ORIGINAL ARTICLE

IMPACT OF COVID 19 PANDEMIC ON PRESENTATION, TREATMENT AND OUTCOME OF PAEDIATRIC SURGICAL EMERGENCIES

Sajjad Ali, Muhammad Asim Khan, Inayat ur Rehman, Muhammad Uzair

Department of Paediatric Surgery Khyber Teaching Hospital Peshawar-Pakistan

Background: During the current pandemic it was observed that factors such as lockdown, campaign to discourage unnecessary visits to hospitals, inadequate clinical evaluation and investigations culminated in serious complications of common paediatric surgical conditions. This observation led to the basis of the idea to statistically and objectively evaluate the impact of the current pandemic on paediatric surgical emergencies. **Methods**: Data of paediatric surgical emergencies during March-May 2019 and March-May 2020 was collected from database of the paediatric surgical department of Khyber Teaching Hospital Peshawar and two groups were constituted, i.e., Pre COVID and COVID groups respectively. These two groups were compared for the number of emergency admissions, the number of emergency surgeries, complications at the time of presentation and surgical treatment given. Data were analysed in SPSS version-22 and *p*-value after Yates correction was generated were necessary to see if the difference was statistically significant ($p<0.05$). **Results:** There were 47.8% fewer emergency admissions and a 77.45% reduction in the number of emergency surgeries done in COVID time as compared to the Pre COVID time. Similarly, the number of perforated appendicitis and complicated intestinal obstruction was significantly higher than expected in COVID group. Same was the difference in the number of patients requiring extensive surgery between the groups. **Conclusion:** Delay in presentation, complications and requirement for extensive surgical procedure are the indirect impacts of the current pandemic on emergency surgical conditions of children.

Keywords: COVID 19; Pandemic; Paediatric; Emergency

Citation: Ali S, Khan MA, Rehman I, Uzair M. Impact of COVID 19 Pandemic on presentation, treatment and outcome of paediatric surgical emergencies in a tertiary care hospital. J Ayub med Coll Abbottabad 2020;32(Suppl. 1):621–4.

INTRODUCTION

Ever since declared a global emergency, COVID-19 has transformed everything from the life of individuals to societies and norms of departments to governments.[1]. No less than economic perspective, the fabric of health system has been badly disrupted by the COVID 19 around the globe leaving no country an exception.[2] Apart from the disease challenging the public health directly by the dent of its effect and taking lives, the collateral damage of this catastrophe is interrupting the delivery of surgical services to an extant beyond measures.[2,3] The justified fear of this rapidly spreading virus and the strategies to confine it have transformed and shrunken surgical practice. In pandemics changing the priorities is part of the plan and so happened in COVID 19 pandemic. The all of sudden huge demand of equipment, space and personnel deprived the surgical capacity to a level where essential surgical delivery is not possible. This change is certainly affecting surgical conditions of patients everywhere on both short- and long-term bases.[3]

The incidence of COVID-19 in children is significantly less and they hardly show the severe symptoms experienced by adults.[4,5] But pandemics affect child health in different ways. Acute and chronic surgical conditions of children deteriorate.[6] The so far practised policy of lockdown when no vaccine is available has momentarily reshaped the health systems and all the resources are converged to contain of the virus and treat its affectees. Hospitals have waved off elective services which will be a challenge in near future as prognostic features of chronic ailments will be the next challenge.[7,8]

As far as the challenges to emergency surgical care are concerned even the prosperous countries like the United States are facing worse problems in delivering emergency surgical services. They are analysing their policies to address the complicating acute surgical conditions on daily basis.[9]

As a natural consequence lockdown, phobia of contracting virus both on behalf of parents and health care workers, paediatric surgical patients are getting neglected and the ultimate fate is worsening of the conditions that would otherwise need less time and resources to deal with. An article published in the most recent issue of the journal of paediatric urology has highlighted the same issue and its consequences.[10] This study is an attempt to highlight the impact of COVID-19 pandemic on emergency paediatric surgical services in terms of complications attributable to any delay in presentation or treatment secondary to the pandemic. The author hopes that the informative data will not just help the authorities to consider it while planning to combat this pandemic but will also be a useful reference in the future, not only for paediatric surgery, but also for others, if another pandemic creates panic in health system.[11]

