



IMPACT OF COVID-19 ON EMERGENCY SURGICAL MANAGEMENT AT VICTORIA AND BOWRING HOSPITAL, BMCRI BANGALORE.

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**ABSTRACT**

**Aim:** To study the outcomes of emergency surgical management during the COVID-19 pandemic.

**Methodology-** A retrospective study was done on the emergency services provided at BMCRI Bangalore from April 1st to December 31st 2020 when the impact of COVID-19 was highest. COVID-19 positive and COVID-19 negative patients were both included, who underwent surgeries for their acute surgical emergency. Sars CoV RTPCR test was done for all patients. For Haemodynamically unstable patients, surgery was done after Rapid antigen testing without waiting for RTPCR reports. All these patients were observed for postoperative outcomes till they were fit for discharge. A total of 196 patients were included in the study who underwent surgeries for acute emergencies. **Results-** Results reveal that, 5.2% patients were tested to be COVID-19 positive before the procedure. 24% of them were tested positive after the surgery. Post-operative complications were noted in 17.4% of patients, of which 15.3% were COVID-19 positive group. Mortality rate of 7.6% was noted in COVID-19 positive group and 1.6% in COVID-19 negative patients. **Conclusion-** Significant increase in waiting time for surgery and duration of surgery was seen during this pandemic. Morbidity and mortality was noted to be significantly increased in COVID-19 positive patients who also presented with concurrent surgical emergencies. Despite the fact that operating with PPE, increased duration of surgery and is laborious, it is mandatory to wear them regardless of the rapid antigen test negative status of patients presenting with acute surgical emergency requiring lifesaving emergency procedures.

**KEYWORDS :** covid-19, emergency surgery, pandemic, personal protective equipments

**INTRODUCTION**

The coronavirus disease (COVID-19 ) has challenged the medical system globally since it's outbreak and is declared as pandemic by WHO <sup>1</sup> The burden of this pandemic is due to highly infectious nature of severe acute respiratory syndrome coronavirus -2 i.e., SARS-CoV-2, which makes it difficult to control the spread of disease. Hospitals affiliated to Bangalore medical college and research institute, i.e., Victoria hospital and Bowring hospital have been designated and dedicated to serve COVID-19 infected patients from 2nd week of March 2020.

In order to minimise the spread of disease and to utilise the hospital resources (ventilators, ICU beds, N95masks, PPE, gowns, facemasks etc.) adequately, it was necessary to postpone the care of patients who doesn't require emergency management <sup>2,10</sup>. Thus, Elective surgeries have been postponed and the patients requiring OPD basis treatment have been referred to the centres near to the patient's residences. Only emergency life-threatening conditions requiring surgical management were treated as the pandemic has created shortage of PPE, and other hospital resources <sup>2,3,4</sup>. New protocols have been laid down to minimise the spread of disease among the hospitalized patients and the health care professionals. Mandatory use of personal protective equipment (PPE) among the health care professionals including doctors, nursing staff and group D workers, the strict protocols at triage, isolating COVID-19 suspects till the RTPCR was negative whenever necessary, has significantly brought down the spread of the disease <sup>2,3,11</sup>. This article aims to assess the impact of COVID-19 on patients requiring emergency surgical management.

**2.1 Selection of Patients**

This is a retrospective study of the collected data of the patients who presented to the hospitals of BMCRI requiring emergency surgical management, from 1<sup>st</sup> APRIL 2020 to DECEMBER 31<sup>st</sup> 2020, (8 months) as the impact of COVID-19 was highest during this period. Demographic data included age, gender, duration of illness at the time of presentation, duration of hospital stay, number of patients infected with COVID-19, number of health care professionals infected with COVID-19, waiting time before surgery, duration of surgery, mortality and morbidity. These were considered for the study as parameters

**2.2 Definitions Duration of illness at the time of presentation to hospital:**

It is the time lag between onsets of symptoms to the presentation at casualty. In cases like hernia onset of irreducibility or obstructive symptoms like vomiting or constipation or pain abdomen is taken as the onset of symptom rather than the onset of hernia itself.

**Duration of hospital stay:**

It is the duration from the time of Patients arrival to hospital till the time of discharge/death

**Waiting time for surgery:**

It is the duration from the time of presentation of patients to the casualty till the patient is taken inside the operating room.

**Duration of surgery:**

It is the time between incision and closure.

**Morbidity:**

It includes intra op/ post op complications of surgery, anaesthetic complications or COVID-19 related complications.

