

ORIGINAL RESEARCH

Incidence, Presentation and Management of Acute Appendicitis During COVID Lockdown: An Experience from Rural Tertiary Care Hospital

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ABSTRACT

Background: Acute appendicitis (AA) is the most common surgical disease with a lifetime risk of 7–8%. Traditionally, appendectomy has been the treatment of choice for acute appendicitis. Mortality rate after appendectomy is very low and may range from 0.07 to 0.7% rising to 0.5 to 2.4% in patients without and with perforation. Over 250,000 appendectomies are performed each year in the USA alone. It was observed during the outbreaks of influenza and Middle East Respiratory Syndrome (MERS) in 2012, that referrals for non-respiratory causes decreased significantly as the epidemics progressed. An outbreak of respiratory disease should not by itself affect the incidence and presentation of acute appendicitis. Nevertheless, we have noticed in our institution that as the COVID-19 pandemic spread in our community there was a significant decrease in the number of cases of acute appendicitis presenting to the ED of our institution and an increase in the number of admitted patients of AA requiring surgery.

Objectives: To compare the incidence and presentation of acute appendicitis before and during the COVID-19 lockdown period. Also, to compare the percentage of patients requiring operative management, intraoperative findings and postoperative complications before and during the COVID-19 pandemic for cases of acute appendicitis.

Methodology: This prospective observational cohort study was undertaken at Government Medical College Baramulla which is a 300 bedded teaching hospital catering as a referral institute for a catchment population of roughly 1.2 million. All consecutive patients of clinically or radiologically diagnosed AA admitted between 25th March and 25th July were included in this study (corresponding to complete lockdown in our country). This was designated as group A. Data was also collected from hospital records of all acute appendicitis patients admitted in the corresponding months of 2019 i.e from 25th March 2019 to 25th July 2019 and analysed for comparison and designated as group B

Results: A total of 169 Cases of Acute appendicitis were evaluated: 52 from the lockdown period i.e Group A and 117 from the non-pandemic period i.e Group B. No statistical difference in the male: female ratio and demographic pattern was observed. Duration of pain preceding admission in Group A was 57.6±8.16 hours and 36.55±7.81 hours in Group B and was statistically significant. It was observed that during COVID lockdown about 69.23% (36) patients had a delayed presentation compared to 20.51% (24) in group B. In Group A, 26.92% (14) patients were managed conservatively and 73.07% patients were operated. In Group B 47.86% (56)

patients were managed conservatively and 52.13%(61)patients underwent operative management.

Conclusion: This COVID- 19 pandemic has forced a paradigm change in all aspects of patient management worldwide and while the focus continues to remain on control of the virus, there are serious apprehensions over the effects on non- COVID patients especially surgical emergencies and malignancy patients. This message needs to reach far and wide in the community, so that the incidence of late presentation of surgical emergencies to ED's, with acute appendicitis being the commonest one is prevented.

Keywords: Acute Appendicitis, SARS-CoV-2, COVID-19

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INTRODUCTION

Since first being detected in December 2019, the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has spread throughout the world and has been classified as a global pandemic of international concern by the WHO. Up to 15% of those affected with the acute form of the illness, termed coronavirus disease 19 (COVID-19), present with a severe phenotype of the disease. The resulting impact on health resources worldwide has been innumerable [1,2]. As COVID-19 is still spreading, the exact impact that this virus has on other diseases will take a while to be studied. Whilst a majority of the published literature regarding COVID-19 has explored disease transmission characteristics, pathogenesis, treatment options and patient outcomes, the impact on other areas of medicine, including general surgery, is yet to be investigated[1].

Acute appendicitis (AA) is the most common surgical disease with a lifetime risk of 7–8% [3]. Traditionally, appendectomy has been the treatment of choice for acute appendicitis. Mortality rate after appendectomy is very low and may range from 0.07 to 0.7% rising to 0.5 to 2.4% in patients without and with perforation [4, 5]. Over 250,000 appendectomies are performed each year in the USA alone [3]. Whilst surgery is still considered as the gold standard for the treatment of AA, a non operative approach has been adopted in selected cases using antibiotics as the first-line of management. Nonetheless, cases of suspected appendicitis are often referred to the Department of Surgery for surgical evaluation and further management and are not treated by primary care physicians. In comparison, other causes of an acute abdomen, such as biliary complaints and recurrent diverticulitis, may be managed successfully in the primary care setting without surgical consults in the Emergency Departments(ED) [6,7].