MATERIAL AND METHODS

This comparative analysis was done on data from the Department of Paediatric Surgery, Khyber Teaching Hospital Peshawar after formal ethical approval from institutional review and ethical approval board. The study included all emergency admissions and surgeries done in the department of paediatric surgery during the current pandemic from March to May 2020 labelled as COVID group. For comparison purpose data of total no of emergency admissions and surgeries done in March to May 2019 was retrieved and tabulated as Pre COVID group. The two groups were compared in terms of the number of admissions and surgeries to assess the indirect impact of the pandemic on the number of paediatric surgical patients seeking health care in the same population. Further impact on the natural course of surgical conditions was evaluated by taking acute appendicitis and intestinal obstruction (commonest paediatric surgical emergencies) as samples. In case of acute appendicitis and intestinal obstructions the number of patients who had complications at presentation was separately noted down. On the basis of these values we calculated the expected values of these complications in COVID group. Then 2×2 contingency tables were created and chi square statistics were applied and *p*-value was generated. *p*-value was considered after Yates correction to know if the difference between the two groups in terms of number of complicated presentations was statistically significant. Value of less than 0.05 was considered significant.

RESULTS

Number of admissions from March to May 2019 (Pre COVID) was 707 which dropped to 369 from March to May 2020 (COVID group). We calculated the percentage reduction for the expected admissions in COVID times and found that there were 47.8% fewer admissions as compared to Pre COVID group (Table-1). Similarly, the number of surgeries done were 579 in the Pre COVID group and only 130 in COVID group depicting a drop of 77.45% during COVID 2020 Pandemic (Table-2). Among complications of common paediatric surgical conditions, perforated appendix was found in 8 cases out of 120 in Pre COVID group against 23 out of 42 in COVID group. In Pre COVID group, there were 103 cases of intestinal obstruction out of which only 15 were complicated. Complicated intestinal obstruction was found in 15 patients out of total 35 in COVID group (Table-3). To know whether this difference in complications was significant or not, we calculated the number of the expected perforated appendix from the data of 2019 which was then compared with the observed data of 2020 and then chi-square test was applied and *p*-value after Yates correction was found to be 0.001 which is significant (Table-4). Same was done for the cases of complicated intestinal obstruction as well and we found that this difference too was statistically significant (Table-5). Regarding the impact on the management of appendicitis and intestinal obstruction, we found that exploratory laparotomy had to be done for a significantly higher number of patients with complicated appendix in COVID group (P) when compared with Pre COVID group where most of the patients were treated by traditional appendectomy incision. Also, a significantly high rate of exploration was noted for intestinal obstruction in COVID group (P) against the Pre COVID group where most of the intestinal obstructions were treated conservatively (Table-6).

Table-1: Total number of admissions done in Pre COVID versus COVID time

	2019 (Pre COVID)	2020 (COVID)	Reduction during COVID	% Reduction during COVID
March	234	130		
April	273	126		
May	200	113		
Total (March, April, May)	707	369	338	47.8%

Table-2: Total number of surgeries done in Pre COVID versus COVID time

Surgeries	2019 (Pre COVID)	2020 (COVID)	Reduction during COVID	% Reduction during COVID
March	197	40		
April	185	47		
May	197	43		
Total (March, April, May)	579	130	449	77.45 %

Table-3: Comparison of Complicated appendicitis and Intestinal Obstruction between Pre COVID & COVID groups

	2019(Pre COVID) n=120	**2020 (COVID) n=42**
Perforated Appendix	08	23
Non-Perforated	112	19
Total	120	42
Complicated Intestinal obstruction	15	15
Non-Complicated	88	20
Total	103	35

Table-4: Perforated appendicitis in Pre COVID VS COVID time.

	Observed	Expected	Chi square	*p*-value	*p*-value (after Yates correction)
Perforated	23	3	11.063	0.0008	0.001
Non-Perforated	19	39			

Table-5: Complicated Intestinal obstruction during Pre COVID VS COVID time.

