

Original Research Article

Management of surgical emergencies during the COVID-19 pandemic: a single center experience

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ABSTRACT

Background: From the time it was declared as a pandemic by WHO, COVID-19 infection caused by corona virus (SARS-CoV-2) has drastically changed how we look at and manage patients all around the world across all faculties. Here, we wrote about a single centre experience of how surgical emergencies were managed at our institute.

Methods: We have collected data retrospectively from 2019 (pre-lockdown) and 2020 (lockdown) for the months of April through July based on 281 emergency room admissions to the department of general surgery. Collected data was categorised into the two cohorts and analysed for multiple variables including days of symptoms, diagnosis arrived at, management modality being conservative or operated.

Results: The most common diagnosis was found to be abscesses followed by appendicitis. Management was found to be significantly different for appendicitis in between 2019 and 2020. Other diagnosis also were analysed and found to be having an inclination towards conservative management over operative management even though the difference was not significant. The number of emergency room admissions were less in 2020 than in 2019, which was contrasting to our anticipation. On comparing with similar articles, we found that conservative management was preferred in the lockdown period, which was in concurrence with our results.

Conclusions: And the patient outcome was also better when the patient was managed conservatively and taken up for surgery electively.

Keywords: COVID-19, Emergency, Surgery, Admissions, Conservative, Appendicitis, Abscess, Diagnosis

INTRODUCTION

Corona virus disease 2019 is a rapidly spreading infectious disease caused by the severe acute respiratory syndrome-coronavirus 2 (SARS-CoV-2). COVID-19 has been declared as a pandemic on 11 March 2020 by WHO.¹ COVID-19 has impacted the delivery of healthcare services around the world, disrupting both elective and emergency services. With the implementation of national lockdown all the elective

surgical consultations have been stopped, keeping only the emergency services open nationwide. With this, it can be anticipated that the emergencies will rise because of patients showing up to the emergency room (ER) for any ailment either minor or major. But in contrast, lockdowns and fear of infection have drastically reduced the number of patients presenting to emergency rooms; in many cases making them present later than usual and complicating their eventual course of treatment. In this study we aimed to see how the pandemic impacted the kinds of surgical

emergencies presenting to the ER and its impact on their presentation to the hospital.

Aims

Primary aim was to study the impact of the implementation of national lockdown on the number and type of surgical emergencies coming to the emergency room and the way they were managed in a tertiary care centre in Chennai, India. Secondary aim was to assess the severity with which the emergencies came to the emergency room before and after the national lockdown.

METHODS

Study design

The study design was a COHORT study.

Software

IBM SPSS statistics for Windows, version 23.0 (Armonk, NY: IBM Corp.)

Sampling technique

The study was a period study. Selection of patients was done based on keywords.

This study was conducted at a single tertiary care centre- Sri Ramachandra Institute of higher education and research retrospectively by accessing the medical records from April 2020 to June 2020. Nationwide lockdown was implemented from 25 March to 3 May 2020.

Elective admissions had been put on hold in the year of 2020 at our institute during the period of lockdown. Surgical emergencies like appendicitis, cholecystitis, obstruction, perforation, pancreatitis, diverticulitis, gastritis, abscess (perianal, ischiorectal, scrotal wall, foot abscesses and diabetic wounds), road traffic accidents (RTA) were included as keywords for searching the medical records for the time span between April to July for the years of 2019 to 2020. Institutional ethical committee approval was obtained and study initiated. Two COHORTs were compared which included patients who got admitted only via the emergency room in 2019 and 2020 to the department of general surgery. The demographics checked for in each patient were age, sex. Other variables compared were date of admission, symptoms and their duration, imaging done, diagnosis arrived, date and type of surgery if done.

All the variables were assessed and statistical analysis done.

Inclusion criteria

Patients who were admitted at the emergency room to the general surgical department at our institution April to

July 2019 and 2020; patients whom RT-PCR for COVID-19 infection had been done for all patients at time of admission; patients only with a negative RT-PCR test for the COVID-19 virus were taken into the study, because the surgical emergencies associated with COVID-19 infection had a totally different spectrum and managing them was involving a multidisciplinary effort with several criteria being taken into consideration for decision making; patients above 18 years of age admitted to surgery department at the ER; patients in whom diagnoses have matched with the keywords used to access in the medical records in the given time period were included in the study.