It was observed during the outbreaks of influenza and Middle East Respiratory Syndrome (MERS) in 2012 [8,9], that referrals for non-respiratory causes decreased significantly as the epidemics progressed. An outbreak of respiratory disease should not by itself affect the incidence and presentation of AA. Nevertheless, we have noticed in our institution that as the COVID-19 pandemic spread in our community there was a significant decrease in the number of cases of acute appendicitis presenting to the ED of our institution and an increase in the number of admitted patients of AA requiring surgery. Thus, the aim of this study was to elucidate the impact of COVID-19 on the incidence and characteristics of patients presenting to the Emergency Department with AA during lockdown months. Since our institution is the only

referral institute in North Kashmir, the incidence of AA diagnosed in our ED likely reflects the overall incidence AA in the general population of this region.

AIM

The primary aim of this study was to describe the incidence, clinical presentation and intra operative findings in AA patients admitted during COVID times.

MATERIALS AND METHODS

This prospective observational cohort study was undertaken at Government Medical College Baramulla which is a 300 bedded teaching hospital catering as a referral institute for a catchment population of roughly 1.2 million. Approval was sought from the medical ethics committee of the hospital. Informed consent was waived off in view of the purely observational nature of the study. All consecutive patients of clinically or radiologically diagnosed AA admitted between 25th March and 25th July were included in this study. This was designated as group A. Data was also collected from hospital records of all acute appendicitis patients admitted in the corresponding months of 2019 i.e from 25th March 2019 to 25th July 2019 and analysed for comparison and designated as group B. Electronic data base and discharge summaries of the patients from the concerned time duration were retrieved and the required parameters and variables were filled up by the author themselves into the proforma designed. This included both complicated and uncomplicated cases irrespective of whether the patients were operated or managed conservatively. Both open and laparoscopic appendectomies were involved in the study. Patient demographics included the following: age, sex, previous episodes of suspected appendicitis, comorbidities, previous antimicrobial therapy, and laboratory findings at admission (white blood count (WBC) and C-reactive protein (CRP), radiological diagnosis (ultrasound (US)/ computer tomography (CT) findings), Alvarado Score, type of treatment received (operative or conservative), intraoperative findings and, type and duration of antimicrobial therapy, duration of hospitalization, management of postoperative complications at days 7 and 15 and COVID status. All patients were monitored until they were discharged and followed twice after discharge at day 7 and day 15 of surgery.

IBM SPSS Statistics ® 16.0 was used for statistical analysis. Descriptive variables were assessed as mean with standard deviation (SD), categorical variables between two groups were compared using Chi-squared test or Fisher's exact test and continuous variables were tabulated using Student's T test whichever applicable.

Inclusion criteria

All patients with suspected clinical diagnosis of AA confirmed by imaging and examined by a surgeon were included in the study.

RESULTS

There were 52 patients of acute appendicitis who were admitted in Surgery Department during the lockdown period. During the same period of time last year a total of 117 patients were admitted with the diagnosis of acute appendicitis. The socio demographic profile of patients was similar in both groups. Leukocytosis (WBC count more than 10000/mm³) was seen in 39 (75%) patients in group A and 64 (54.70%) patients in group B, and the comparison was statistically insignificant. Duration of pain preceding admission in Group A was 57.6±8.16 hours and

36.55±7.81 hours in Group B and was statistically significant. It was observed that during COVID lockdown about 69.23% (36) patients had a delayed presentation compared to 20.51% (24) in group B. In Group A, 26.92% (14) patients were managed conservatively and 73.07% patients were operated. In Group B, 47.86% (56) patients were managed conservatively and 52.13% (61) patients underwent operative management.

Variable	Group A, n=52	Group B, n=117	P Value
Age	26.45 ±13.21	24.23 ±7.84	0.8731
Males	28(53.8%)	47(40.2%)	0.38
Leukocytosis>10000/mm ³	39	64	0.23
Duration of pain (hours)	57.60±8.16	36.55±7.81	0.0001
Delayed presentation (72 hours)	36	24	0.0001
Conservative Mx	14	56	0.11
laparoscopicMx	0	26	0.0001
Open surgery	38	35	0.002
Mean duration of surgery (Minutes)	52.4 ±11.82	47.40±15.63	0.091
Mean Post-operative hospital stay (Days)	4.04 ±1.32	2.07 ±0.92	0.0035
Alvarado score	8.16 ±0.78	6.23 ±1.21	0.0015

POST OPERATIVE COMPLICATION			
Complication	Group A	Group B	P Value
Intra Abdominal Abscesses	12 (23.07%)	4 (3.41%)	<0.05
Surgical Site Infection	5 (9.61%)	11 (9.40%)	0.78
Prolonged Paralytic ileus	3 (5.76%)	7 (5.98%)	0.74

Mean duration of surgery was 52.4 ±11.82 minutes in Group A and 47.40±15.63 minutes in Group B. Mean postoperative hospital stay was 4.04 ±1.32 days in Group A and 2.07 ±0.92 days in Group B. A total of 27(51.92%) patients presented with perforation in the COVID era i.e Group A and 34(29.05%) patients were found to have perforation in Group B which is statistically significant. Perforation rate increased by 22.87% in lockdown period. In terms post operative complications 23.07% patients developed intra Abdominal Abscesses in Group A and 3.41% in Group B. The number of patients developing surgical strike infection and Prolonged Paralytic ileus was comparable in both the groups as shown above in the table. In Group A Seven (7) patients tested positive for COVID-19. There was no mortality in either group.

