

Influence of Covid -19 on the management of Appendicitis

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ABSTRACT

Objective: Acute Appendicitis encounters as the frequent problem in surgical pediatric patients leading to Appendectomy, being one of the most common procedures performed in surgical Emergency. During COVID-19 pandemic, the trends in the management of acute appendicitis have changed. Conservative management of appendicitis with antibiotics is being proposed as an alternative to conventional appendectomy. So, this study is conducted to compare the presentation and outcome of Appendicitis managed during pre and post pandemic period in our settings.

Methodology: After approval of Ethical Review Committee, a total of 267 patients of age 1-12 years were selected for the study. It was a retrospective Cohort Study. Patients were divided into group A (n=145) which was pre pandemic group. Data was collected retrospectively from charts regarding demographics, presentation, duration of stay operative findings and complications from May-Oct 2019 and Group B (n=122) during covid-19 was collected from the patients presented with appendicitis over a period of six months from May-Oct 2020. Similar months of the year were selected to remove seasonal variation in the presentation of Appendicitis. All information was collected on a predesigned Performa. Data was compared and analyzed on SPSS 20.

Results: Out of 267 patients, 151 (56.56%) were male. Group A patients presented during pre-pandemic period (n=145) were undergone appendectomy for appendicitis in 129 patients (88.96%) with 59 patients (40.68%) having acutely inflamed appendix and 70 patients (48.27%) had complicated appendicitis such as gangrenous, perforated with generalized peritonitis. In Group A only 16 patients (11.03%) were managed conservatively for appendicular mass. In contrast to group B (n=122) presented during pandemic, only 43 patients (35.24%) were operated with findings of acutely inflamed appendicitis while gangrenous/perforated appendicitis with pelvic abscess and/or generalized peritonitis was found in most of the patients with a number of 69 (56.55%), only 10 (8.19%) patient presented as Appendicular mass hence managed conservatively.

Conclusion: Delay in presentation and early conservative management during pandemic crisis has resulted in an increase in the complications of Appendicitis. Early referral to specialized centers with vigilant selection for conservative treatment can save patients from developing complications.

Keywords: Appendicitis, covid-19, Appendectomy, complications, Pandemic

INTRODUCTION

The spread of COVID 19 in all countries was predictable since it was first reported in Wuhan, China during NOV 2019¹. This fatal viral infection dramatically engaged the entire globe rapidly without any boundaries or limitations. However, pediatric population was the least affected² during its early waves as compared to adult population.

Acute appendicitis is the most common emergency presenting in the of pediatric surgery unit with 1-2 % of the admission pertaining to it³. This pandemic has altered management including triage and surgical protocols in an unprecedented fashion. During the covid-19 pandemic, the fear of contracting the corona virus and stay-at-home policy has kept patients from frequent hospital visits. Moreover, the guidelines regarding the management of acute appendicitis were also modified towards conservative management to avoid long surgical lists. A number of recent studies across Europe, USA and India support the idea of conservative management of Appendicitis with oral or Intravenous antibiotics only with observation not only in adults but also in children^{4, 5, 6}.

It is well understood that Pediatric patients are at higher risk of developing more complications⁷ associated with appendicitis like pelvic collection, peritonitis, sepsis, wound infection and intestinal obstruction in addition to prolonged hospital stay and increased economic burden on health care system. Keeping in view the tendency of developing such life-threatening complications in children and the restrictions caused by Pandemic lockdown, prolonged conservative treatment leading to delayed presentation in ER is both controversial and questionable as it poses a big threat to greater morbidity and mortality caused by perforation and sepsis.

The study aims at the influence of COVID-19 Pandemic on the presentation of appendicitis in pediatric population and comparison of outcome of surgical management of appendicitis during (may- Oct 2020) and before (may- Oct 2019) the covid-19 out breaks in our region in terms of complications.

PATIENTS AND METHODS

After Ethical considerations are met by the approval committee of the institute, a total of 267 Patients of ages between 1- 12 years who were treated for acute appendicitis at CH & ICH Multan. It was a retrospective Cohort study. Patients were divided into group A and

Received on 02-01-2021

Accepted on 06-06-2021

Group B depending upon their period of treatment. The patients of group B (n=122) admitted with appendicitis during the COVID 19 pandemic for the period of six months (May-Oct 2020) were compared to the patients who were treated for acute appendicitis during the same months of last year (May-Oct 2019) in the same department labelled as Group A (n=145). Those who were not willing for study or who had postoperative finding inconsistent with appendicitis were excluded from the study.

After admission, history and examination were done as routine. Baseline investigations such as Complete Blood count including white cell count, and viral screening done for hepatitis B and C and ultrasonography abdomen was performed in all patients.

According to our treatment protocol for acute appendicitis, surgical management /Appendectomy was done for both non perforated and perforated appendix while appendicular abscess/mass was managed with NPO and intravenous antibiotics till the improvement of symptoms. If no improvement for 48 h, exploration was done. The same treatment protocols were followed during the COVID 19 pandemic.