Exclusion criteria

Patients who were admitted on elective basis in both 2019 and 2020; patients who had turned positive for RT-PCR COVID-19 infection; patients who had their diagnosis not matching to the specific keywords chosen for the study were excluded.

RESULTS

After adequate data collecting, a total of 281 patients were admitted via the ER in 2019 and 2020 together in the months specified. A total of 65 patients were admitted into COHORT B, while 216 patients have been included in COHORT A, which was a drastic decrease in number of ER admissions in 2020 than 2019.

The results were analysed using IBM SPSS statistical analysis software version IBM SPSS version 20.

Demographics were analysed and was found out that average age of presentation in 2019 was 45.2 ± 17.9 years, and in 2020 it was 50 ± 17.9 years.

The gender distribution between the 2 COHORTs showed a more or less similar presentation with males being 66% in 2019 and 58% in 2020. The average duration in days from symptom onset to presentation at the hospital was 5.8 ± 11.1 days in 2019 and it was 28.3 ± 77.6 days in 2020 with a p value of 0.023 which was found to be significant.

The number of days between date of admission and date of surgery for patients managed operatively were calculated and was found to be 1.6 ± 2.3 days in 2019 and 2.8 ± 7.4 days in 2020 with a p value of 0.396 which was found to be not significant.

The imaging modality used most commonly in either COHORTs was contrast enhanced computerized tomography (CECT whole abdomen), been used more liberally in 2020 to reduce exposure to sonologists.

Of the total admission in COHORT A 51.9% were managed operatively, while in COHORT B 47.7% were operated.

The most common diagnosis arrived at was abscesses both in 2019 (25.5%) and 2020 (29.2%). Out of the other diagnosis included in the study acute appendicitis was highest (16.2%) in COHORT A, while in COHORT B it was acute obstruction (18.5%) (mechanical or paralytic). 112 (51.9%) patients from COHORT A underwent operative management, while in COHORT B, 31 (47.7%)

patients were managed operatively. Every patient admitted had a delay from time of admission to time for surgery in COHORT B unlike COHORT A. The delay was attributed to the delay for the reporting of RT-PCR for COVID-19, according to hospital policy in order to reduce the transmission rates.

Table 1: Sex distribution between years.

Sex distribution			Year		Total
			2019	2020	
Sex	Male	Count	144	38	182
		%	66.7	58.5	64.8
	Female	Count	72	27	99
		%	33.3	41.5	35.2
Total	Count	216	65	281	
	%	100.0	100.0	100.0	

Table 2: Diagnosis and their distribution between 2019 and 2020.

Diagnosis and distribution			Year		Total
			2019	2020	
Diagnosis	Appendicitis	Count	35	10	45
		%	16.2	15.4	16.0
	C/L	Count	23	7	30
		%	10.6	10.8	10.7
	AMO	Count	33	12	45
		%	15.3	18.5	16.0
	Pancreatitis	Count	15	5	20
		%	6.9	7.7	7.1
	Abscesses	Count	55	19	74
		%	25.5	29.2	26.3
	D/G/C	Count	20	4	24
		%	9.3	6.2	8.5
	Perforation	Count	5	0	5
		%	2.3	0.0	1.8
	RTA	Count	12	1	13
		%	5.6	1.5	4.6
	Miscellaneous	Count	18	7	25
		%	8.3	10.8	8.9
Total	Count	216	65	281	
	%	100.0	100.0	100.0	

Table 3: Duration comparison between 2019 and 2020.

Year	N	Mean	SD	P value
Days from admission to surgery (only operated)	2019	112	1.6	0.396
	2020	31	2.8	
Days from symptom onset to admission (all)	2019	216	5.8	0.023
	2020	65	28.3	

Table 4: Total cases and their means of management.