**2.3 PROTOCOLS DURING PANDEMIC**

**2.3.1 Triage protocols:**

Casualties of the hospitals of BMCRI followed the same strict standards. Triage setup included two separate sections, one

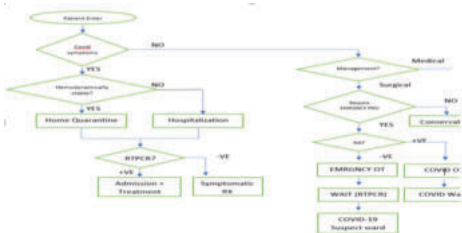


Figure 1: Flow Chart Showing Patients' Entry To Discharge/Death

for the patients with presenting complaints related to COVID-19 with no other significant complaints (COVID-19 screening OPD) and the other for the rest of the patients. At the COVID-19 screening OPD, patients with presenting complaints related to COVID-19 are evaluated in detail, nasopharyngeal and oropharyngeal swabs are taken for RTPCR. If the patients' vitals are stable, patients are advised regarding home quarantine, protocols to be followed at home are explained. Once the reports are available, If RTPCR positive patients are admitted and treated. For the patients whose presenting complaints are not related to COVID-19 or those patients with other significant symptoms are evaluated. Mainly categorised into medical or surgical emergency For the patients with symptoms of surgical emergency, they are further categorised into those who require immediate lifesaving procedure, for instance exploratory laparotomy for a case of hollow viscous perforation, or patients who require an emergency surgery but are hemodynamically stable<sup>6,7,11</sup>. All the patients requiring admission, nasopharyngeal and oropharyngeal swabs are taken for both Rapid Antigen Test (RAT) and RTPCR test. For patients who require immediate lifesaving procedure, the procedure is carried out based on rapid antigen test without waiting for the RTPCR reports. Figure (1) shows details of this fact.

**RESULTS**

Significant increase in morbidity is seen in patients tested as COVID-19 positive. Increase in duration of illness before presentation thereby increased severity at the time of presentation, increased duration of hospital stay and also complications due to COVID-19 can be attributed as the reasons. Sensitivity of rapid antigen test found to be 68.8 and Specificity of rapid antigen test found to be 94.6

**Table 1: Distribution of the patients based on age**

Age		Groups		Total
		COVID	NON COVID	
18to 25 yrs	Count	8	24	32
	%	4.1%	12.2%	16.3%
26 to 35 yrs	Count	11	35	46
	%	5.6%	17.9%	23.5%
36 to 45 yrs	Count	7	23	30
	%	3.6%	11.7%	15.3%
46 to 55 yrs	Count	9	35	44
	%	4.6%	17.9%	22.4%
56 to 65 yrs	Count	18	26	44
	%	9.2%	13.3%	22.4%
Total	Count	53	143	196
	%	27.0%	73.0%	100.0%

Chi-square value- 5.76  
p value- 0.21

**Table2: Distribution of patients based on gender**

Gender		Groups		Total
		COVID	NON COVID	
Females	Count	20	39	59
	%	10.2%	19.9%	30.1%
Males	Count	33	104	137
	%	16.8%	53.1%	69.9%
Total	Count	53	143	196
	%	27.0%	73.0%	100.0%

Chi-square value- 2.01  
p value- 0.15

**Table 3: Distribution of complications and mortality among the groups**

Conditions		Groups		Total	Chi-square value	p value
		COVID	NON COVID			
COMPLICATIONS	NO	Count	25	138	67.21	0.00*
		%	12.8%	70.4%		
	YES	Count	28	5		
		%	14.3%	2.6%		
MORTALITY	NO	Count	35	139	37.69	0.00*
		%	17.9%	70.9%		
	YES	Count	18	4		
		%	9.2%	2.0%		

\*significant

**Table 4: Distribution of patients based on trauma**

Trauma		Groups		Total
		COVID	NON COVID	
Non- trauma	Count	47	128	175
	%	24.0%	65.3%	89.3%
Trauma	Count	6	15	21
	%	3.1%	7.7%	10.7%
Total	Count	53	143	196
	%	27.0%	73.0%	100.0%

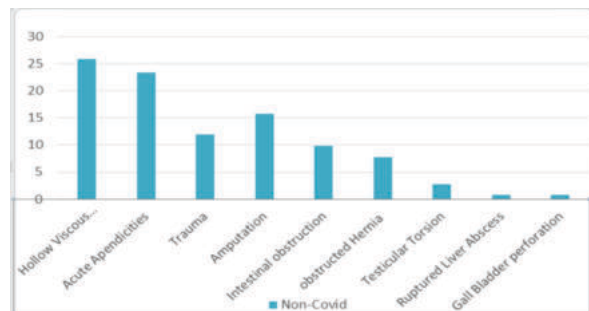
Chi-square value- 0.86  
p value- 0.026\*

