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Original Research Article

Retrospective analysis of outcome of COVID positive patients undergoing emergency surgeries for acute general surgical conditions

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ABSTRACT

Background: There is a significant impact of COVID-19 disease on medical and surgical community. Acute surgical emergencies had to be addressed inspite of several hardships to save the lives of patients. There is a need to understand the impact of COVID-19 disease on outcome of surgical emergencies. This study aimed to analyse the outcomes of COVID-19 patients with general surgical emergencies.
Methods: This retrospective study was conducted on 50 patients undergoing emergency surgeries for acute general surgical pathologies in department of general surgery, Government General Hospital, Guntur from January 2021 to October 2021. Patients were divided into two groups, 25 patients who were COVID positive and 25 patients who were COVID negative. The outcomes assessed were mortality, multi organ dysfunction syndrome, surgery related complications and number of days of hospital stay.
Results: Mortality was higher in COVID group when compared to non COVID group (32% vs. 8%). Average number of hospital stay was higher in COVID group than non Covid group (11.78 days vs. 8.43 days). COVID-19 patients developed MODS 2.88 times greater than non COVID patients (20% vs. 8%). Surgery related complications were higher in COVID-19 patients (28% vs. 8%).
Conclusions: COVID positivity was associated with higher complications rate, higher mortality and increased duration of hospital stay.

Keywords: Mortality, Morbidity, Complications, Hospital stay, Multiorgan failure

INTRODUCTION

COVID pandemic has played havoc with the lives of people and affected the outcome of all the diseases during the pandemic.[1] Most of the elective surgeries were postponed or stopped, while emergency surgeries were performed irrespective of COVID positive state.[2] COVID testing was made mandatory whether the patient had symptoms or not at the time of undergoing treatment (medical/surgical). Patients were categorised as positive, negative. Rapid antigen test was done, if positive confirmed with RT-PCR. Emergency surgeries were done mostly for acute surgical pathologies like acute and complicated appendicitis, perforation peritonitis, acute intestinal obstruction. Several studies were conducted in relation with perioperative morbidity and mortality in COVID-19 patients.[8-12]

We felt the need to study outcome of COVID patients compared to non COVID patients undergoing similar surgeries for acute surgical pathologies in our institute.

In this retrospective observational quantitative study, outcomes of COVID-19 patients were compared with non

COVID patients who underwent emergency surgeries for similar pathologies by same surgical teams at Government General Hospital, Guntur from January 2021 to October 2021. Our primary objective was to compare mortality, meds, surgery related complications and number of days of hospital stay with non COVID group. Our secondary objective was to analyse the demographic data such as age, gender and comorbid conditions and COVID severity.

Aim

The aim was to study the outcome of COVID-19 patients undergoing emergency surgeries and to compare them with non COVID patients.

Objectives

Primary objectives

The primary objectives were to study the parameters of outcome like number of days of hospital stay; complications of surgery like leak, wound dehiscence, wound infection; MODS; mortality.

Secondary objectives

The secondary objectives were to study the demographic features; comorbid factors and COVID infection; COVID severity based on CRP, serum ferritin and D-dimer values.

METHODS

Study design

It was a retrospective observational quantitative study.

Study population

Patients who underwent emergency surgeries for acute general surgical pathologies from January 2021 to October 2021 at Government General Hospital, Guntur were the study population. COVID-19 infection was diagnosed preoperatively with rapid antigen test and later confirmed with RT-PCR.

Inclusion criteria

Patients above 16 years and below 80 years, who underwent emergency surgeries for acute general surgical pathologies were included in this retrospective study.

Exclusion criteria

Patients who underwent minor procedures and who underwent surgeries for trauma and emergencies related to state of pregnancy were excluded.

All patients were divided into two groups. COVID group with 25 patients and non COVID group with 25 patients. In both groups similar baseline characteristics, similar patholologies were recorded and similar procedures were performed.

The study was approved by Institutional Ethics Committee.

