

Analysis of patients with emergency surgery in a pandemic hospital



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AIM: This study aimed at comparing the patients that received emergency management surgery (surgery and medical treatment) in our hospital, which is a pandemic hospital and provides emergency surgery, with the pre-pandemic period.

MATERIAL AND METHODS: Data of the patients who received treatment at the emergency surgery clinic of our hospital between March 12 and May 12, 2020, were compared with those of the patients treated between March 12 and May 12, 2019.

RESULTS: A 55% decrease was observed in the number of patients hospitalized in the emergency surgery clinic. There was a 37% decrease in the number of patients with medical treatment, a 63% decrease in the number of the operated patients, and a 60% decrease in the number of patients hospitalized due to trauma.

CONCLUSION: Patients requiring urgent surgical treatment hesitate to apply to the pandemic hospital. Histopathologically, delayed surgery might be concerned with significantly more-inflammatory alterations which may lead to irreversible histopathologic and cytostructural changes in the era of emergency surgery. Therefore, we assume that it would be more useful to follow up and treat COVID-19 suspected and positive patients in the pandemic hospitals and to provide the emergency branch service in other hospitals in case of a possible second wave.

KEY WORDS: COVID-19, SARS-CoV-2, Pandemic, Trauma, Emergency surgery, Emergency

Introduction

The Coronavirus disease started when the Wuhan Municipal Health Commission reported 27 pneumonia cases with an unknown etiology on December 31, 2019. Chinese scientists named this factor that led to atypical pneumonia as "SARS-CoV-2". This disease, which originates from Coronavirus, was named COVID-19 by the World Health Organization on February 11, 2020, and accepted as a pandemic on March 11. This disease, which has spread quickly in more than 150 countries, has cre-

ated an international public health problem ¹. People have been encouraged to stay at home, call emergency numbers, or possess family doctors in case of illness, therefore, application to the emergency department has decreased compared to the past. However, this situation cannot explain the apparent decrease in the number of emergency patients requiring surgery. There may be patients diagnosed with an acute abdomen at home, and the fate of these patients is still unpredictable ². Traumatic injuries and emergency surgical cases are inevitable even during a pandemic. Trauma patients should be managed like potential COVID-19 patients without delaying their acute treatment. Owing to social isolation and fear of disease transmission, there has been a decrease in the application to pandemic hospitals for complaints apart from COVID ³. In the treatment of patients who require urgent surgery or are diagnosed with cancer, it is highly important to take measures for the protection of health professionals and other patients, protection of patient rooms, operating rooms, and surgical instruments. It should not be forgotten that this

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will provide all the health professionals, especially surgeons, with protective and legal advantages⁴.

The present study purposed to, it is aimed to analyze the patients who underwent emergency surgical treatment (surgery and medical treatment) in our hospital, which is a pandemic hospital and provides emergency surgery and to compare them with the pre-pandemic period.

Material and Method

Data of the patients who received treatment at the emergency surgery clinic of our hospital between March 12 and May 12, 2020, were compared with those of the patients treated between March 12 and May 12, 2019. Our hospital is the only tertiary hospital in the city center within the Ministry of Health. It is a pandemic hospital and renders emergency services. Surgical masks were distributed to all the patients admitted to the hospital during the pandemic process. COVID-19 suspected and diagnosed patients were directed to the relevant COVID-19 units after triage. Patients who applied with symptoms other than COVID-19 were evaluated in the emergency department and treated by the relevant branch physicians in normal services.

Routine lung x-rays of all the patients who were admitted to the emergency department with diagnoses other than COVID-19 were taken. All the doctors and medical personnel working in the medical service have always used personal protective equipment (PPE). The visitor policy has been updated as follows: all the patients can only have 1 visitor at a time, and each visitor must wear a surgical mask during their visit. All the patients were hospitalized in single rooms. The number of open poly-

clinics, which is four per day, in the surgery clinic, was reduced to one, and the number of patients examined was minimized; and all the surgeries except for emergencies and cancer patients were postponed. Thus, it was ensured that the resources would be usable only for the most serious cases. All the patients who could not have a PCR test and who were operated on urgently due to life threats were followed up and treated by following the necessary measures in terms of transmission until they were discharged.

