Annals of Medicine and Surgery 66 (2021) 102339

Contents lists available at ScienceDirect

Annals of Medicine and Surgery

journal homepage: www.elsevier.com/locate/amsu

Cross-sectional Study

The impact of the Covid-19 pandemic on emergency surgery in a tertiary hospital in Jordan. A cross sectional study

Mohammad Rashdan, Raed Al-Taher, Mohammad Al-Qaisi, Ibrahim Khrais *, Mohammad Salameh, Ibraheem Obaidat [1], Mutaz Abbad, Tabarak Alsaadi, Amjad Bani Hani

Department of General Surgery, School of Medicine, The University of Jordan, Amman, Jordan

ARTICLE INFO

Keywords:
COVID-19
Surgery
Emergency
ER
Trauma

ABSTRACT

Background: Since the emergence of COVID-19 pandemic, governments around the world reacted by implementing curfews and sometimes nation-wide lockdowns intended to control the spread of the disease and help the already overwhelmed healthcare systems from imminent collapse. The Jordanian government was one of those countries that implemented a complete nation-wide lockdown which lasted for 3 months during the peak months of 2020. The aim of this study is to shed the light on the impact of this lockdown on the surgical emergency practice at a tertiary referral center in Amman, the capital of Jordan.

Methods: A retrospective review of the medical records of the patients who were admitted to the hospital through the emergency department over the lock-down months in 2020 and compare them to the records of the patients admitted within the same period in 2019.

Results: A total of 143 patients were admitted in the 2020 group, compared to 201 patients in the 2019 group, marking a 28% reduction in admission rate. The average duration of symptoms before the ER visit was significantly longer in the 2020 period compared to 2019 (95.32 ± 148.62 min, 57 ± 64.4 min respectively, $p = 0.01$) which resulted in a Significant increase in the ICU admission in the same period (P=.00001). As for the type of management, there was no difference between the two groups with similar percentage of surgeries performed in the two periods ($p = 0.333$). Additionally, the average length of stay did not also differ ($p = 0.141$).

Conclusion: The COVID-19 pandemic has negatively affected the health care systems around the world to the point of collapse in some countries. This study has demonstrated its effects on the emergency surgery practice at our institution which was mainly related to the delay in getting medical care caused by the strict lock-down laws implemented in the country. Thus, we recommend that special measures should be taken to improve the access to medical care during future events that may require limiting the movement of people and vehicles in the country.

1. Introduction

Since the beginning of the COVID-19 disease from Wuhan wet markets in December 2019, a rapid increase in the numbers of infected people took place worldwide. Governments started to control the influx of the SARS-CoV-2 and its transmission by lockdowns and curfews. Jordan, similar to many other countries, implemented a nation-wide lockdown on March 2020 and closed the borders and the airports in an attempt to control the influx of COVID-19 cases from neighboring countries. The lock-down lasted until May, and it's believed that it helped the government control the pandemic by preventing a steep rise in the number of new COVID-19 cases that might overwhelmed the healthcare services in the county. During the lockdown period, the emergency departments were one of the most active parts of the health systems and were operating at full capacity 24 h a day. At our institution, which is a tertiary referral hospital with one of the biggest and most crowded emergency departments in Amman, the impact of the pandemic and the lockdown on the different specialties within the hospital and especially the emergency surgery practice was inevitable.

In this study we compare the emergency surgery practice during the 3-month lock-down period, from March to May 2020, with the same period of the previous year.

* Corresponding author. University of Jordan, School of Medicine, Jordan University Hospital, Department of Pediatric Surgery, Queen Rania str., 11941, Amman, Jordan.
E-mail address: Ibrahim.khrais92@gmail.com (I. Khrais).
[1] Currently working in the Department of vascular surgery, Sheffield teaching hospitals NHS Foundation Trust, Sheffield, UK.

https://doi.org/10.1016/j.amsu.2021.102339
Received 25 March 2021; Received in revised form 12 April 2021; Accepted 13 April 2021
Available online 1 May 2021

2. Methods and materials

We conducted a retrospective review of the medical records of all patients who were admitted to the surgical wards through the emergency department at the Jordan University Hospital in the periods from March 2020 (the date of the first COVID-19 case reported in Jordan) to June 2020. The records were compared to those of patients who were admitted in the same period from the year 2019.

Data collection includes the number of admissions, the reason for admission, the average duration of symptoms duration until admission, the age of the patients admitted, gender, type of management, and the average length of stay before discharging the patients.

The data were analyzed using Microsoft Excel® and SPSS 23.0 (SPSS Inc., Chicago, IL). Discrete variables are reported as numbers and percentages. Continuous variables are reported as a mean and standard deviation. A two-tailed P value of <0.05 was considered statistically significant. We used the student's t-test to compare continuous variables and the chi-squared test to compare categorical variables.

The work has been reported in line with the STROCSS criteria [1].

