Original Article

DOI: 10.7860/JCDR/2023/62072.17829

Paediatric Appendicitis: Has SARS-COV-2 Influenced the Clinical Profile and Management during the Pandemic Period?

Surgery Section

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ABSTRACT

Introduction: The Coronavirus Disease-2019 (COVID-19) had profound repercussions on routine medical practices all over the globe. There are fewer studies on the impact of the pandemic on childhood surgical conditions like Acute Appendicitis (AA), which is the most common paediatric surgical emergency.

Aim: To analyse whether COVID-19 has influenced the clinical profile and management of paediatric appendicitis during the pandemic period.

Materials and Methods: A retrospective study was carried out in the Department of Paediatric Surgery, SAT Hospital, Government Medical College, Thiruvananthapuram, Kerala, India, comparing AA cases during the pandemic period (group A=from February 2020 to January 2022) with AA cases during the prepandemic period (group B=from February 2018 to January 2020). Analysis of data regarding patient demographics (age, sex), duration of symptoms and hospital stay, type of appendicitis, total and differential leucocyte count, ultrasonographic findings, treatment modality and complications was done. Subgroup analysis of children in group A was done by comparing AA cases with active/recent COVID-19 infection (Subgroup A1) with the rest of AA in the group (Subgroup A2). Pearson's Chi-square test was used for the analysis of categorical variables and independent t-test was used for numerical data. p-value<0.05 was considered significant.

Results: There were 826 AA cases, with 375 children in group A and 451 in group B. A significant reduction in the number of AA cases was noted during the first year of the pandemic (n=167 vs n=242, p-value=0.009) and a significantly higher number of cases were managed conservatively during the pandemic period (n=48 vs n=10, p-value <0.0001). Children with active/recent COVID-19 infection presented late (p-value=0.03), had a significantly higher incidence of complicated appendicitis (p-value=0.02), decreased total leucocyte count (p-value=0.01), decreased polymorph count (p-value=0.02) and higher incidence of the conservative modality of treatment (p-value<0.005).

Conclusion: Overall, there were no significant differences in the clinical profile of AA during the pandemic period. But, children with AA who had active/recent COVID-19 infection had a longer duration of symptoms and a higher incidence of complicated appendicitis. The pandemic influenced the management protocols with an increase in the number of AA cases being managed conservatively when compared to the prepandemic period.

Keywords: Appendectomy, Inflammation, Polymerase chain reaction, Severe acute respiratory syndrome coronavirus 2

INTRODUCTION

The last two years, witnessed Severe Acute Respiratory Syndrome caused by the novel coronavirus {Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2)/COVID-19} pandemic gripping the entire world and disrupting all aspects of life. Changes in routine medical/ surgical practices, reallocation of healthcare resources, fear of the dreaded pandemic, isolation/quarantine measures, and stay-at-home orders could have possibly resulted in delayed treatment seeking for non COVID-19 conditions. The same is particularly true during the rapid surges in COVID-19 cases or 'waves' of the COVID-19 pandemic, which often coincided with the nationwide/ regional lockdowns. All over the globe, numerous authors have reported a sudden drop in visits to the Emergency Department (ED) for non COVID-19 emergency conditions, resulting in delayed presentation of such cases [1]. In 2020, the Centre for Disease Control and Prevention (CDC) reported that four out of 10 adults in the United States (US) avoided or delayed medical care because of concerns related to COVID-19, which might potentially have an impact on the clinical course, management and outcome of non COVID-19 conditions [2]. This is true from a paediatric perspective as well [3,4]. There have been reports of fewer patients presenting with suspected Acute Appendicitis (AA), increased incidence of complicated appendicitis, higher rate of perforation in paediatric appendicitis, and prolonged hospitalisation for AA during the COVID-19 pandemic period [4,5]. In the prepandemic phase, the incidence of appendicitis has been reported to be 0.94-1 case per 1000 children, with 20% of paediatric appendicitis presenting with perforation [6,7]. However, few other studies report no change in the prevalence or severity of AA during the pandemic period [8]. The gastrointestinal manifestations of COVID-19 infection as well as the post-COVID-19 Multisystem Inflammatory Syndrome in Children (MIS-C) can mimic appendicitis, which adds to the diagnostic and management dilemma.