STATISTICAL ANALYSIS

We compared 2019 and 2020 with various methods according to different variables in two different sub-groups: medical and operational procedures. As seen in the analysis results, no significant difference could be found according to the variables examined between 2019 and 2020.

Chi-square test was used in both groups for gender, and the P-value was higher than 0.05 (0.435, 0.620, respectively); no significant difference could be found. Mann-Whitney test was used for age, length of hospital stay, WBC, Neutrophil and CRP values, and the P-value was higher than 0.05 (0.445, 0.816, 0.109, 0.793, 0.249, 0.421, 0.729, 0.179, 0.969, 0.532, respectively) in all of them; no significant difference could be found. Even though it was not possible to perform a statistical hypothesis testing, it was detected from the available data that there was a decrease an approximately 55% decrease in the number of patients admitted to the emergency surgery department during the pandemic period, an approximately 37% decrease in the number of the patients that underwent medical treatment, an approxi-

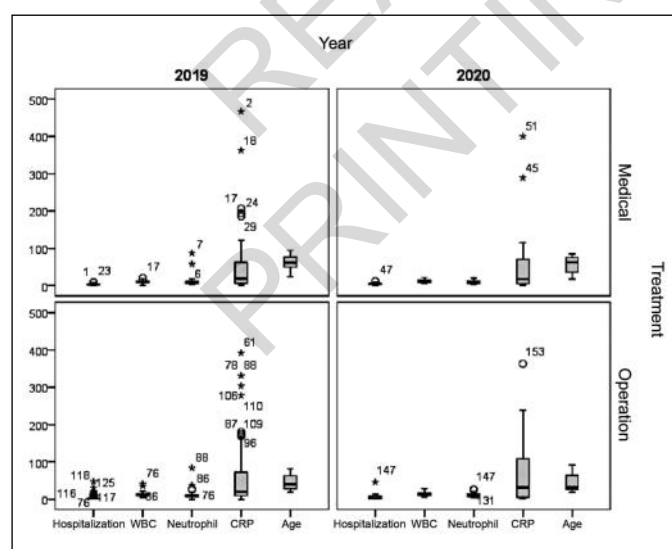


Fig. 1: The distribution of the length of stay, WBC, neutrophil, CRP level and age in 2019 and 2020 according to undergoing operation or medical treatment.

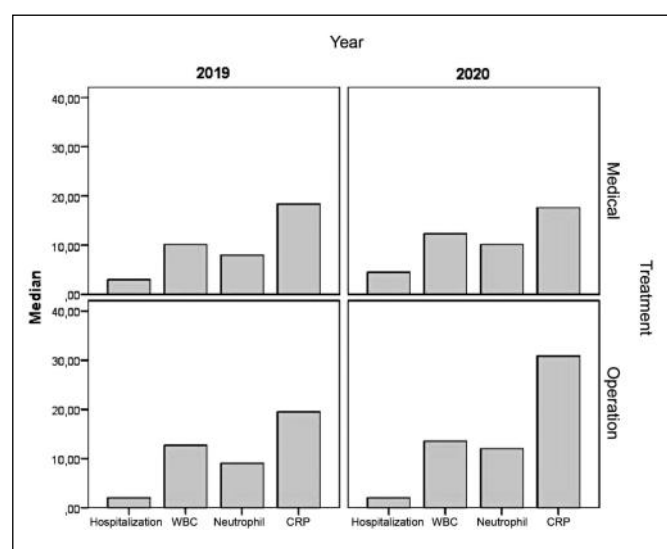


Fig. 2: The median values of length of stay, WBC, neutrophil and CRP level in 2019 and 2020 according to undergoing operation or medical treatment.