3. Results

A total of 143 patients were admitted in the three months from March to May in 2020, compared to 201 patients in the same period of the previous year marking a 28% decrease in admission rate. There was no significant deference in age between the two groups($P = 0.901$). However, there was a significant difference in the sex distribution with the majority of those admitted in 2020 being males ($p = 0.0157$) (Table 1).

The average duration of symptoms before the ER visit was significantly longer in the 2020 period compared to 2019(95.32 ± 148.62 min, 57 ± 64.4 min respectively, $p = 0.01$). This is mostly due to difficulty in getting access to medical care due to the strict lockdown laws implemented in this period which limited vehicle movement across the country to government vehicles, ambulances and those with special authorization only (Table 2). The effects of the longer duration of symptoms prior to getting medical care was reflected by the increased number of ICU admission in the 2020 group compared to 2019 (P=.00001) (Table 2).

As for the type of management, there was no deference between the two groups with similar percentage of surgeries performed in the two periods ($p = 0.333$). Additionally, the average length of stay did not differ between the 2 groups ($P = 0.141$) nor the mortality rate ($P = 0.398$) (Table 2).

The presenting complaint and diagnoses are outlined in Table 3.

4. Discussion

The COVID-19 virus is the biggest health pandemic to hit the globe in the 21st century with more than 125 million confirmed cases worldwide to this day [2]. From the beginning, governments and healthcare officials in every country started implementing measures that would stop that sharp rise of new COVID-19 cases to ease the effects of this rapidly spreading virus on their healthcare system and medical facilities. In Jordan, the first confirmed case of COVID-19 infection was reported in March 2020 in a Jordanian male returning from China. Since then, reports showed a steady increase in the number of new cases and, unfortunately, the number of deaths from the virus. In response, the government implemented a nation-wide full lockdown to decrease the spread of the virus and help the overwhelmed healthcare systems deal with the pandemic.

During the lockdown which lasted until May, all surgeries were cancelled apart from emergency and oncologic cases. All patients planned for surgery had a rapid COVID-19 PCR if it's possible, if not, the patient is assumed to be COVID-19 positive and precautions must be taken to decrease the risk of viral transmission which included full personal protection equipment, decreasing the Operating Room staff who were checked regularly for any signs of infection, a dedicated theater was prepared for those patients and finally the theater was fully sterilized after every case in accordance with guidelines and protocols

Table 1
Patient's demographics.

Category	2019	2020	P value
Total admissions	201	143	
Age *mean* ± *SD*	44 ± 23.7	43 ± 23.6	0.901
Gender			
Male	103	92	0.0157[a]
Female	98	51	

[a] Chi Square test.

Table 2
Average durations of symptoms before ER visits, Type of management and length of stay.

Category	2019	2020	P value
Management			0.333[a]
Surgical	99 (49.3%)	78(54.5%)	
non-surgical	102 (50.7%)	65 (45.5%)	
Avg Symptoms hrs	57 ± 64.4	95.32 ± 148.62	0.01
Type of admissions ICU n(%)	12(6%)	29(20%)	>0.0001[a]
LOS days	4.54 ± 7.31	5.72 ± 7.1	0.141
Mortality Number(%)	3(1.5%)	4(2.8%)	0.398[a]

LOS; length of stay.
[a] Chi Square test.

Table 3
Presenting complaint and diagnoses.

Category	2019	2020
Abdominal Pain	114	73
Acute Appendicitis	13	10
Surgery	11	9
Conservative	2	1
Acute Cholecystitis	29	15
Surgery	16	13
Conservative	13	2
Acute Pancreatitis	6	7
Surgery	2	1
Conservative	4	6
Intestinal Obstruction	26	23
Surgery	2	7
Conservative	24	16
Complicated Hernia	14	2
Surgery	14	2
Conservative	0	0
For Observation	23	11
Surgery	2	2
Conservative	21	9
Others	3	4
Perianal Pain	25	9
Surgery	21	9
Conservative	4	0
Soft Tissue Infection	16	26
Surgery	9	17
Conservative	7	9
Burn	18	14
Trauma	19	11
Others	9	10

put forward by the hospital committee.

Due to the increased load on the medical teams during the pandemic, each department prepared an emergency plan which included creating a dedicated COVID teams in each department, including the surgery departments, in an attempt to aid the medical teams in caring for Covid patients since a large number of them got infected with COVID-19 despite the precautions and use of PPE. Additionally, different protocols were put in place that encouraged following conservative approaches in treating surgical conditions that do not need urgent surgical interventions without risking the patient's health in an attempt to reduce the risk of virus transmission among the staff and the patients.

Simone et. all published a systemic review in the Annals of the Royal College of Surgeons of England during the early period of the pandemic to address the change in surgical practices in light of the COVID-19 pandemic [3]. The systematic review recommended postponing surgery, if feasible, until the patient is no longer considered potentially infectious or at risk of perioperative complications. However, for emergency surgeries that cannot be postponed or delayed, all precautions must be taken in order to minimize the risk of exposure to the virus by involving a minimal number of healthcare staff and shortening the occupation of the operating theatre. The article also illustrates the role of conservative management in acute appendicitis and acute cholecystitis with intravenous antibiotic and analgesia instead of surgery with no increase in the incidence of complications.