In January 2020, the southern state of Kerala, India, reported the first case of COVID-19 in India [9]. Unlike many other states in the country, Kerala never had a typical wave of the pandemic. Availability of adequate healthcare resources at the grass-root level, better health awareness of the people, and relatively early healthcare seeking behaviour meant that the hospital infrastructure was never overwhelmed, even though it reached near maximum capacity during the peak of the pandemic [10]. There is an impression that the clinical pattern of paediatric appendicitis has changed during the pandemic, with decreased number of ED visits and an increase in the number of conservatively managed appendicitis, as well as an increased prevalence of complicated appendicitis during this period with more postoperative complications when compared to the prepandemic phase [5,11]. With this study, authors aimed to find the impact of the COVID-19 pandemic on the most common paediatric surgical emergency – Acute Appendicitis (AA) in Kerala, India.

MATERIALS AND METHODS

A retrospective study was carried out in the Department of Paediatric Surgery, SAT Hospital, Government Medical College,

Thiruvananthapuram, Kerala, India, after obtaining Institutional Research Committee approval (A2/SBMR/99/2022/GMCT) and Human Ethics Committee clearance (HEC No. 02/11/2022/MCT) in March 2022. The data collection and analysis were done after obtaining clearance from both committees.

Inclusion criteria: All cases of AA admitted in the Department of Paediatric Surgery, SAT Hospital, Government Medical College, Thiruvananthapuram, during the four years from 1st February 2018 to 31st January 2022 were included in the study.

Exclusion criteria: Children with congenital intra-abdominal anomalies were excluded from the study.

The cases were categorised into: (a) Group A, the two year pandemic period from 01/02/2020 to 31/01/2022 and (b) Group B, the two year prepandemic period from 01/02/2018 to 31/01/2020.

Study Procedure

Appendicitis cases were diagnosed based on history, clinical findings, and investigations (laboratory with or without abdominal ultrasonography). The following data were collected, analysed, and compared between the two groups: (i) patient demographics-age and sex; (ii) duration of symptoms; (iii) duration of hospital stay; (iv) type of appendicitis- simple/complicated appendicitis [12]; (v) investigations- total and differential leucocyte count, ultrasound of the abdomen; (vi) treatment provided-conservative/surgical; and (vii) complications encountered. Complicated appendicitis was defined as perforated appendicitis or gangrenous appendicitis or appendicular abscess with features of peritonitis [12].

During the pandemic period (group A), nasopharyngeal swabs were taken from all children to detect the SARS-COV-2 virus and tested with Reverse Transcription Polymerase Chain Reaction (RT-PCR). If faster results for COVID-19 were needed for early surgery of severe appendicitis cases, either TrueNat or Cartridge Based Nucleic Acid Amplification (CBNAAT) tests were done instead of RT-PCR. The tests were also chosen based on institutional availability at that particular point in time. The children in group A were further divided into: (1) Subgroup A1, which included children admitted with appendicitis who had active or recent COVID-19 infection (tested positive for COVID-19 during or within three months prior to hospital admission for appendicitis); (2) Subgroup A2, which included children in group A who were tested negative for COVID-19 infection or had COVID-19 infection more than three months prior to hospital admission for appendicitis. The data for subgroups A1 and A2 were compared.

STATISTICAL ANALYSIS

The data collection and analysis were done using Microsoft Excel and Statistical Package for the Social Sciences (SPSS) software version 26.0 for Windows. In the descriptive analysis, qualitative data were expressed as mean and standard deviation (SD) or as median and range, based on data distribution. Quantitative data were described as absolute and relative frequency. Numerical data fit the normal distribution and independent t-test was used for the comparison of the two groups. Pearson's Chi-square test was used for the analysis of categorical variables. p-value <0.05 was considered statistically significant & p-value <0.001 was considered highly significant.

RESULTS

There were 826 children admitted with suspected AA during this period, with 375 children in group A (pandemic period) and 451 children in group B (prepandemic period). A significant reduction in the number of appendicitis cases was noted in the first year of the pandemic compared to a similar period during the prepandemic phase [Table/Fig-1-3].