Means of management			Year		Total
			2019.0	2020.0	
Management	Operative	Count	112	31	143
		%	51.9	47.7	50.9

Continued.

Means of management		Year		Total
Conservative	Count	104	34	138
	%	48.1	52.3	49.1
Total	Count	216	65	281
	%	100.0	100.0	100.0

Table 5: Percentage of operatively managed diagnosis between 2019 and 2020 for each diagnosis.

Diagnosis	2019 (COHORT A)	2020(COHORT B)	P value
	Percent	Percent	
Appendicitis	82.9	30	0.003
Cholecystitis/lithiasis	60.9	28.6	0.204
Acute obstruction	60.6	50	0.524
Pancreatitis	6.7	0	1
Abscesses	58.2	78.9	0.166
Gastritis/colitis	5	0	1
Perforation	100	-	-
RTA	50	0	1
Miscellaneous	22.2	71.4	0.058

Abscess was the most common diagnosis encountered in either COHORT. The duration from symptom onset to presentation at hospital was significantly longer for patients in COHORT B when compared to COHORT A with a p value of 0.0005. This could be translated in the number of patients ending up in operative management in COHORT B (78% of total abscesses in COHORT B) as they presented in a severe state that COHORT A with a p value of 0.166.

Appendicitis was seen as 16.2% in COHORT A and in 15.4% in COHORT B. Though the incidence was on the similar lines, only 30% were operated in 2020, while 82.1% being operated in 2019 with a p value of 0.003. The decrease in operative rate can be attributed for the fear of transmission to the operating team staff. On the contrast, the patients managed conservatively had no severity of morbidity, when compared to appendicitis patients on 2019. The morbidity was compared with means of hospital stay being similar in 2019 (7.38 days) and 2020 (6.34 days).

Acute obstruction was seen in 15.3% in COHORT A and 18.5% in COHORT B. The difference for operative management between COHORT A and B even though was not found to be significant with p value of 0.542, the percentage of operative management was higher in 2019 (60.5%) than 2020 (50%). The other diagnosis also showed more percentage of them being managed conservatively in COHORT B, than compared to COHORT A, but level of significance was not found to be significant due to less number of sample size in 2020.

DISCUSSION

COVID-19 pandemic was still ongoing battle around the globe against the novel SARS-CoV-2 virus. The virus had first been identified in Wuhan city, Hubei province of

China in December 2019. The initial exposed population in China presented with unknown etiology of fever, fatigue and dry cough. This was then reported to WHO on 3 January 2020, which was then declared as a public health emergency of International concern (PHEIC) on 30 January 2020. From then it had been spreading rampantly across the international borders in waves affecting countries all across the world. According to the situation report released by WHO as of 26 February 2020 Republic of Korea 1261 cases, highest number of cases after China, followed by Italy in the European region with 322 confirmed cases. On the other end India showed only 3 confirmed cases. Taking the time period of start for this study, India showed 11,439 cases as of 15 April 2020.³ Thinking of how exponentially the number of cases have amplified reinstated how infectious this virus was. From then, till now the cases have been fluctuating, with India now being hit bad by the second wave.

COVID-19 first case in India was detected on 20 January 2020 Thrissur, Kerala.⁴ And first case recorded in state of Tamil Nadu was on 7 March 2020. From then, cases have been spiking in exponential fashion across the nation and the world. Health care resources have been diverted from all departments to meet the demands of the rising cases. All elective surgeries have been deferred from the beginning of lockdown to reallocate staff, especially anaesthetists for managing the critical care and for the use of ventilators from the theatre complexes for the sick. Outpatient services have been withheld for the sake of minimising the risk of cross infection and new patients with mild symptoms were consulted via telemedicine. As Yubin observed in their study there was an initial shortage of PPE, as that was the most essential need for medical professionals to avoid cross exposure between individuals and the need for anaesthetists in critical care.⁵ Routine follow up patients were asked to continue scheduled consultations over telecommunication method

as suggested by Jaffe et al and there was an increase in the number of patients communicating via the same.⁶