TABLE I - The number of patients treated in the emergency surgery department

	March-May 2019	March-May 2020
Number of operated patients	73	27
Number of patients that received medical treatment	33	21
Number of hospitalized patients (total)	106	48

TABLE II - The surgeries mostly performed in the emergency surgery department

	March-May 2019	March-May 2020
Most frequent operations		
appendectomy	42	18
cholecystectomy	10	2
strangulated inguinal hernia repair	5	1
stomach perforation	2	2
mesenteric ischemia	0	2
perianal abscess drainage	5	0

mately 63% decrease in the number of the operated patients and a 60% decrease in the number of the patients hospitalized due to trauma (Figs. 1, 2).

Results

The number of patients admitted to the emergency surgery department between March 12 and May 12, 2019, was 106. While 73 of these patients were operated on 33 patients were treated medically. The most common surgeries were appendectomy (42), cholecystectomy (10), perianal abscess drainage (5), and strangulated inguinal hernia repair (5). A total of 5 patients, including in-vehicle traffic accidents (3), firearm injury (1), falling from height (1), were hospitalized due to trauma and 2 of them were operated whereas 3 were medically followed up and treated (Table I, II).

The number of patients admitted to the emergency surgery department between March 12 and May 12, 2020, was 48. While 27 of these patients were operated on, 21 patients were treated medically.

The most common surgeries were appendectomy (18), stomach perforation (2), mesenteric ischemia (2), and cholecystectomy (2). Only 2 patients (fall from height) were hospitalized due to trauma and were medically treated, and there were no patients who had surgery due to trauma (Table I, II).

In all the surgeries, there were health professionals dressed in PPE, only an anesthesia team was available in the operating room during intubation, and the sur-

gical team entered the operating room after intubation. As PPE, surgical masks, N95 masks, caps, glasses, visors, double layer sterile gloves, and sterile surgical box gowns were used.

Discussion

Due to the number of COVID-19 cases increasing rapidly day by day, many hospitals have been declared the pandemic hospitals in our country, and all the planned and elective surgeries have been canceled. PPE has been made available primarily to COVID-19 patients and health professionals that deal with these patients in many countries and hospitals.

Acute surgical emergencies are inevitable and should be handled in due time and logically. The COVID-19 pandemic has had many effects on emergency management; for instance, there is a limited number of operating rooms for only urgent surgeries and health professionals have to use PPE in the US. The American College of Surgeons (ACS) has published guidelines for managing acute surgical emergencies⁵. It has been aimed to provide timely care to patients admitted due to urgent surgical situations, to use patient care resources (intensive care unit beds, PPE, ventilators, etc.) effectively and to protect the health of health professionals. The professional experiences of surgeons have become more important to evaluate the acute surgical needs of the patients. In order to protect the surgeons and operating room personnel against COVID-19, it has become a requirement to take additional measures for the drainage of pneumoperitoneum and aspiration of body fluids during the operations such as endotracheal intubation, tracheostomy, and gastrointestinal endoscopy and laparoscopic procedures, which pose danger for aerosol and droplet transmission. Surgeons and personnel who are not needed for intubation should stay outside the operating room until anesthesia induction and intubation are completed for patients with or suspected of the COVID-19 infection⁶.

Traumatic injuries are inevitable even during a pandemic. Owing to social isolation and fear of disease transmission, there has been a decrease in the application to pandemic hospitals for complaints apart from COVID. As learned from Italy, health professionals are the ones with the highest risk of developing the disease, which means an increased burden of personnel shortage³.

In a global healthcare emergency, the allocation of limited resources is not a normal practice for most doctors and surgeons. Those who know or have worked on military medicine admit that this resembles triage during the war medicine and includes nuances specific to the pandemic characteristics. In this context, SAGES/EAES has given the following suggestions under the title of "Suggestions Related to Surgical Response to the COVID-19 Crisis" on March 30, 2020: all the elective

surgical and endoscopic cases must be postponed, and operations to be performed must be limited to life-threatening and progressive malignancy in case of a delay in the operation and active symptoms that may require urgent treatment⁷.