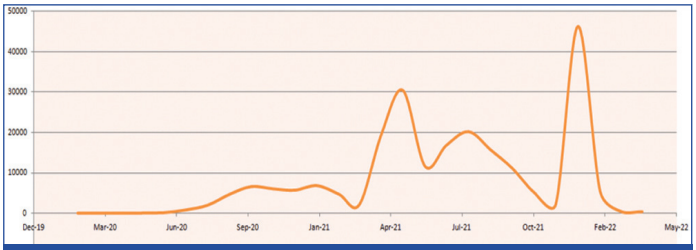
Group A vs Group-B (pandemic vs prepandemic period): There were no significant differences in the demographic data (age, sex),

Appendicitis cases	Group A (pandemic phase- Feb 2020-Jan 2022), n	Group B (Prepandemic phase-Feb 2018-Jan 2020), n	p-value
Appendicitis cases during the 1st year**	167	242	**0.009**
Appendicitis cases during the 2nd year***	208	209	
Total	**375**	**451**	
Total admissions during the 1st year**	974	1972	**<0.001**
Total admissions during the 2nd year***	1294	1939	
Total	**2268**	**3911**	

[Table/Fig-1]: Appendicitis cases during the pandemic and prepandemic period. The table also depicts the total admissions (for all paediatric surgical conditions) during the same period for comparison.
*χ^2 test was used. p-value in bold font indicates statistically significant values.
**1st year in group A corresponds to the period from February 2020 to January 2021 and in group B corresponds to the period from February 2018 to January 2019
***2nd year in group A corresponds to the period from February 2021 to January 2022 and in group B corresponds to the period from February 2019 to January 2020

	Pandemic period (group A) Feb 2020-Jan 2022			Prepandemic period (group B) Feb 2018-Jan 2020		
Month	2020	2021	2022	2018	2019	2020
January	-	19	22	-	20	18
February	16	21	-	23	21	-
March	12	13	-	17	18	-
April	17	12	-	19	16	-
May	12	11	-	18	20	-
June	12	18	-	25	15	-
July	13	19	-	23	18	-
August	13	22	-	20	17	-
September	17	18	-	23	16	-
October	13	16	-	11	20	-
November	13	18	-	20	19	-
December	10	18	-	20	14	-
Total	375			451		

[Table/Fig-2]: Monthly appendicitis cases during the pandemic (February 2020 to January 2022) and prepandemic (February 2018 to January 2020) periods.



[Table/Fig-3]: Chart depicting the COVID-19 waves (February 2020 to January 2022), denoting the number of new COVID-19 cases reported in the state of Kerala.

duration of symptoms, and total and differential leucocyte counts between the two groups [Table/Fig-4]. During the pandemic period, 48 cases (13%) were managed by conservative/non surgical means, whereas only 10 cases (2%) were managed so during the prepandemic phase (p-value <0.0001) [Table/Fig-5]. Group A (pandemic period) had 209 cases (56%) of simple appendicitis and 163 cases (44%) of complicated appendicitis; whereas Group B (prepandemic period) had 272 cases (60%) of simple appendicitis and 178 cases (40%) of complicated appendicitis [Table/Fig-6-8]. The postoperative complication rates were comparable between the two groups [Table/Fig-9].

Subgroup Analysis of group A comparing children with active/recent COVID-19 infection (Subgroup A1) vs the rest (Subgroup A2)-showed a significant delay in presentation (increased duration of symptoms) in Subgroup A1. Similarly, a significant increase in

Parameters		Group A (Pandemic phase)	Group B (Prepandemic phase)	p-value
Age	Mean±SD (years)	8.8±2.4	8.7±2.6	0.27#
	Median (years)	9.1	9.1	
	Range	17 days to 12.9 years	1.1 years to 12.9 years	
Sex	Male/Female	236/139	280/171	0.80##
Duration of symptoms	Mean±SD (days)	2.7±2.1	2.8±2.6	0.55#
	Median (days)	2	2	
	Range (days)	1-14	1-15	
Ultrasound scan**	Positive/negative	284/48	290/90	**0.002**##
Leucocyte count (cells/ml)	Mean±SD	16173±5769	15824±5298	0.36#
	Median	15400	15500	
	Range	1100-35200	2000-38000	
Polymorphs (% of WBC)	Mean±SD	76±12	77±11	0.06#
	Median	79	80	
	Range	23-97	32-95	