**Table 5: Comparison of parameters between COVID and Non-COVID patients using sample T Test**

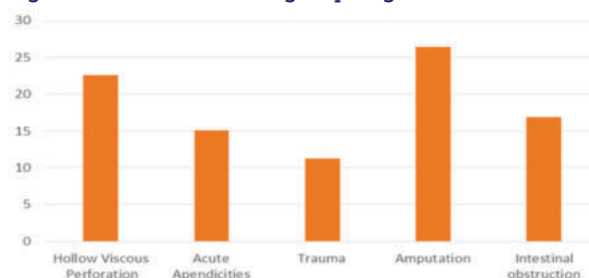
		N	Minimum	Maximum	Mean	S.D	Mean diff	t value	p value
Age	COVID	53	19	65	44.89	15.619	3.2	1.41	0.15
	NON-COVID	143	18	66	41.68	13.439			
Duration of illness (in days)	COVID	53	1	30	8.64	6.723	2.18	2.8	0.006*
	NON-COVID	143	1	20	6.46	3.918			
Waiting time (in min)	COVID	53	40	680	340.85	190.958	60.25	1.83	0.068
	NON-COVID	143	25	640	280.59	208.691			
Duration of surgery(in min)	COVID	53	45	200	91.42	32.156	-1.87	-0.16	0.87
	NON-COVID	143	45	990	93.29	80.858			

Analysis of the above tables (1-5) suggests that surgical patients were affected irrespective of age group during COVID-19 pandemic with slight male predominance.

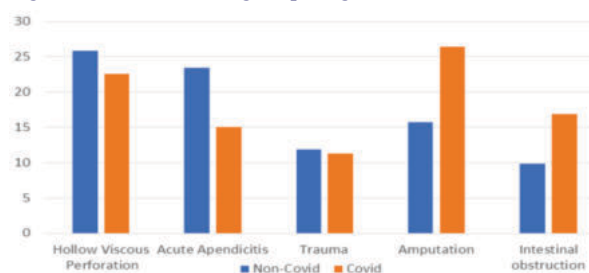
Mortality and morbidity were more often seen in patients affected with COVID-19 than the ones who tested negative.



**Figure2: Non Covid-19 Emergency Surgeries**



**Figure3: Covid-19 Emergency Surgeries**



**Figure 4: Comparison of Non Covid-19 vs Covid-19**

## Emergency Surgeries

It is noted that during the pandemic, patients who underwent surgery majority of them were having hollow viscous perforation among COVID-19 negative patients whereas amputations were more common among the COVID-19 positive patients. Number of patients who presented with acute appendicitis was found to have complicated appendicitis such as appendicular abscess, appendicular perforation, hence requiring surgical management and not conservative medical line of management<sup>6</sup>.

## DISCUSSION

During the pandemic, the goal of surgical management was not only optimization of patient care but also to minimize the spread of COVID-19 among the patients and health care workers. Several changes were made in hospitals in order to accommodate as many potentially severe cases as possible<sup>5</sup>. Optimal usage of hospital resources like ICU, ventilators, PPE, surgical gowns, gloves, n95 masks, etc was a challenge in itself<sup>2,3</sup>. Hence new protocols were designed and standardized once the hospitals were dedicated to the service of COVID-19 infected patients. Elective surgeries were postponed and patients requiring treatment on OPD basis were referred to hospitals nearby patients residences<sup>2,4,8</sup>. A total of 196 patients were treated during the period of April to December 2020 who required emergency surgical procedures. It was noted that there was delay in presentation of patients to hospital from the onset of symptoms due to fear of acquiring COVID-19 infection. Significant increase in the waiting time before surgery was noted. This was to ensure the safety protocols designed to decrease the spread of COVID-19. However the patients requiring immediate lifesaving procedure were taken for surgery without obtaining RTPCR reports but based on rapid antigen test results. Rapid antigen test was a screening test, with a high specificity but low sensitivity. Advantage is that it is cheaper and less time consuming. However it is mandatory to perform the confirmatory tests whenever necessary. Number of surgeons, anesthetists, nurses, technicians and group D workers were reduced as much as possible. Donning and doffing methods of PPE was taught prior to joining the duties for all the healthcare workers. Attempt was made to minimize the duration of surgery by allowing the senior staff members to operate. Easily disposable gowns and PPE were used and disposed after every OT. Operation theatre was fumigated with 10% formaldehyde solution after each procedure. Separate wards were allotted for COVID-19 positive, negative, tests awaited (COVID-19 suspect ward). During the hospital stay COVID-19 surveillance was done regularly among the patients. It was mandatory to take history of COVID-19 related symptoms for every patient during their stay.

## CONCLUSION

The COVID-19 pandemic has affected the management of patients requiring surgical management. Effective triage, OT and ward protocols ensured that the spread of the COVID-19 was minimal. Morbidity and mortality among the COVID-19 positive patients was higher compared to COVID-19 negative group owing to late presentation, severity of illness, increased duration of hospital stay and also due to COVID-19 related complications. Rapid antigen test is NOT a reliable test owing to its lower sensitivity; however it is beneficial in emergency setting due to rapidity of obtaining results. Waiting for pre-operative RTPCR reports is safe for both patients and health care workers.

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