	Observed	Expected	Chi square	*p*-value	*p*-value (after Yates correction)
Complicated Intestinal obstruction	15	5	7.0	0.008	0.017
Non-complicated Intestinal obstruction	20	30			

Table-6: Impact of Pandemic on the treatment of appendicitis and intestinal obstruction; Comparison between Pre COVID and COVID groups

	2019(Pre COVID)	2020 (COVID)	*p*-value
Appendectomy	120	42	
Via routine appendectomy incision	116 (96.66%)	30 (71.42%)	
Via transverse laparotomy incision	4 (3.44%)	12 (28.57%)	0.008
Intestinal Obstruction	103	35	
Conservative	88 (85.45%)	06 (17.14%)	0.00001
Exploration (total)	15 (14.56%)	29 (82.85%)	

DISCUSSION

In our study there were 338 (47.8%) fewer emergency admissions during March-May 2020 (COVID group) than were expected (Pre COVID). More or less but a significant reduction in is noticed everywhere in number of paediatric medical or surgical emergency patients seeking medical/surgical attention. In Italy a 73–88% reduction was seen as compared to same period in 2019.[11] Similarly, in this study 75.45% fewer emergency surgeries were done in as compared to previous year. This implies that fewer children were brought to hospitals for emergency concerns. Consequently, there were chances that these emergencies might have complicated the prognosis and affected the treatment plan. The effect of delaying surgery should always be kept in mind during pandemics as depicted in a recent issue of European Urology.[12] A. Spinelli, in his recent article highlighted the consequences of compromised access to hospitals resulting in deterioration of acute surgical conditions.[13] We experienced the same. Among 42 patients of acute appendicitis who presented during the pandemic, 23 were perforated in Contrast to the Pre COVID group where the figure was just 08 out of 120 children with acute appendicitis (Table-3). Chi square test followed by Yates correction yielded a statistically significant p value of 0.001 suggesting either delay in presentation or provision of emergency health care services. Most of these patients reported to hospitals 3–4 days after the onset of symptoms while this is 1–2 days in routine. In a study by Scher KS, among 335 operated for acute appendicitis, 108 (32%) were perforated and statistically attributable to a delay of more than 2.5 days.[14] Similarly, in our study among 35 children who came with intestinal obstruction, 15 were already complicated. Among these 35 patients 29 needed laparotomy including those 15 with complications like gangrene and perforation due to delayed presentations. Majority of these patients (79%) were admitted 2 days after the onset of symptoms. In pre COVID group there were 103 cases of intestinal obstructions in which only 15 were perforated or gangrenous obstruction. Here the mean time of presentation was 0–2 days since symptoms were developed. As shown in table-6, the rise in number of complicated cases during COVID times after Yates correction was statistically significant (0.017). Late presentation was also a recognized factor complicating intestinal obstruction in work done by Hussain Z.[15] Similarly, Chiedozi LC, in his study concluded late admission due to any cause as an important contributory cause for complications in intestinal obstruction and risk for indicated exploration.[16]

In our study, during Pre COVID period, only 4 (3.44%) out of children with appendicitis needed formal right upper transverse laparotomy incision while rest 96.66% were operated via our favoured Lanz incision. On the other hand, in COVID times saw a prominent increase in number of children requiring right upper transverse laparotomy incision for management of appendicitis statically shown by *p*-value of 0.008. Early presentation and more children seeking surgical advice might be the reason for low complicated presentations.[16] A high rate of exploratory laparotomy was also noticed by Dun EL, in his study and attributed it to perforation secondary to delayed presentation.[17] High rate of exploratory laparotomy in COVID group (82.85%) as compared to that in Pre COVID (14.56%) in cases of intestinal obstruction due to more complicated and delayed presentation is also consistent with findings in literature.[18]

CONNCLUSION

Pandemics not just threaten the health and lives of people but the collateral effect on all aspects of health becomes un-measurable where economic crises arise, lock down and social distancing is practiced, public transport is banned. Though the policy of restricting the health services affects elective services only, emergency paediatric surgical services do not remain unaffected due to the very same reasons. The mutual fear of health care workers and parents from contracting COVID-19 infection in hospitals further increases the chances of neglect. Consequently, the number of paediatric emergency surgical patients reaching hospitals is too low in current pandemic. What is happening to those who do not manage to reach hospital is not known. Those who are brought are late, mostly complicated and require more extensive and risky surgical procedures than would have been required had they been to hospital in time.

RECOMMENDATIONS

Collateral impact of pandemic on health system and delivery of emergency health services should be part of policy to contain and combat pandemic. There should be clear guidelines for in time dealing of emergency medical and surgical conditions of both children and adults. More than fear of contracting illness parents should know that the risks of delayed access to hospital for emergency conditions can be way higher than those of pandemic itself. Since COVID is still there, governments and public health bodies should consider the alarming consequences of their policies and review them in best interest of health system and ultimately human lives.