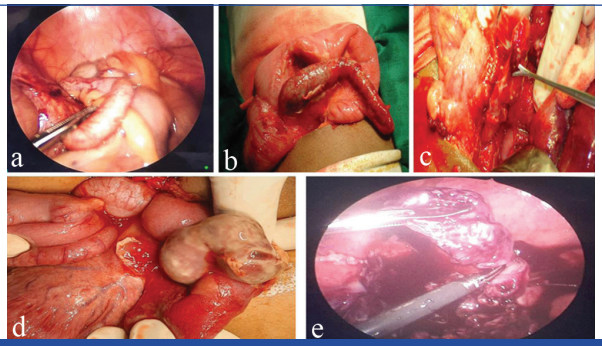
[Table/Fig-4]: Demographics, clinical features and investigations.
**Ultrasound scan was performed in 332/375 in group A and 380/451 cases in group B
#t-test was used; ##X^2 test was used; p-value in bold font indicates statistically significant values

Parameters		Group A (Pandemic phase)	Group B (Prepandemic phase)	p-value
Duration of hospital stay	Mean±SD (days)	6.1±3.2	6.1±3.5	0.87#
	Median (days)	5	5	
	Range (days)	2-31	2-35	
Type of appendicitis	Complicated/Simple appendicitis	163/209	178/272	0.22##
Treatment	Conservative/ surgical	48/327	10/441	**<0.001**##
Complications	n	53	67	0.77##

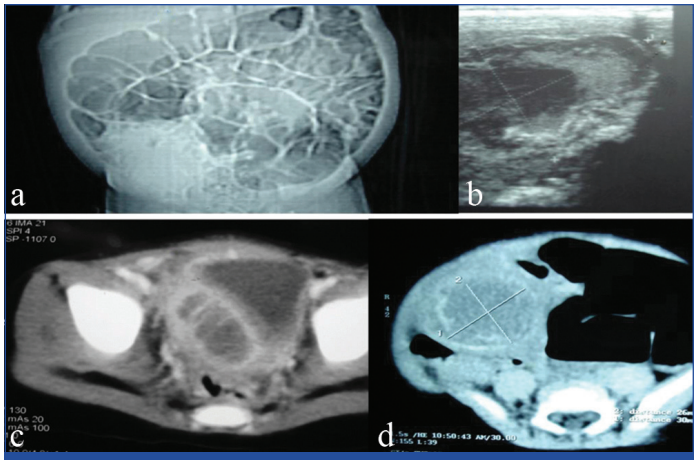
[Table/Fig-5]: Duration of hospital stay, type of appendicitis, treatment and complications.
#t-test was used; ##X^2 test was used; p-value in bold font indicates statistically significant values

Parameters		Group A (pandemic phase)		Group B (prepandemic phase)	
Simple appendicitis	Acute Appendicitis (AA)	197	209 (56%)	252	272 (60%)
	AA with early mass formation	12		20	
Complicated appendicitis	Appendicular abscess with peritonitis	48	163 (44%)	23	178 (40%)
	Gangrenous appendicitis	28		49	
	Perforated appendicitis	87		106	
Non appendicitis*	NA	3		1	
	Total	**375**		**451**	

[Table/Fig-6]: Type of appendicitis.
*Macroscopically and histopathologically negative for appendicitis. Values are presented as n, n(%)



[Table/Fig-7]: a) Simple appendicitis; b) appendicitis with abscess; c) perforated appendicitis with abscess and peritonitis; d&e) gangrenous appendicitis.



[Table/Fig-8]: Radiological images of complicated appendicitis: a) X-ray image of an appendicular abscess; b) Ultrasound image showing appendicular abscess; c) Computed tomography image of perforated appendicitis with pelvic abscess; d) Computed tomography images showing appendicular abscess in the right paracolic space extending to the subhepatic region, following perforated appendicitis.