Definitions

COVID-19 patients were defined as patients who were tested preoperatively with rapid antigen test and confirmed with RT-PCR who may be symptomatic or asymptomatic.

Non COVID patients were defined as patients who were tested negative with rapid antigen test and who had no symptoms of COVID-19 preoperatively, postoperatively.

Data collection

A detailed history was taken and data such as age, sex, diabetes, hypertension, asthma were recorded. History of onset of symptoms, any associated breathing difficulty, fever, vomiting was recorded. After thorough clinical examination, necessary blood investigations and radiological investigations were conducted to confirm the emergency surgical condition and its severity. Rapid antigen test to detect COVID infection was carried to all patients undergoing emergency surgeries and if positive, confirmed with RT-PCR test. Emergency procedures performed were noted. Outcomes such as mortality, shock and multi organ failure, surgery related complications and number of days of hospital stay were recorded.

Statistical analysis

The distributions of continuous variables were presented as means and standard deviations; the distributions of categorical variables were presented as frequencies and percentages. Categorical variables were calculated by means of odds ratio (CI 95%) and chi-square test. Data was analyzed using Microsoft excel.

RESULTS

As shown in Table 1, the mean age of patients with COVID positivity is 37.96 years and mean age of with non COVID patients is 37.84 years. 92% of the study subjects are male and 8% are female. 92% of patients with COVID positivity are male and 8% of COVID positive patients are female.

The incidence of diabetes in COVID positive patients was 20% and in COVID negative patients was 8%. The incidence of hypertension in COVID positive patients was 24% and in COVID negative patients, it was 20%.

Table 1: Baseline characteristics.

Characteristics	COVID (n=25)	Non COVID (n=25)
	N (%)	N (%)
Demographic data		
Mean age±SD (years)	37.96±18.8	37.84±16.6
Male	23 (92)	23 (92)
Female	2 (8)	2 (8)
Comorbid conditions		
DM	5 (20)	2 (8)
HTN	6 (24)	5 (20)
COVID severity		
Elevated CRP	9 (36)	
Elevated D-dimer	9 (36)	
Elevated serum ferritin	2 (8)	
Pattern of surgical conditions		
Acute appendicitis	8 (32)	8 (32)
Complicated appendicitis	4 (16)	4 (16)
Perforation peritonitis	9 (36)	9 (36)
Acute intestinal obstruction	4 (16)	4 (16)

Table 2: Morbidity and mortality.

Parameters	COVID	Non COVID	P value
	N (%)	N (%)	
Average number of hospital days	11.78	8.43	
Complications			
Leak	1 (4)	0(0)	
Wound dehiscence	3 (12)	1 (4)	
Wound infection	3 (12)	1 (4)	
Total	7 (28)	2 (8)	0.65
MODS	5 (20)	2 (8)	0.22
Mortality	8 (32)	2 (8)	0.033

36% of COVID positive patients had elevated CRP and elevated D-dimer and 8% of COVID positive patients had elevated serum ferritin.

36% of acute cases were perforation peritonitis, 32% were acute appendicitis, 16% were complicated appendicitis and 16% were acute intestinal obstruction in both groups.

Average number of hospitals stay for COVID positive patients undergoing emergency surgeries was 12 days and in COVID negative patients, it was 8.43.

28% of COVID positive patients had postoperative surgical related complications when compared to 8% of COVID negative patients. The p value of total complications is not significant. Odds ratio is 4.47 with 95% CI (0.83 to 24.19).

20% of patients with COVID positivity had MODS when compared to 8% in non COVID patients. P value is not significant. Odds ratio is 2.88 with 95% CI (0.5 to 16.48).

32% of COVID positive patients died when compared to 8% in non COVID patients. Chi square statistic is 4.5, p value is 0.033895 which is significant ($p<0.05$). Odds ratio is 5.41 with 95% CI (1.017 to 28.79).

DISCUSSION

In India, COVID-19 was first reported in Kerala on 27th January 2020.[3] Indian government imposed stringent lockdowns to curtail the COVID-19 spread.[4] All elective surgeries were stopped. Only emergency surgeries were performed. Although COVID-19 is not a surgical disease, it had a huge impact on outcome and surgical related problems.[5] Various studies reported higher perioperative morbidity and mortality.