Ethical approval: Formally granted by the institutional Review and Ethical Board

Conflict of interest: Nil

Financial support/grant: Nil

AUTHORS' CONTRIBUTION

SA: Conceptualization, drafting, data and proof reading. MAK: Data collection, analysis, introduction. IUR: Literature search, drafting, proof reading. MU: Data collection, analysis, proof reading.

REFERENCES

1. Stahel PF. How to risk-stratify elective surgery during the COVID-19 pandemic? Patient Saf Surg 2020;14:8.
2. Diaz A, Sarac BA, Schoenbrunner AR, Janis JE, Pawlik TM. Elective surgery in the time of COVID-19. Am J Surg 2020;219(6):900–2.
3. Søreide K, Hallet J, Matthews JB, Schnitzbauer AA, Line PD, Lai PB, *et al*. Immediate and long-term impact of the COVID-19 pandemic on delivery of surgical services. Br J Surg 2020;10:11670.
4. Cruz AT, Zeichner SL. COVID-19 in children: initial characterization of the pediatric disease. Pediatrics 2020;145(6):e20200834.
5. Lee PI, Hu YL, Chen PY, Huang YC, Hsueh PR. Are children less susceptible to COVID-19? J Microbiol Immunol Infect 2020;53(3):371–2.
6. Mukhtar S. Preparedness and proactive infection control measures of Pakistan during COVID-19 pandemic outbreak. Res Soc Adm Pharm 2020;S1551–7411(20):30373–9.
7. Gilbert M, Dewatripont M, Muraille E, Platteau JP, Goldman M. Preparing for a responsible lockdown exit strategy. Nat Med 2020;26(5):643–4.
8. Willan J, King AJ, Djebbari F, Turner GD, Royston DJ, Pavord S, *et al*. Assessing the Impact of Lockdown: Fresh Challenges for the Care of Haematology Patients in the COVID-19 Pandemic. Br J Haematol 2020;189(6):e224–7.
9. Cheeyandira A. The effects of COVID-19 pandemic on the provision of urgent surgery: a perspective from the USA. J Surg Case Rep 2020;2020(4):rjaa109.
10. Cini C, Bortot G, Sforza S, Mantovani A, Landi L, Esposito C, *et al*. Paediatric urology practice during COVID-19 pandemic. J Pediatr Urol 2020;16(3):295–6.
11. Lazzerini M, Barbi E, Apicella A, Marchetti F, Cardinale F, Trobia G. Delayed access or provision of care in Italy resulting from fear of COVID-19. Lancet Child Adolesc Health 2020;4(5):e10–11.
12. Stensland KD, Morgan TM, Moinzadeh A, Lee CT, Briganti A, Catto JW, *et al*. Considerations in the triage of urologic surgeries during the COVID-19 pandemic. Eur Urol 2020;77(6):663–6.
13. Spinelli A, Pellino G. COVID-19 pandemic: perspectives on an unfolding crisis. Br J Surg 2020;107(7):785–7.
14. Scher KS, Coil JJ. Appendicitis: factors that influence the frequency of perforation. Sout Med J 1980;73(12):1561–3.
15. Hussain Z, Sheikh KA, Lone R, Arif S, Rasool A, Mudassir S, *et al*. Small bowel obstruction in children–A surgical challenge. Surgeon 2006;2(4):5.
16. Chiedozi LC, Aboh IO, Piserchia NE. Mechanical bowel obstruction: Review of 316 cases in Benin City. Am J Surg 1980;139(3):389–93.
17. Dunn EL, Moore EE, Elerding SC, Murphy JR. The unnecessary laparotomy for appendicitis-can it be decreased? Am Surg 1982;48(7):320–3.
18. Janik JS, Ein SH, Filler RM, Shandling B, Simpson JS, Stephens CA. An assessment of the surgical treatment of adhesive small bowel obstruction in infants and children. J Pediatr Surg 1981;16(3):225–35.

Submitted: July 26, 2020	*Revised: September 24, 2020*	*Accepted: November 8, 2020*

Address of correspondence:

Dr Sajjad Ali, Department of Paediatric Surgery, Khyber Teaching Hospital, Peshawar-Pakistan

Cell: +92 332 994 1534

Email: sajjadbuneri@gmail.com