Post-operative complications	Group A (pandemic phase)* n (%)	Group B (prepandemic phase)** n (%)
Nil	274 (83.8%)	374 (84.8%)
Surgical site infection/ wound dehiscence	28 (8.6%)	46 (10.4%)
Intestinal obstruction	10 (3.1%)	10 (2.3%)
Residual collection	13 (4%)	9 (2%)
Faecal fistula	1 (0.3%)	2 (0.5%)
Sepsis	1 (0.3%)	0

[Table/Fig-9]: Postoperative complications.
*327 cases underwent surgery in group A; **441 cases underwent surgery in group B

Parameters		Subgroup A1, n=34	Subgroup A2, n=341	p-value
Age	Mean±SD (years)	8.8±2.6	8.8±2.4	0.97#
	Median (years)	9.7	9.1	
	Range	2.8-12.5 years	17 days to 12.9 years	
Sex	Male/Female	20/14	216/125	0.6##
Duration of symptoms	Mean±SD (days)	3.7±2.8	2.6±2	**0.003**#
	Median (days)	3	2	
	Range (days)	1-12	1-14	
Duration of hospital stay	Mean±SD (days)	7.1±4.3	6±3.1	0.06#
	Median (days)	6	5	
	Range (days)	2-20	2-14	
Ultrasound scan**	Positive/negative	26/8	258/40**	0.11##
Leucocyte count (cells/mL)	Mean±SD	13829±4173	16407±5858	**0.01**#
	Median	13850	15500	
	Range	5200-22500	2000-38000	
Polymorphs (% of WBC)	Mean±SD	71±15	76±12	**0.02**#
	Median	77	80	
	Range	39-89	23-97	
Type of appendicitis	Complicated/ simple/ non appendicitis	12/19/3	151/189/1	**<0.001**##
Treatment	Conservative/ surgical	13/21	35/306	**<0.001**##
Postoperative complications	n (%)	3 (14%)	50 (16%)	0.8##

[Table/Fig-10]: Subgroup analysis of group A.
**Ultrasound scan was not done in 43 cases in group A2; #t-test was used; ##X^2 test was used; p-value in bold font indicates statistically significant values

complicated appendicitis and a decrease in the total leucocyte and polymorph count were noted in Subgroup A1 [Table/Fig-10].

There were four cases of suspected appendicitis, managed surgically, which had an alternate diagnosis, three in group A (one case of Meckel's diverticulitis and two cases of MIS-C) and one in group B (case of an ileocaecal mass lesion) [Table/Fig-6]. In addition to this, during the pandemic period, 12 cases were referred from peripheral centers as suspected AA. But clinically, since these cases were not suggestive of appendicitis, they were admitted to the Paediatric Medical Ward. On evaluation, the cases had features of MIS-C and were treated accordingly. These 12 cases were not included in this study.

DISCUSSION

Acute Appendicitis (AA), the most common emergency surgical condition in children retained the status during the COVID-19 pandemic period as well [5,11]. SARS-CoV-2 was first detected late in 2019 and the COVID-19 was declared a pandemic by the World Health Organisation (WHO) on 11 March 2020 [13]. The global pandemic resulted in fears about hospitalisation, a chance for cross-infection, prolonged stay in the ED, delays in treatment due to disease control measures, and other logistical restrictions. These factors had a significant impact on most non COVID-19 conditions like AA with possible adverse outcomes [14].

In a study published in 2021, which was based on 118 paediatric appendicitis in Turkey, Ulusoy O et al., reported that there was a 31% decrease in the number of AA cases during the pandemic period [5]. A large retrospective multicentre study done in Israel by Tankel et al., in 2019-2020 on 519 adult appendicitis, demonstrated a significant reduction in the number of AA cases during the pandemic period and the authors consider the reason for the same to be a successful treatment of appendicitis by conservative/non surgical measures on an outpatient basis at home [15]. La Pergola et al. conducted an Italian multicentre study in 2020 and noticed a reducing trend in the number of appendicitis in the very high pandemic diffusion areas, but the results were not significant [8]. Authors found a significant reduction in AA during the first year of the pandemic. The numbers reached prepandemic levels during the second year of the pandemic, even though Kerala had comparatively larger COVID-19 waves during this period. Once the fear and apprehension of the pandemic decreased along with the relaxation of lockdown and quarantine measures, the population and healthcare system adapted to the 'new normal'.