Federal and state governments have expressed that non-urgent surgical interventions must be delayed or suspended⁸⁻¹¹. To fulfill these requirements, it has been recommended to create a priority list of the operations performed in the related surgery department¹¹⁻¹³. At the Würzburg University Hospital, a list of priorities containing the level of urgency has been prepared: Urgency level-I includes diseases requiring urgent surgical intervention (colorectal cancer with local complications, strangulated inguinal hernia). Urgency level-II includes priority operations that should be performed within 2-4 weeks (colorectal liver metastases, recurrent strangulated hernias, symptomatic anal fissure resistant to conservative treatment). Urgency level-III includes all the procedures that allow for a delay of 4-8 weeks (chronic recurrent sigmoid diverticulitis etc.).

Urgency level-IV includes all the other optional procedures (ostomy transport without local complications, functional rectal diseases).

The pandemic transmission of COVID-19 occurs with aerosolized viral particles; its fecal-oral transfer is also possible, but this is not clear¹⁴. Negative pressure systems and laminar airflow should significantly decrease the number of virus particles in the operating room^{15,16}. CO₂ pressure and flow should be kept at the minimum level since virus particles can be transmitted in the aerosol. Energy devices should be used at the lowest energy level to prevent unnecessary smoke and aerosol production because previous studies have shown that viral and bacterial aerosols can be detected in both laparoscopic and open surgical operations¹⁷. In urgent and life-threatening situations where the PCR test does not exist, all the patients should be considered COVID-19 positive and should be treated similarly to infected patients. Necessary precautions should be taken into consideration before, during, and after the surgery^{18,19}.

In all the emergency surgeries we have performed during the pandemic period, the above-mentioned precautions have been applied meticulously. None of the patients, general surgery physicians, and co-health personnel had surgery-related transmission. Histopathologically, delayed surgery may be pertinent to the more-inflammatory changes that might lead to some irreversible histopathologic and cytostructural alterations in the relevant tissues²⁰. However, emergency surgery remains its significance and severity, globally, in the era of emergency, extensively²¹⁻²⁶.

Conclusion

Patients requiring urgent surgical treatment hesitate to

apply to the pandemic hospital, therefore, we believe that it will be more beneficial to follow up and treat COVID-19 suspected and positive patients in pandemic hospitals in case of a second wave and to provide emergency branch service in other hospitals.

Riassunto

Questo studio è finalizzato a paragonare l'attività di trattamenti d'urgenza, sia medici che chirurgici nel nostro ospedale dedicato agli eventi della pandemia, nel corso di questa emergenza rispetto al periodo pre-pandemico. Abbiamo paragonato i dati dei pazienti sottoposti a trattamenti nella clinica di chirurgia d'urgenza del nostro ospedale tra il 12 Marzo e il 12 Maggio 2020 rispetto a quelli dei pazienti trattati dal 12 Marzo al 12 Maggio del 2019.

RISULTATI: Si è registrato un calo del 55% del numero dei pazienti ricoverati nella clinica di chirurgia d'urgenza, con un decremento del 37% nel numero dei pazienti sottoposti a trattamento medico, un 63% nel numero dei pazienti sottoposti a trattamenti chirurgici ed un 60% di diminuzione dei ricoveri per cause traumatiche.

CONCLUSIONE: I pazienti che richiedono un trattamento chirurgico d'urgenza esitano ad accedere all'ospedale pur dedicato alla pandemia. Pertanto noi riteniamo che sarebbe più utile seguire a trattare i pazienti sospetti o positivi per infezione da COVID 19 in ospedali dedicati alla pandemia, e di preparare servizi di trattamento d'urgenza anche in altri ospedali nel caso di una possibile seconda ondata.

Authors' contributions

IA: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Resources, Software, Validation, Visualization, and Writing – original draft.

TK: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Resources, Validation, Visualization.

SV: Data curation, Formal Analysis, Investigation, Methodology, Project administration, Validation, and Visualization.

MG: Data curation, Formal Analysis, Investigation, Methodology, Project administration, Validation.

DS: Investigation, Methodology, Software, Supervision, Visualization, and Writing – review & editing.

IS: Conceptualization, Investigation, Methodology, Software, Supervision, Visualization, Writing – original draft, and Writing – review & editing.

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