Comparison between both group A and B was done in terms of age, sex, time between the symptoms onset and admission to ED, abscess/collection on USG study, incidence of perforation, postoperative intestinal obstruction, duration of hospital stay, and readmission in patients with acute appendicitis. Severity of Symptoms was noted by ALVERADO scoring of the patients at the time of Admission. Appendicitis was classified as uncomplicated (acute catarrhal or inflamed) and complicated (perforated at tip or base, pelvic abscess or generalized peritonitis) depending upon the operative findings. Data of group A and B was collected from charts and noted on a predesigned Performa. All the information was then analyzed statistically on SPSS version 20.

RESULTS

Out of 267 patients, 145 patients were treated with acute appendicitis in 2019 while 122 patients were treated during the COVID 19 pandemic in 2020. Their demographic values are shown in chart below.

There was no statistical significant difference in the demographic data of both groups. There was no difference in presenting symptoms, like nausea, vomiting, loss of appetite in both groups but the symptoms like pain abdomen, fever and WBC count were more prevalent in

pandemic group and the difference was statistically significant with p value <0.05. More patients in Group B presented with Alvarado score >7.

Average Time between the onset of symptoms and presentation to the emergency department was 25.2 ±15.4 hours for Pre pandemic group with patients presenting with symptoms> 48h were around 8.91% while it was 35.19 ± 20.15 hours during the pandemic with patients presenting with symptoms >48h were around 56.19%. Similarly duration of hospital stay was more prolonged in pandemic group 3 ± 1.5 days as compared to 1.5 ± 0.4 days in the pre pandemic group that was statistically significant with p value <0.05.

Frequency of appendicitis with perforation, abscess formation, postoperative intestinal obstruction and readmission was noted in patients of pandemic year group and the p value was <0.05 and has been shown in the following graph.

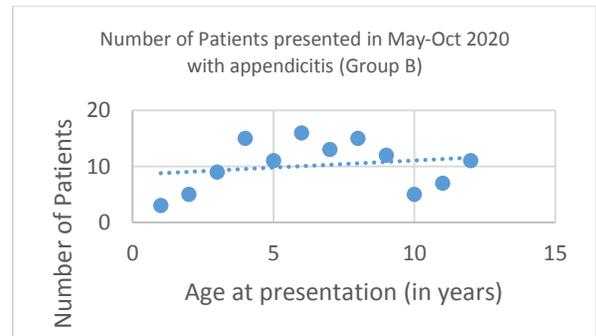
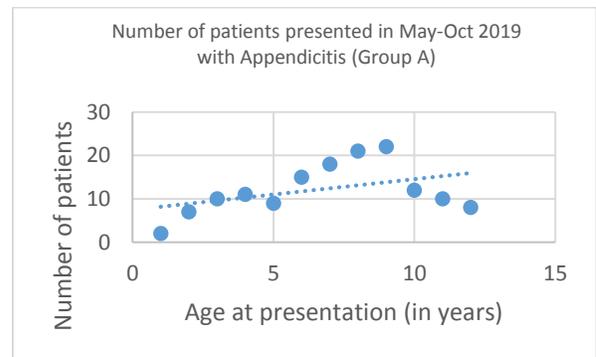
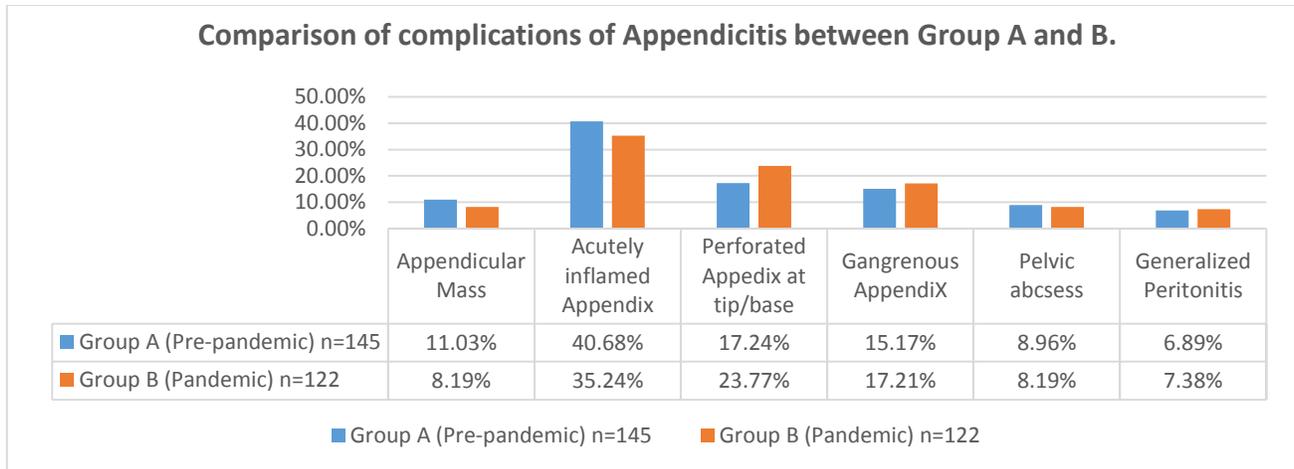


Table 1: Comparison of the presenting symptoms in Appendicitis between Group A(Pre-pandemic) and Group B (Pandemic). Statistical analysis was done on SPSS version 20. And Fischer’s exact test of significance was performed.