The incidence of diabetes and hypertension were almost similar in COVID and non COVID patients undergoing emergency surgeries in our study. This showed that the emergency surgical condition like acute appendicitis, perforation, intestinal obstruction were the result of inherent problems and not due to COVID state.

In this study, we found that 5 times risk of mortality in COVID patients when compared to non COVID patients undergoing emergency surgery (odds ratio=5.41). 32% COVID patients died when compared to 8% of non COVID patients which was statistically significant.

20% of COVID patients developed MODS postoperatively when compared to 8% of non COVID patients which was not statistically significant. COVID patients developed MODS 2.8 times more than non COVID patients.

COVID patients had 4.47 times more risk of developing postoperative surgery related complications than non COVID patients. COVID patients undergoing emergency surgeries had more number days of hospital stay than non COVID patients.

Corona virus infection is known to trigger inflammatory response in the host, which is manifested as a raise in CRP levels, serum ferritin in the COVID positive patients in the group 1 compared to group 2.[6] The acute surgical condition with associated inflammation also triggered an inflammatory response leading to distributive shock, multiorgan failure and increased mortality and morbidity in group 1 COVID positive patients compared to COVID negative patients.[7]

Osorio et al studied patients undergoing emergency general and gastrointestinal surgery found that COVID-19 infection was associated with high postoperative complication and mortality rates.[8] Mortality rate among patients infected with COVID-19 was greater than that in

non COVID-19 (12.6 versus 4.6 per cent) which was in concurrence with the present study (24% vs. 8%). They also reported 24% of COVID-19 positive patients had severe complications such as MODS and respiratory complications when compared to 11.8% in COVID-19 negative patients, similar results were observed in the present study (20% vs. 8%). Duration of hospital stay was higher in COVID-19 positive patients than COVID-19 negative patients (7days vs. 4 days) which was comparable with the present study (11.84 vs. 8.43 days).

Doglietto et al studied patients who underwent surgical treatment in various departments including emergency surgeries in Spedali Civili Hospital (Brescia, Italy).[9] In this matched COHORT study it was documented that surgical mortality and complications were significantly higher in patients with COVID-19. The mortality rate in patients with COVID-19 was 19.51% and those without COVID-19 was 2.44%. These results are comparable with the present study (24% vs. 8%). They also documented local complications such as SSI, wound dehiscence was rare and didn't differ between COVID-19 positive and negative patients where it was shown local complications were significantly higher in COVID-19 positive patients in the present study (28% vs. 8%).

Knisely et al studied the perioperative morbidity and mortality of patients with COVID-19 who undergo urgent and emergent surgery in New York city and documented COVID-19 was associated with an increased risk for serious perioperative morbidity and mortality.[10] The mortality rate was 16.7% in COVID-19 patients when compared to 1.4% in COVID negative patients. These results were lower than present study but comparable (24% vs. 8%). 58.3% of COVID-19 patients had MODs when compared to 6% in COVID-19 negative patients. Similar results were observed in the present study where MODs in COVID-19 was 20% and COVID-19 negative patients was 8%.

In an International COHORT study conducted on patients infected with COVID-19 who had surgery in different specialties with no control comparisons documented an overall mortality rate of 23.8 per cent, which were similar to the present study (24%).[11]

The National Emergency Laparotomy Audit of England and Wales (NELA) group, conducted an analysis on COVID-19 patients who underwent emergency laparotomy and reported mortality rate of 12.5%.[12]

The main limitation of this study was observation of the data retrospectively.

CONCLUSION

In this study, there was significant association between COVID positivity and mortality in patients undergoing emergency surgeries. MODS, number of days of hospital stay and postoperative complications were higher in COVID patients but they were not statistically significant. COVID positivity was associated with higher complications rate, higher mortality and increased duration of hospital stay. Further research with large sample size was required to achieve significant association.

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