

SARS-COV-2 and its implication in the presentations and outcomes of acute appendicitis: a surgical emergency.

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Abstract : Background: The most frequent abdominal surgical emergency is acute appendicitis. During the acute SARS-COV-2 pandemic, confinement and stay-at-home orders were enforced internationally to stop the spread of the disease, prevent the overload of the healthcare system, and reduce fatalities. Nevertheless, there are worries that because of these regulations, patients did not seek critical medical attention.

Methods: There were 40 patients total, 20 in the COVID-19 pre-group and 20 in the COVID-19 post-group. The time between the onset of symptoms and admission in the COVID-19 group was 65.0 hours, which is significantly longer than the 17.3 hours observed in the pre-COVID-19 group (p 0.001). After the pandemic outbreak, there were considerably more cases of complex appendicitis than there were previously (50% versus 20%, p0.001). In the post-COVID-19 group, the average hospital stay was longer (3 versus 4.5 days; p=0.041).

Conclusions: The COVID-19 pandemic had an impact on the timing of appendicitis diagnoses as well as the disease's course and average hospital stay. After the COVID-19 pandemic epidemic, patients with acute appendicitis were more likely to develop complicated appendicitis.

Keywords: COVID-19, complicated appendicitis, pandemic, and acute appendicitis

Introduction:

Acute appendicitis is one of the most frequent surgical emergencies involving the abdomen.¹ During the COVID-19 pandemic, the international health organization and the government of India implemented a variety of strategies and measures to prevent the disease's spread. These steps were also taken to reduce morbidity and mortality as well as healthcare system overload. China, the United States, the European Union, and eventually India were severely hit by the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) (COVID-19) pandemic.

In order to contain the spread of COVID 19, numerous state governments in India imposed a complete lockdown with stay-at-home recommendations after the first case of the illness was discovered in India in January 2020.² Numerous surgical institutions, including the American College of Surgeons, established guidelines for addressing elective cases and postponing non-emergency surgical treatments. By avoiding elective and non-emergency cases and concentrating solely on emergencies and patients infected with SARS-COV-2, the majority of resources were utilized in tackling the pandemic. The state and federal government warnings also strongly supported the idea of maintaining a lesser workload over emergency departments in hospitals. This resulted in a 50–60% decrease in the number of people seeking emergency medical attention during the first few weeks of lockdown.

This slow decline in the number of patients over several weeks asserted that certain emergency cases and patients chose not to receive medical care out of fear of being infected with the SARS-COV-2 virus.⁴

Even the press has reported on multiple cases of patients who experienced serious medical emergencies—including MI, hypoglycemic crises in diabetics, seizures, and peptic perforation—but who did not go to the emergency department.⁵

In the research presented below, we make reference to the movement limitations implemented during the SARS-COV-2 pandemic and their significant impact on the presentation of emergencies (such as acute appendicitis) in emergency rooms as well as the increase in disease burden.

Aims and objectives:

Understanding the impact of the SARS-COV-2 pandemic on a patient's presentation with acute appendicitis from the onset of the disease's signs and symptoms is the aim.

The objective is to compile data regarding effects of delayed presentation of patients at the emergency room in relation to illness development, surgical technique, and length of stay.

Methods:

During the peak of the SARS-COV-2 pandemic, this study was conducted in a tertiary care facility in Maharashtra's department of surgery for six months while accounting for all movement constraints, and the results were compared to information from the pre-COVID era. As a consequence, the study was categorized as a retrospective observational one. The data was divided into two categories, pre-COVID era (before the SARS-COV-2 pandemic) vs. during the pandemic, based on when the patient arrived at the emergency room. Patient discharge records and digital databases were obtained in order to compile the relevant data for the respective time period. The complete database was then divided into several categories and parameters for analysis.

Complications related to acute appendicitis, demographic factors, length of hospital stay, and intraop findings in both groups were among the factors that affected the study.

Inclusion criteria.

The study included all patients over the age of 18 who presented to the emergency room with signs and symptoms of acute appendicitis and were diagnosed with it based on a clinical examination and radiological evidence.

Exclusion criteria

All patients who are under the age of 18.

all patients who were not diagnosed from acute appendicitis.

All patients, regardless of diagnosis, had HRCT thorax and a reverse transcriptase polymerase chain reaction (RT-PCR) test done to look for the SARS-COV-2 antigen after the SARS-COV-2 pandemic.