DISCUSSION

The current COVID-19 pandemic has posed a unique situation; on the one hand the surgical community is grappling to cope with the effects of COVID-19 on patient care and the provision of surgical services, and is constantly updating the protocols for treatment of surgical emergencies. The challenges are unprecedented but surgeons are coming out as winners. On the other hand, the fear psychosis created by COVID-19 among the general public has led to the delayed presentation of surgical emergencies, with the patients trying to avoid consulting the specialists at the onset of the disease process. With this thing in mind we conducted the present study in a large referral center of a developing country to elucidate the effects of COVID-19 pandemic on the incidence and presentation of acute appendicitis. To the best of our knowledge, this is the first paper in the English literature reflecting on the change in incidence and presentation of acute appendicitis from a developing country during COVID-19 pandemic.

After the lockdown was imposed in our country to contain the COVID pandemic, we noticed a significant decrease in the number of acute appendicitis patients reporting to our emergency department. As the lockdown progressed it was observed in our centre, that although the number has decreased but most of the patients admitted as AA were complicated and essentially requiring operative management. The mean duration of pain preceding hospital admission or before seeking medical advice was found to be significantly higher in COVID times as compared to the pre-COVID cohort and was statistically significant. This led to delayed presentations which were also found to be higher in Group A with statistical significance. Perforation is a feared complication of AA and an incidence of 15 to 40 percent has been reported¹⁰. We noticed similar results in group B but a statistically significant increase in the number of patients presenting as perforation in group B. This can be explained by a possible reluctance of patients to report to hospitals for early detection and treatment for the fear of contracting COVID. In our part of the world, as the pandemic progressed, there was a hysteric compulsion felt by general masses to stay away from healthcare workers and facilities for fear of getting infected with COVID. This encouraged people to self medicate at home and would only report to hospitals in case their symptoms did not subside or worsened. Also during the initial few months of the lockdown, private hospitals and primary healthcare centres were closed in our district and most of the secondary healthcare facilities were converted into dedicated COVID hospitals. This meant that patients had to travel longer distances to reach the only tertiary care facility in North Kashmir which was further compounded by the difficulty in managing transport facilities during lockdown. All this led to a delay in seeking proper treatment and an increase in number of the patients progressing to complicated appendicitis mostly requiring operative management. Delay in seeking medical advice in developing countries especially in rural settings like ours is already an age old problem due to number of reasons most notable being geographical topography, acceptance of home made treatments and illiteracy. These obligations were further accentuated by the measures taken to contain the spread of coronavirus disease and hence the delay in presentation which explains the increased incidence of patients presenting with perforation in our study.

The mean operative time is more in Group A, possibly because of more number of complicated cases but not statistically significant. Similarly the mean duration of post operative hospital stay and post operative complication rates were higher in Group A but did not carry any statistical significance.

CONCLUSION

This COVID- 19 pandemic has forced a paradigm change in all aspects of patient management worldwide and while the focus continues to remain on control of the virus, there are serious apprehensions over the effects on non- COVID patients especially surgical emergencies and malignancy patients[12] Fear of contracting the virus will undoubtedly impact non- COVID patients seeking adequate and timely medical care. As office consultations are being replaced by alternate temporary methods of healthcare delivery, such as teleconferencing, healthcare workers must consider its implication on adequate clinical assessment and its impact on the management. The challenge ahead lies in continuing to deliver optimum healthcare to patients and at the same time an effort should be made at the administrative and community level to allay the fears of patients regarding COVID with an emphasis to seek medical advise in case of any surgical or medical emergency because the delay would effect the clinical presentation and further management and increase patient mortality and morbidity. From the surgeons' perspective, bacterial sepsis as in a case of acute appendicitis when neglected or treated with alternate non-scientific remedies, as already described, will result in death or require intensive care support creating an extra burden on an already over stretched healthcare system . This message needs to reach far and wide in the community, so that the incidence of late presentation of surgical emergencies to ED's with acute appendicitis being the commonest one is prevented .

LIMITATIONS

This was a single centre study not necessarily reflecting the incidence of the general population of our state. We acknowledge the fact that, even though all the records of previous year were scrutinized meticulously, we may inadvertently have missed few of them, leading to bias. But we tried to double check it by physical verification of both electronic and hard records.

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