical emergencies during the pandemic in its published guidelines. Based on these guidelines, non-surgical treatment was recommended, if safe and possible, for patients with known COVID-19 positivity or with clinical suspicion of COVID-19 infection. If surgery was required for these patients, then the use of appropriate protective equipment and the adoption of all necessary precautions in order to protect the healthcare team were recommended (12).

A 12% decrease was observed in the numbers of patients presenting in the study group during the COVID-19 pandemic compared to the control group. In their broad-based retrospective cohort study, Tebela et al. showed a general decrease in emergency surgery presentations with the emergence of the COVID-19 pandemic. However, they observed a lower level of change in types of treatment (medical or surgical) during theCOVID-19 pandemic (13). Göksoy et al. observed a 25% decrease in presentations to the emergency department among patients requiring urgent surgical evaluation during the COVID-19 pandemic (14).

The findings of the present study showed a significant difference between the time of the COVID-19 pandemic and the equivalent period one year previously in terms of decisions to operate (p=0.001) and types of operation performed (p=0.004). However, no significant difference was determined in hospital presentation times (p=0.569). Although a decrease was observed in hospital presentations during COVID-19, no delay occurred in hospital admission times. The present study also shows a compliance with the ACS guideline

recommendations in the operative decisions taken. Rausei et al. also examined emergency surgery practices and surgical procedures during the COVID-19 pandemic and observed a decrease in emergency surgery applications and operations (15).

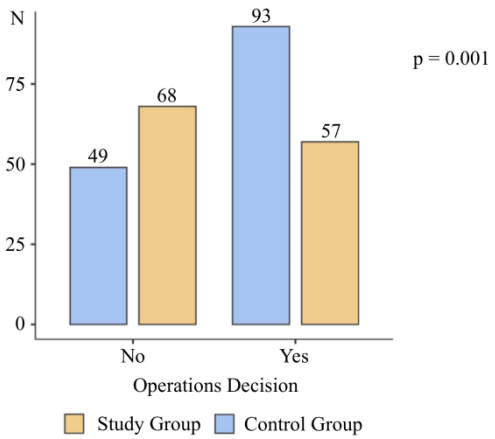

Figure 1. The Number of Surgical Treatments in the Study and Control Groups

No significant difference was determined in mortality (p=0.394) or length of hospital stay (p=0.053) between the COVID-19 pandemic and the control period. Consistent with the previous literature, no difference in mortality was determined between the two periods. Krutsri et al. compared the COVID-19 pandemic and the normal period in terms of emergency surgery morbidity and mortality, but observed no statistically significant difference (6). Cano-Valderrama et al. examined emergency surgery status between COVID-19 and control periods, observing the same mortality in both, but an increase in morbidity during the COVID-19 period. However, that increase in morbidity was not significant in multivariate analysis (7).

Limitations

This study involves data for the first 80 days after the first case of COVID-19 was observed in Turkey. Although it provides some idea of the general situation in the pandemic, a longer period would provide more detailed results. A second limitation is that the study was conducted in a single center. This research therefore needs to be supported by multicenter studies involving larger numbers of patients.

CONCLUSION

This study shows a decrease in emergency surgery presentations during the COVID-19 pandemic. The COVID-19 pandemic affected the management of patients with emergency surgery requirements. A lower rate of surgical intervention was determined in the study group. However, despite the preference for medical treatment methods, this has not eliminated the need for immediate surgical intervention in life-threatening situations such as high-risk patients, hemodynamic deterioration, and shock. In conclusion, we recommend that physicians take the necessary protective measures, carefully evaluate each patient on a case-by-case basis in terms of surgical intervention, and apply the appropriate treatment indication without delay.

Informed consent: Patients' consents were obtained from the patients before starting the study.

Conflict of Interest: None declared.

Financial Disclosure: None declared.

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