Rahul et al observed in their study that, with elective consultations being stopped more patients came to ER for emergency admissions, but in contrast the number of patients turning up to the ER in our study were found to be fewer which was contrasting to their study results.⁷ This was evident in our study with ER admissions in 2020 falling down to less than one third of those in 2019. Patel et al in a study of 225 patients showed that significantly fewer patients got admitted during lockdown compared with pre-lockdown (66% of patients in group 1 compared with 48% of patients in group 2), which was similar to our study.⁸ It could be because of the patients primarily refraining from coming to the hospital with the fear of infection and approaching local practitioners and using home remedies for managing the ailment.

Patients in COHORT B have been observed to be coming to the ER with longer duration of symptoms and more severe in nature as suggested in a study by Patel.⁸ The delay could be because of the presence of fever as a common complaint for COVID and other acute surgical conditions (acute appendicitis, cholecystitis) where the primary etiology was overlooked for COVID and the fear of patients disclosing this as they would be kept in quarantine homes isolated from family and also themselves getting exposed to the infection.

Many surgical emergencies, usually managed operatively were tried to be managed conservatively, in order to decrease the risk of exposure for the operating surgeons and the anaesthetists and theatre staff. Surek et al in a similar study, identified that patients presenting with incarcerated hernias of the anterior abdominal wall underwent non-surgical management via taxis more in the lockdown period than pre-lockdown period and the morbidity and mortality rates were comparatively low as surgery was avoided in the emergency setting.⁹ Similar were their results in uncomplicated appendicitis and cholecystitis and were found to be statistically significant. The similar finding was noted in our study with respect to appendicitis wherein, there was no increase in morbidity of patients being managed conservatively. So, we can also infer from the findings that antibiotics were non inferior to appendectomy in patients with a non perforated appendix. This might be a total different study in itself and was beyond the scope of this study.

In a review by Simone et al it had been stated that in the pandemic period, non-operative approach can be applied unless acute appendicitis, acute cholecystitis and adhesive small bowel obstructions developed peritonitis and no strangulation was suspected in incarcerated hernias.¹⁰ During 2019, we found that 60.6% of patients presenting with obstruction were operated in emergency setting, while only 50% of the cases with obstruction were operated during 2020. So were our findings in the cases of appendicitis with 82% being operated in 2019

while only 30% being operated in 2020. Appendicitis, cholecystitis and obstructions were operated in 2019 even when there were no signs of peritonitis. This showed us that we can increase our threshold for operating in an emergency setting unless there was evidence of strangulation or peritonitis. Unless there were signs of hemorrhages, bowel perforations and obstructions, these patients can be conserved conservatively as said in the article by Patriti et al.¹¹ The most important criterion was to exclude strangulation and even if in a mild doubt, the patient should be taken up for surgery. Patients with signs of peritonitis or perforation were taken up for surgery as early as possible. If surgery was to be performed mandatorily, open approach was preferred over laparoscopy in order to reduce the aerosol spread inside of the theatre.

On the other context, we found in our study that 78.9% of patients being diagnosed with abscesses were operated in 2020, while only around 58% of those were operated in 2019. This can be explained by the fact that the patients presented after a longer symptom duration course (significance $p=0.023$), so were in a much worse presentation than their counterparts of 2019 and operating them was mandated.

Limitations

This was a retrospective study. It didn't represent large geographical area. There were limited number of emergency surgeries. The sample size was limited.

CONCLUSION

This study has reinforced the fact of decreased number of emergency admission in the surgical departments during the lockdown period, which was quite contrasting to the proposed hypothesis of emergencies being increased. Those presenting to the ER were also presenting with a protracted symptomatic course due to the fear of infection of COVID-19, which was anticipated. Operative management of many patients was deferred and managed conservatively and were discharged with no increase in morbidity or mortality, highlighting the fact of we having a low threshold for surgery. From this we can learn that surgery can be deferred in an emergent setting and then planned electively once the condition of the patient improves. Patients with surgical emergencies treated conservatively need to be on followed up for knowing the long-term outcomes in them.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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