Statistical analysis

For statistical analysis, IBM's statistical programme for the social sciences (SPSS) statistics 16.0 was utilized. The mean and standard deviation (SD) of the descriptive variables were calculated, the Chi-squared test or Fisher's exact test was used to compare the categorical variables between the two groups, and the student's t-test was used to quantify the continuous variables. Due to the patient's delayed arrival at the hospital, it was anticipated that after lockdown was initiated, clinical metrics and outcomes might significantly change. P values lower than 0.05 were regarded as significant.

Results:

Twenty patients were from the pre-pandemic era and twenty from the post-pandemic era, making up a sample size of 40 patients. In terms of local demography-related parameters and clinical presentation with respect to age, gender, pre-operative signs/symptoms, and clinical findings, there was very little statistical difference between the two groups. In comparison to the pre-pandemic era, the incidence of appendicitis with complications including perforation with peritonitis or lump formation was significantly higher in the post-pandemic era (50% versus 20%, $p < 0.001$). Patients in the post-pandemic group showed lower admission rates and treatment intentions due to fear of SARS-COV-2 (92.7 versus 32.6, $p < 0.001$) than those in the pre-pandemic group. In the post-pandemic group, hospital stays lasted longer on average (3 versus 4.5 days; $p = 0.041$).

Parameters	Pre-COVID-19 group (n=20)	Post-COVID-19 group (n=20)	p value
Duration since onset of symptoms (hours)	17.3	65	<0.001
Complicated appendicitis (%)	4 (20)	10(50)	<0.001
Appendicular abscess (%)	2(10)	5(25)	0.001
Perforated (%)	1(5)	4(20)	<0.003
Gangrenous (%)	1(5)	1(5)	0.020
Mean duration of hospital stay (days)	3	4.5	0.41

In post-COVID-19 group, the interval from onset of symptoms to admission was 65.0 hour, which is significantly longer than the 17.3 hour interval noted in pre-COVID-19 group ($p < 0.001$).

Discussion:

This study compared the numerous factors between the pre-pandemic era and during the pandemic at tertiary care facility in Maharashtra. There have been a few researches on appendicitis during the pandemic, and the majority of them have recommended treating fewer people in light of the current situation.^{6,7}

The post-COVID-19 group showed a 65-hour increase in the amount of time that the abdominal pain presented before the patient was admitted to the hospital ($p < 0.001$). Since the beginning of time, developing countries have experienced the scenario of delayed presentation of emergencies to health care facilities due to financial challenges and inadequate access of transport during regular days, which was already compromised by the pandemic.

It is reasonable to assume that throughout these periods of stringent immobility, confinement to houses, upholding social distance, and receiving home-based remedies, patients will be apprehensive and anxious about contracting SARS-COV-2 infection from health workers or hospitals.⁸

This worsens the patient's already-ailing condition, which accounts for the higher rates of perforation and complications presenting in our scenario. Due to their own concern of contracting the illness, even the hospital personnel were hesitant to admit patients. In contrast to non-complicated appendicitis, appendicular perforation is one of the feared complications of delayed hospital admission that raises morbidity and mortality. According to studies, perforation rates typically range from 16% to 40%.⁹

Although there was a considerable increase in perforation rates in the COVID-19 group by 32% compared to pre-COVID-19 patients (52% versus 20%), our analysis showed nearly equal rates of perforation. 2-6% of people with acute appendicitis presented with an appendiceal lump, which was typically an abscess or inflammatory phlegmon.¹⁰ It rose from 10% in the pre-COVID-19 group to 24% in the COVID-19 group in our research. Between the two groups, the mean operative time increased dramatically, with the latter group's mean duration indicating a modest increase.

This might be because the operating surgeons took extra precautions, practically eliminating the possibility of prick injuries and operating while wearing personal protective equipment (PPE) in conditions of poor visibility making every effort to prevent complications from happening, and complicated appendicitis that required extra caution to be taken into account. The post-COVID-19 group also experienced a longer hospital stay. In compared to the same period prior to this contagious calamity, we could observe a higher number of people coming to the emergency rooms and getting treated. The closure of private hospitals in the area and the

conversion of the government hospital to an exclusive COVID care facility, from which the patient is admitted, may be the legitimate causes of this disparity. The pooling of patients may have also occurred at our institute, which is one of the region's tertiary centers. The study's shortcomings include the limited sample size and retrospective design in a single center.

Conclusion:

The SARS-COV-2 pandemic had an impact on the timing of diagnosis of appendicitis, its course, and the average length of hospitalization. Low treatment compliance was shown by the patients. After the COVID-19 outbreak, patients with acute appendicitis were more likely to develop complicated appendicitis and present to emergency rooms.

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