Symptoms	Pre-pandemic group (n=145) N (%)	Pandemic group(n=122) N (%)	P value (significant if <0.05)
Pain RIF	137 (94.48%)	101(82.78%)	0.028
Nausea/Vomiting	139(95.86%)	117(95.90%)	0.041
Fever	102(70.34%)	109(89.34%)	0.0436
Generalized pain abdomen	20(13.79%)	41(33.60%)	0.0511
Other symptoms like diarrhea, dysuria.	49(33.79%)	47(38.52%)	0.058
Raised WBCs	116(80%)	119(97.54%)	0.049
Alvarado score >7	99(68.27%)	106(86.88%)	0.045



DISCUSSION

In our study the striking feature observed was increase in the number of patients with complicated appendicitis. In pre-pandemic group, most of the patients (40.68%) undergone for appendectomy had findings of acutely inflamed appendix while gangrenous/ perforated appendicitis were collectively around 48.27%. According to a study done in 2017 by Hamdi Hameed Almaramhy et al³, the rate of complications of appendicitis ranges from 28 to 57% among children of ages 2-12 years due to misdiagnosis or delayed diagnosis even after the availability of advanced diagnostic modalities such as CT scan Abdomen.

During Covid-19 pandemic, the patients studied in Group B had acutely inflamed appendix in only 35.24% of the patients while mostly gangrenous/ perforated Appendix with or without pelvis abscess and generalized perforation were found in around 56.55% of patients. This is a higher rate noted than the studies performed earlier. There was an almost 45% increase in the complication of appendicitis with 23.7% perforated Appendix and 17.21% of gangrenous Appendix which is slightly higher than described in a recent Bavarian study published in May 2021 under similar circumstances⁸. In their findings Frank-Mattias et al indicate a rise of 35% in the complications of appendicitis including adults as well. Similarly another recent study done by Geogios Orthopoulos et al⁹ claims 21.1% increase in perforated while 29.1% increase in perforated appendix making a collective figure of 50.2%, consistent with and even more than our findings.

The time between onset of symptoms and presentation to the emergency department is a very crucial indicator of complications as this duration increases and going beyond 24-48 hours the rate of complications will also become double. In our study, average Time between the onset of symptoms and presentation to the emergency department was 25.2 ±15.4 hours for Pre pandemic group with patients presenting with symptoms > 48h were around 8.91% while it was 35.19 ± 20.15 hours during the pandemic with patients presenting with symptoms >48h were around 56.19%. There were certain factors proposed which caused delay in treatment. A common practice a referral clinics regarding the management of acute appendicitis during COVID 19 pandemic was altered to

some extent towards conservative management to limit the spread of SARS-CoV-2. In addition parents were avoiding to visit the hospitals due to fear of contracting the corona virus during the surgical procedure and hospital stay further studies are required to rule out these factors affecting the results. A multi-center retrospective study by Marie Burgard et al¹⁰ in May 2021 analyzed this aspect by encountering 52% increase in complicated appendicitis related to delay in the presentation during covid-19 Pandemic as the number of patients presenting with symptoms >48h were 61% as compared to 26% during pre-pandemic period. In contrast Serim Turanli et al¹¹ and Kulachanya Suwanwongse et al¹² Noticed no significant difference in the complications of appendicitis due to delay in presentation in the scenario of Coronavirus Pandemic.

Leire Bonilla et al¹³ Clair D. Garell et al¹⁴ show done in different parts of the world are consistent with our result of association of delay in presentation of around 47% and 41.7% increase in complications respectively .

Although the time duration between symptoms and admission in the emergency department is a subjective data which was compared in objective way in the form of conservative treatment which leads to more complications like appendicular perforations. Further studies are still proposed to find out the odds of relationship between the two.

Our algorithm regarding the management of acute appendicitis was altered during the COVID 19 pandemic. The major change was a conservative management during COVID 19 which was not followed before pandemic and this factor had great impact on complications.

Limitations of the study: It was a single center study with limited funds to find more accurate results.

CONCLUSION

Covid-19 pandemic has shifted the trend of management of appendicitis towards conservative management ultimately resulting in increase in complications. Early diagnosis and surgical treatment of acute appendicitis is the crucial step to overcome the unwanted complications while delay at patients end or at choosing the treatment modality increases morbidity and financial burdens such as prolonged hospital stay, major surgical procedures and high cost of treatment. It is highly recommended to keep

threshold for appendectomy low rather than trials of conservative treatment.

Funds contribution: There is no funding for the article.

Acknowledgment: We thank IT department Children Hospital and Institute of child health Multan for their unconditional support during preparation of this paper.

Conflict of Interest: There is no conflict of interest.

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