Various studies report that prolonged duration of symptoms and delayed presentation to the Emergency Department results in an increased incidence of complicated appendicitis cases, increased duration of hospital stay, and higher complication rates due to appendicitis [5,16-18]. A retrospective study of 118 patients done by Ulusoy O et al., found that during the pandemic period, the incidence of complicated appendicitis increased from 14% to 33%, and hospital stay was prolonged by 44% [5]. Yet another study conducted in Israel, based on 161 cases from three medical centers in 2020, Snapiri O et al., show an increase in complication rates from 11% in the prepandemic period to 22% in the pandemic period [16]. Place R et al., found that perforated appendicitis increased from 19% during the prepandemic period to 39% during the pandemic period in a study conducted in North Virginia, US in 2020 [4]. The reason for this increase is presumed to be due to the prolonged duration of symptoms and delay in presentation caused by the stay-at-home orders, isolation/quarantine measures, and fear of COVID-19 contamination in hospitals [5]. On the contrary, Percul C et al., found no significant increase in complicated appendicitis during the pandemic period in a study conducted in Argentina in 2021 [19]. Similarly, authors found no significant difference in the duration of symptoms, complicated appendicitis, complications related to appendicitis, or the duration of hospital stay. However, authors found a significant delay in presentation and an increase in complicated appendicitis among children with active/recent COVID-19 infection when compared with the rest of the study group during the pandemic period [Table/Fig-11] [5,17].

Classic diagnostic methods in diagnosing appendicitis include history, clinical examination, and laboratory analysis. Radiological imaging and scoring systems are used based on individual cases and institutional protocols. Ulusoy O et al., report that the diagnostic sensitivity of USS was higher during the pandemic period (84%) and secondary findings of appendicitis like appendicoliths, free fluid, and periappendiceal fat stranding increased during this period [5]. And similar results were found in the present study as well. Tullie L et al., recommended routine ultrasound imaging in children with suspected appendicitis, as terminal ileitis which can be a manifestation of COVID-19 can mimic appendicitis and the same can be managed with non operative means [20]. In a United Kingdom (UK) study on 172 cases of AA by Sheath C et al., found significantly higher inflammatory markers (total leucocyte count and C-reactive protein) in the pandemic period [17]. Authors did not find a similar increase during the pandemic period. However, the total leucocyte count and polymorph counts were significantly

Parameters		Ulusoy O et al., Turkey, 2020 [5]			Sheath C et al., UK, 2020 [17]			Present study		
		Pandemic	Prepandemic	p-value	Pandemic	Prepandemic	p-value	Pandemic period	Prepandemic period	p-value
n		48	70	-	18	10	**0.03**	375	451	-
Male:female (%)		33: 15 (69: 31%)	43: 27 (61: 39%)	0.415	13: 5 (72: 28%)	6: 4 (60: 40%)	0.5	236: 139 (63: 37%)	280: 171 (62: 38%)	0.8
Age (Mean±SD years)		10.1±4.1 years	11.7±3.9 years	0.058	3-15 years	5-15 years	0.67	8.8±2.4 years	8.7±2.6 years	0.27
Duration of symptoms (Mean±SD hours)		44.8±43.7 hours	22.6±23.5 hours	**<0.001**	1-14 days	1-2 days	**<0.01**	2.7±2.1 days	2.8±2.6 days	0.55
Simple appendicitis, n (%)		27 (62.8%)	50 (83.3%)	**0.025**	14 (78%)	9 ((0%)	0.6	209 (56%)	272 (60%)	0.22
Complicated appendicitis n (%)		16 (37.2%)	10 (16.7%)	-	4 (22%)	1 (10%)	-	163 (44%)	178 (40%)	-
Treatment	Surgical, n	48	70	-	17	10	-	327 (87.2%)	441 (97.8%)	**<0.0001**
	Conservative, n	0	0	-	1	0	-	48 (12.8%)	10 (2.2%)	-
Postoperative complication n (%)		2 (4.2%)	3 (4.3%)	0.935	0	0	-	53	67	0.77
Hospital stay (Mean±SD hours)		69.8±56.2 hours	48.4±33.2 hours	**0.017**	2-10 days	1-6 days	0.29	6.1±3.2	6.1±3.5	0.87
Negative Appendectomy rate, n (%)		10 (14.3%)	5 (10.4%)	0.475	0	0	-	3	1	-

[Table/Fig-11]: Comparison of Clinical profile of paediatric appendicitis in different series [5,17].
p-value in bold font indicates statistically significant values

lower in the subgroup of children with AA who had active or recent COVID-19, when compared with the rest.

