



The Effect of Covid-19 On Emergency Surgical Cases. Data From A High-Volume City

Covid-19'un Acil Cerrahi Vakalar Üzerindeki Etkisi. Yüksek Hacimli Şehirden Veriler

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Abstract

Background COVID -19 placed a tremendous and unforeseen burden on the health system worldwide. In addition to the general surgery practice, the approach to emergency surgery cases, and patients' admissions to the hospitals were also seriously affected by this unexpected consequence. Here in we aim to pay attention to the notable decrease in cases requiring urgent surgical intervention in our city and to try to explain this upshot.

Materials and Methods In this multicenter retrospective study, emergency general surgical interventions performed in the 3rd and 2nd stage private and public hospitals, before the pandemic (January 2020- February 2020), and acute phase of the pandemic (Mid-March 2020 - Mid-May 2020) in Sakarya province were compared.

Results The distribution of patients before pandemic by gender was 53.1% in male patients, 46.9% in female patients, while 61.6% in male, and 38.4% in female patients during the pandemic respectively. The mean age of patients was 54.72±3.65 before pandemic and 38.54±2.32 during the pandemic, and there was a statistically significant difference in terms of the age distribution of patients undergoing emergency surgery (p<0.05). During the two months before the pandemic, a total of 290 emergency surgeries were performed, while in the acute pandemic period, 164 emergency operations were performed in the same time interval. There was a statistically significant decrease in the number of patients undergoing emergency surgery during the pandemic period compared to non-pandemic (p= 0.012).

Conclusion Although the causes for the decrease in cases requiring emergency surgery may be partially defined. However, the disease groups whose alteration reasons cannot be explained at the moment may need further detailed strategic preparation in order not to encounter undesired results in the future.

Keywords COVID-19, Pandemic, Surgery, Emergency Surgery

Özet

Amaç COVID -19 dünya çapında sağlık sistemi üzerinde muazzam ve öngörülemeyen bir yük oluşturdu. Elektif genel cerrahi uygulamalarına ek olarak, acil cerrahi vakalarına yaklaşım ve hastaların hastanelere kabulleri de bu beklen-medik sonuçtan ciddi şekilde etkilenmiştir. Burada, şehrimizde acil cerrahi müdahale gerektiren olgulara kayda değer azalmaya dikkati çekmeyi ve bu durumu açıklamaya çalışmayı amaçlıyoruz.

Materyal ve Metod Bu çok merkezli retrospektif çalışmada, Sakarya ilinde, pandemi öncesi (Ocak 2020- Şubat 2020) ve pandeminin akut fazı (Mart 2020 Ortası- Mayıs 2020 Ortası) dönemlerinde yapılan acil cerrahi ameliyatlara karşılaştırılmıştır.

Bulgular Pandemi öncesi hastaların cinsiyete göre dağılımı erkek hastalarda %53.1, kadın hastalarda %46.9, pandemi sırasında erkeklerde %61.6 ve kadın hastalarda %38.4 idi. Hastaların ortalama yaşı pandemi öncesi 54.72 ± 3.65 ve pandemi sırasında 38.54 ± 2.32 idi ve acil cerrahi geçiren hastaların yaş dağılımı açısından istatistiksel olarak anlamlı fark vardı (p <0,05). Pandemi öncesi iki ay boyunca, toplam 290 acil ameliyat yapılırken, akut pandemi döneminde, aynı zaman aralığında 164 acil operasyon gerçekleştirildi. Pandemi döneminde acil cerrahi geçiren hasta sayısında pandemi olmayan döneme göre istatistiksel olarak anlamlı bir azalma vardı (p = 0.012).

Sonuç Acil cerrahi işlem gerektiren durumlarda azalmanın nedenleri kısmen tanımlanabilir. Bununla birlikte, değişikliğin nedenleri şu anda açıklanamayan hastalık gruplarında, gelecekte istenmeyen sonuçlar ile karşılaşmamak için daha ayrıntılı stratejik hazırlığa ihtiyaç olabilir.

Anahtar Kelimeler COVID-19, Pandemi, Cerrahi, Acil cerrahi

INTRODUCTION

When COVID 19 was first described,^{1,2} we were unable to foresee the serious health problems it would create. In our country, rapid action was taken against the virus, and various necessary measures and arrangements were provided. As a result of the seriousness and rapid progression of the pandemic, healthcare administrators have concentrated their health resources on this issue in terms of humans and medication. Changes in general surgical practice were inevitably adopted quickly. Some centers postponed elective surgery procedures and only performed surgery for exceptional cancer cases, which could have been disadvantageous to patients. Emergency surgical cases have been carried out during the pandemic according to the guidelines of the national surgical associations as well as many leading international communities.^{3,8} This study aimed to ascertain the diversity and variation in the number of emergency surgery procedures performed during the pandemic in hospitals in our city during the acute phase of the pandemic.