At our institution, we noticed a 28% decrease in admission rate during the lockdown period. This is consistent with a retrospective analysis from the Auckland City Hospital which revealed a significant drop in the number of admissions during the lockdown period of about 26% ($P = 0.000$) [4]. Additionally, a 56.8% decrease in trauma patients was found ($P = 0.002$). However, there was a decrease in the median length of stay from 1.8 to 1.3 days (P 0.0310) [5].

Surgery is still considered the standard of care when it comes to the management of acute appendicitis with a laparoscopic approach preferred over the open one due to the decreased complications and faster recovery. This did not change at our institution during the COVID-19 pandemic as shown in Table 2. However, a multicentric cohort study conducted in the UK revealed that the non-operative management of acute appendicitis appears to be an effective first line treatment in the short term regardless of sex, co-morbidity and with only a minority of patients requiring surgery as a second line [6]. The authors also suggest that antibiotics should be considered as the first line not during the pandemic only, but perhaps even beyond.

Complicated hernias are considered one of the most common emergent surgeries performed in any surgical department due to the high risk of morbidity and mortality associated with delaying the repair. In the other hand, elective hernia repair for uncomplicated hernias were postponed in our institution and many others around the world to decrease the risk of viral transmission to the OR staff and other patients. Thus, when elective procedures were cancelled, we expected an increase in the number of hernia related complications. However, there was a reduction in the incidence of complicated hernias presenting to the emergency department at our institution during the pandemic period. This trend was similar to other hospitals around the world [7].

In china, where the first case of COVID-19 infection in humans was reported, the hospitals and medical centers addressed the effect of the virus on the early on and put forward new protocols to help reduce the viral transmission among healthcare staff. Some of these protocols were related to the surgical practices. Some hospitals set up a separate triage area or fever clinic to screen for respiratory symptoms in surgical patients. All patients were screened for common symptoms of COVID-19 such a s fever, dry cough, and dyspnea. Additionally, the Chinese national guidelines recommended that blood test for COVID-19 and chest CT scan should be used as routine examinations for patients requiring admission [8].

The American college of surgery also published new recommendations on scheduling surgical procedures during the pandemic. The patients were classified according to the type of surgery and risk of risk of complications. The American College of Surgeons (ACS) advised to postpone non-urgent surgeries during the beginning of the pandemic. However, the recommendations were changed later. Elective surgeries for confirmed cases or patients with high risk for post-operative complications were rescheduled. For low-risk patients, elective surgeries should not be abandoned unless there are constrained health resources [9].

For cancer patients who have to delay surgery, the ACS advised considering alternative treatment approaches to delay surgery, such as neoadjuvant chemotherapy or additional chemotherapy. However, the Society of Surgical Oncology recommended that decisions must be made on an individual basis considering the biology of each cancer, alternative treatment options, and waiting time for rescheduled surgery. They have classified surgeries into various tiers according to the urgency of surgery. Up to Tier 2b (most elective surgeries like hernia), they are advising postponing of surgery. For Tier 3a and 3b, where most cancer surgeries will fall, ACS is not advising postponement at the moment though it may Change.

5. Conclusion

The COVID-19 pandemic has negatively affected the health care systems around the world to the point of collapse in some countries. This study has demonstrated its effects on the emergency surgery practice at our institution which was mainly related to the delay in getting medical care caused by the strict lock-down laws implemented in the country. Thus, we recommend that special measures should be taken to improve the access to medical care during future events that may require limiting the movement of people and vehicles in the country.

Funding

The authors received no financial support for the research and/or authorship of this article.

Ethical approval

This study has been approved by the Institutional review board at the Jordan University Hospital.

Sources of funding

The authors received no financial support for the research and/or authorship of this article.

Author contribution

Mohammad Rashdan developed the main concept and designed the study.

Amjad Bani Hani supervised and helped edit the manuscript.

Raed Al-Taher contributed to the editing.

Mohammad Al-Qaisi contributed to the editing.

Ibrahim Khrais performed contributed to the literature review and drafted the manuscript.

Mohammad Salameh contributed toward data analysis.

Ibraheem Obaidat contributed toward data analysis, drafting.

Mutaz Abbad contributed toward data analysis, drafting.

Tabarak Alsaadi contributed toward data collection.

Registration of Research Studies

Name of the registry: Clinicaltrials.gov.

Unique Identifying number or registration ID: NCT04815135.

Hyperlink to your specific registration (must be publicly accessible and will be checked): https://clinicaltrials.gov/ct2/show/study/NC

T04815135.

Guarantor

Ibrahim Khrais.

Consent

No consent has been obtained for this study as it does not disclose any personal information of the study subjects and in accordance with the IRB guidelines at the Jordan University Hospital.

Declaration of competing interest

All authors declare no conflict of interest.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.amsu.2021.102339.

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