The pandemic, COVID-19 turned out to be a major decision making factor in the management of paediatric AA. Children with active COVID-19 infection often presented with gastrointestinal symptoms like abdominal pain, diarrhoea, ileus, mesenteric adenopathy with terminal ileitis mimicking appendicitis (pseudoappendicitis) and a surgical abdomen with or without very minimal flu symptoms [14,21-27]. Paediatric COVID-19 infection can cause shock, fever, dysregulated immune response with host tissue damage, and hyperinflammation resulting in MIS-C. The CDC issued a case definition for MIS-C including a severe illness requiring hospitalisation in individuals <21 years of age and presenting with fever for ≥24 hours, laboratory evidence of inflammation, multisystem (≥2) organ involvement, and a recent SARS-CoV-2 infection or exposure within four weeks prior to the onset of symptoms. Children with MIS-C most often require intensive care, as many of them develop multi-organ dysfunction, with gastrointestinal (92-95%) and cardio-vascular (80%) being the most common systems affected [28,29]. Malhotra A et al., suggest the possibility that paediatric appendicitis could be a 'Gut reaction' (hyper-inflammatory complication) of COVID-19 infection [24]. It has been postulated that COVID-19 may cause AA by: (i) causing lymphoid hyperplasia leading to inflammation and ischemia; (ii) Angiotensin-Converting Enzyme receptor-2 (ACE-2 receptor), which is the functional receptor for COVID-19 is expressed in the glandular cells of the appendix as with other areas of the gut [30,31]. The present study had two cases operated for suspected appendicitis which had no features of appendicitis peroperatively and further evaluation proved the diagnosis to be MIS-C. As awareness of the condition increased and with focused evaluation, the authors were able to correctly diagnose 12 cases of MIS-C, which were originally referred to us as suspected AA for surgical management.

Appendectomy is the classical standard treatment of choice for AA. However, conservative management with antibiotics has gained popularity in recent years, especially following reports of successful medical treatment of simple appendicitis in adults [32-34]. Even though evidence for the same is limited in the paediatric population, there has been a recent shift towards conservative/ non surgical treatment for non complicated appendicitis [14,17,35,36]. This trend is much more evident and has particular significance during the pandemic phase and even beyond. These factors possibly influenced decision making in suspected appendicitis cases, and hence the relatively significant increase in the number of conservatively managed cases of suspected appendicitis during the pandemic phase in the present study as well.

Limitation(s)

This is a single-institution study and was done retrospectively. A multi-institutional prospective study should provide a more accurate analysis.

CONCLUSION(S)

Globally, the pandemic affected all aspects of health services, with a significant decrease in the number of cases in the Paediatric Emergency Department as was evident from the lower number of paediatric appendicitis cases during the first year of the pandemic. Even though there was no overall delay in the presentation of appendicitis or increase in complications between the pandemic phase and prepandemic phase, children affected with recent/active COVID-19 infection presented late to the surgeon. Similarly, complicated appendicitis cases were significantly higher in children with recent/active COVID-19 infection, when compared with other children during the pandemic phase. The pandemic had an impact on management protocols, with conservative treatment gaining popularity in children with uncomplicated appendicitis.

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PLAGIARISM CHECKING METHODS: [Jain H et al.]
- Plagiarism X-checker: Dec 07, 2022
- Manual Googling: Feb 14, 2023
- iThenticate Software: Mar 31, 2023 (10%)

ETYMOLOGY: Author Origin

AUTHOR DECLARATION:
- Financial or Other Competing Interests: None
- Was Ethics Committee Approval obtained for this study? Yes
- Was informed consent obtained from the subjects involved in the study? NA
- For any images presented appropriate consent has been obtained from the subjects. NA

Date of Submission: **Dec 05, 2022**
Date of Peer Review: **Feb 28, 2023**
Date of Acceptance: **Apr 01, 2023**
Date of Publishing: **May 01, 2023**