MATERIAL and METHODS

In this multicenter retrospective study, the acute phase period of the pandemic in our country (Mid-March 2020–mid-May 2020) and the non-pandemic 2-month period (January 2020–February 2020) were the dates of the study. Emergency surgical procedures performed during the two periods at third (Sakarya University Educating and Research Hospital) and second level public (Yenikent State Hospital) and private (Ada Tip Hospital, MEDAR Hospital, Beyhekim Hospital) health institutions in Sakarya Province were included in this study. The distributions of age and gender, as well as the type and number of emergency procedures performed in the general surgery clinics of our city during the two periods, were evaluated. The urgent surgeries were collected under eight main headings. These titles are described in detail in Table 2. The statistical analysis was performed using SPSS version 25 (SPSS Inc., Chicago, IL, USA). Numerical variables are presented as mean \pm standard deviation. Categorical variables are pre-

sented as counts and percentages. The Shapiro-Wilk test was used to determine whether the variables were normally distributed. The Wilcoxon signed-rank test was used for nonparametric dependent samples. Student's t-test was used to compare independent parametric groups. A p-value <0.05 was considered significant. Ethics committee approval was obtained from the Sakarya University Ethics Committee and the Ministry of Health, General Directorate of Health Services.

RESULTS

The distribution of patients before the pandemic by gender was 53.1% male and 46.9% female; it was 61.6% male and 38.4% female during the pandemic. The mean age of the patients undergoing emergency surgery was 54.72 ± 3.65 years before the pandemic and 38.54 ± 2.32 years during the pandemic ($p < 0.05$). A total of 114,473 patients were admitted to the emergency departments of all branches before the pandemic, and 46,006 were admitted during the pandemic period. During the 2 months before the pandemic, 290 emergency surgeries were performed, while during the acute pandemic period, 164 emergency operations were performed during the same time interval ($p = 0.012$) (Table 1). Surgery during the pre-pandemic period was performed mostly for acute appendicitis (44.48%) followed by other operations (15.51%), strangulated hernia (10.35%), acute cholecystitis (9.66%), tumor ileus (7.25%), non-tumor ileus (5.51%), perforation (4.82%), and trauma-related (2.42%) surgeries (Figure 1). Acute appendicitis (57.32%) was the most common reason for a surgical procedure during the acute phase of the pandemic, followed by other operations (11.58%), acute cholecystitis (11.54%), non-tumor ileus (6.7%), strangulated hernia (4.87%), tumor ileus (3.67%), perforations (3.1%), and trauma-related surgeries (1.22%) (Figure 2).

Cases	Before Pandemic	During Pandemic	Rate of change
Acute Appendicitis	129	94	-27%
Acute Cholecystitis	28	19	-32%
Strangulated Hernia	30	8	-73%
Trauma	7	2	-71%
Tumor Ileus	21	6	-71%
Non-Tumor Ileus	16	11	-31%
Perforation	14	5	-64%
Other	45	19	-58%
Sum	290	164	-43%

Significance: p=0.01

Before Pandemic

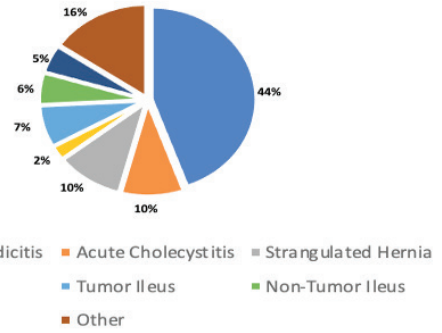


Figure 2: Percentage distribution of cases before pandemic

During Pandemic

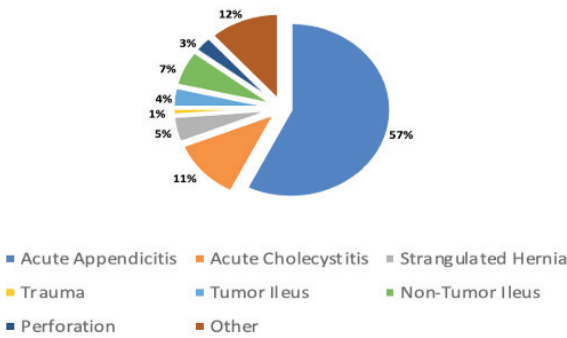


Figure 1: Percentage distribution of cases during pandemic

	Before Pandemic		During Pandemic	
	n	percent	n	percent
Appendicitis	Laparoscopic (119), Open (10)	44.48%	Laparoscopic (34), Open (60)	57.32%
Cholecystitis	Laparoscopic (27), Open (1)	9.66%	Laparoscopic (17), Open (2)	11.54%
Hernia	Umbilical (7), Incisional (8), Inguinal (13), TAPP (2).	10.35%	Umbilical (1), Incisional (0), Inguinal (7), TAPP (0)	4.87%
Trauma	Gunshot (1), Sharp (2), Blunt (splenectomy (3), Diaphragm injury (1))	2.42%	Gunshot (0), Sharp (1), Blunt (splenectomy (1), Diaphragm injury (0))	1.22%
Tumor Ileus	Right Colon (11), Left Colon (4), Rectosigmoid (6)	7.25%	Right Colon (2), Left Colon (3) Rectosigmoid (1)	3.67%
Non-Tumor Ileus	Brid (4), Bezoar (8), Volvulus (4)	5.51%	Brid (9), Bezoar (1), Volvulus (1)	6.7%
Perforation	Gastric (peptic ulcer lap.(7) open (2)), Small intestine (3), Colon (diverticular) (2)	4.82%	Gastric (peptic ulcer open (2)), Small intestine, (0) Colon (diverticular) (1)	3.1%
Other	Mesenteric ischemia (8), Giant goiter (1) Fournier gangrene (3) Perianal abscess (24) Pyloric stenosis (2) Diagnostic laparoscopy (7)	15.51%	Mesenteric ischemia (0) Giant goiter (0) Fournier gangrene (3), Perianal abscess (15), Pyloric stenosis (0), Diagnostic laparoscopy (0)	11.58%
Sum	290	100%	164	100%

TAPP: Trans-Abdominal Pre-Peritoneal Lap: laparoscopy

DISCUSSION

The COVID 19 outbreak is an unprecedented health problem, and healthcare systems did not initially realize the large number of resources needed for this unexpected situation. Medical staff and equipment were promptly focused on the rapid spread of the epidemic and the necessity for hospitalization. Several centers in our country suspended elective surgical procedures, as did the rest of the world. Priority was given to patients who required cancer surgery and surgeries that could not be postponed. Covid-19 has also had critical effects on surgery in this province. Our hospital and all of its employees were commissioned for the pandemic, as it is the only third-level health facility in our city. Emergency surgical cases are normally carried out at second-level private and public hospitals and all deferrable elective cases were postponed. Outflow from the province was prohibited by the Ministry of Health.

Emergency surgical procedures were commenced under extreme conditions and with differences in approach. Emergency surgical interventions were performed on COVID-19 patients, with all precautions undertaken according to the guidelines.⁹ The number of admissions to emergency departments decreased as did the number of cases requiring emergency surgery.^{10,11} We have experienced a significant decrease in the number of admissions to the emergency department during the pandemic (Table 1). The reasons include the curfew restriction recommended by the Ministry of Health and the fact that patients would rather not visit the hospital for complaints to avoid infection with the virus.

Cases requiring urgent surgical intervention were generally reduced.^{12,13} Although both national and international centers have addressed this issue, no study has explained the reason. There was a marked reduction in all emergency surgery indications in our city. While there may be a rational explanation for the decrease in some diseases due to the pandemic, it does not explain the decrease in other surgical cases. The decrease in the numbers of acute

appendicitis and acute cholecystitis cases may have been affected by the change in dietary habits caused by the ban on leaving home. Similarly, as non-operative management^{14,15} of such cases may be possible, medical follow-up may be favored by physicians during the acute phase of the pandemic. Similarly, social isolation and a lack of mobility are among the factors for a reduction in the number of incarcerated hernia and trauma cases (vehicle, inside or outside injuries, gunshot wounds, cutting, and penetrating mechanism injuries). However, Valderrama et al. reported an increase in the number of strangulated inguinal hernia cases during the pandemic.¹³ The limitations and changes in life habits mentioned above may have caused a decrease in the incidence rates of non-tumor ileus. Nevertheless, it does not explain the dramatic decrease in the frequency of incidence of tumor-related intestinal obstructions and mesenteric ischemia following a few restrictions on social life. Some hypotheses can be proposed. These disease groups may have been infected with COVID 19, and their underlying and progressive diseases may have exacerbated COVID 19. Therefore, they may have been lost without being diagnosed with an underlying pathology. Furthermore, patients may have been unable to present at a hospital, so they attempted to solve their medical problems, and undesired outcomes may have been encountered. Nevertheless, the decrease in the number of cases requiring emergency surgery was statistically significant.

One of the limitations of our study is that of evaluating data from a single city. More detailed epidemiological studies should be carried out to investigate the reasons for the decrease in the number of patients. However, our study will be an important resource for similar studies to be carried out in the future.

CONCLUSION

The COVID 19 pandemic has affected all health systems in unexpected and unpredictable ways. As a result of a decreased number of cases, noted above, it may be that an increased number of acute and complex abdominal problems

may present to emergency services soon. Therefore, we think that we should be well organized for the diagnosis and treatment of emergency general surgery cases in the second and perhaps the third wave of the pandemic. We believe that the studies to be carried out worldwide regarding this issue will have benefits.

Availability of Data And Materials

There is no additional data available to share with the readers.

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Contributions

BM: design, data collection, data analysis, interpretation, writing and revision. EG, ED, ZB: Data collection, data interpretation, and revision. BK, FC: Data analysis, interpretation, and writing. FA: Study design, interpretation and revision. ATH, AM, MA, UCD, SC, OY, MS, ZK: data collection, data interpretation, and revision. All authors read and approved the final manuscript.

Ethics approval and consent to participate

Sakarya University Ethics Committee has approved this research project. 71522473/050.01.04/280

Competing interests

The authors have no conflicts of interest. The authors are responsible for the content of the paper.

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