



## Original Article

# Management of paediatric surgical patients during the COVID-19 pandemic: Our challenges

Alam MS<sup>1</sup>, Basher AKMK<sup>2</sup>, Khan JG<sup>3</sup>, Huque MM<sup>4</sup>, Hossain T<sup>5</sup>, Islam S<sup>6</sup>, Rahman S<sup>7</sup>,  
Hasina K<sup>8</sup>, Hanif TA<sup>9</sup>, Huq A<sup>10</sup>

### Abstract:

**Purpose:** Here we describe the challenges and procedures adopted to ensure safe paediatric surgery services during the COVID-19 pandemic at the paediatric surgery department in non-Covid-19 wing of Dhaka Medical College Hospital-1.

**Materials and Methods:**

**Design:** Retrospective study.

**Setting:** Department of paediatric surgery in non-Covid-19 wing of Dhaka Medical College Hospital-1, a tertiary care academic medical center in Dhaka, Bangladesh.

**Participants and duration:**

All patients who were admitted in the department of paediatric surgery in Dhaka Medical College Hospital-1 from March 1 through June 30, 2020.

**Methods:** We identified patients with or without a rRT-SARS-CoV-2 PCR receiving care at the department of paediatric surgery. The healthcare professionals were trained to clean, disinfect, use of PPEs, and other wastes were disposed of as per waste management protocols.

**Data collection & analysis:** Patient data were manually abstracted from the medical record for evaluation. Responses were analysed using Microsoft Excels & SPSS, and presented as categorical data and percentages.

**Main outcome measures:** We describe patient characteristics including demographics, presenting symptoms, type of treatment (Surgery vs Non Surgery), outcomes (morbidity & mortality), hospital stay, and distance travelled for treatment.

**Results:** A total of 320 paediatric surgical patients were included in this study, among all patients about 66.87% patients were male child and 79.06% patients required surgeries. There were 5 patients with confirmed COVID-19, who were transferred to the Covid-Surgical unit. During this period, there were 4 (1.25%) children who died due to non-COVID related causes. In surgical group only 24(7.5%) patients developed postoperative complications. Length of hospital stay of 44 (13.75%) of non-surgical patients were less than 72 hours, whereas 141 (40.06%) of surgical patients were more than 72 hours. Majority of patients of both groups travelled more than 100 km distance for treatment.

**Conclusions:** This corona crisis has provided an opening for rational health care and formulating global policies. So that in future such pandemics can be tackled more carefully and consistently with advancing knowledge and better preparation.

**Key Words:** Paediatric surgical patients, COVID-19 pandemic.

1. Prof. Mohammed Shadrul Alam, Professor of Paediatric Surgery, Mugda Medical College Hospital, Dhaka, Bangladesh
2. Dr. AKM Khairul Basher, Associate Professor, Department of Paediatric Surgery
3. Dr. Jaglul Gaffer Khan, Associate Professor, Department of Paediatric Surgery
4. Dr. Muhammed Moinul Huque, Associate Professor, Department of Paediatric Urology
5. Dr. Tahmina Hossain, Associate Professor, Department of Paediatric Surgery
6. Prof. Dr. Shahnoor Islam, Professor, Department of Paediatric Surgery
7. Prof. Dr. Samidur Rahman, Professor, Department of Paediatric Surgery
8. Prof. Dr. Kaniz Hasina, Professor, Department of Paediatric Surgical oncology
9. Prof. Dr. Abdul Hanif Tablu, Professor, Department of Paediatric neonatal Surgery
10. Prof. Dr. Ashraf-Ul-Huq, Professor of Paediatric Surgery, Dhaka Medical College Hospital Dhaka.

**Correspondence to:** Prof. Dr. Mohammed Shadrul Alam, Professor of Paediatric Surgery, Mugda Medical College Hospital, Dhaka, Bangladesh.

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## Introduction:

On January 30th, 2020, the World Health Organization acknowledged a novel coronavirus (SARS-CoV-2) as a 'public health emergency of international concern'<sup>1</sup> and later declared coronavirus disease (COVID-19) a pandemic. Although children are supposed to be less susceptible to COVID-19, the true infected rate of children may be understated because some children with asymptomatic and mild infections are unlikely to be tested<sup>2</sup>. The effects of COVID on the hospital healthcare delivery system are thoughtful, and disturbance in the healthcare systems is expected to threaten the healthcare delivery to the most vulnerable paediatric surgical patients. So far, the mechanism of viral resistance for COVID-19 in children and young people is unknown. We need to be concerned about the direct impact of Covid-19 on their physical health, and their surgical conditions.

Paediatric surgical patients are at high risk of exposure to respiratory infections transmissions including COVID-19 and other complications. The significant delay in the diagnosis and treatment of some paediatric surgeries especially emergency ones have to be performed even during the pandemic period which will likely increase post-operative morbidity like pneumonia, hospital resource use and mortality rates. The term "urgent surgery" is applied in the specialty of paediatric surgery, is most commonly the surgeries for oncological conditions, intestinal obstruction or obstructive uropathies with risk of sepsis in children. On the other hand, within paediatric urology, one might think of testicular torsions and Wilms tumors as requiring urgent surgery<sup>3</sup>.

Apart from acute surgical emergencies, there are some surgical conditions that require timely interventions or else a delay can be detrimental to a child's health, e.g. orchiopexy is best performed before 1 year of age to decrease the risk of infertility and testicular malignancy<sup>4</sup>. Difficult decisions are being made about how best to protect paediatric surgical patients from the direct and indirect consequences of COVID-19. So, the paediatric surgeons of Dhaka Medical College Hospital (DMCH), are all going to do something for their patients during this pandemic time with the principle to know yourself, know your enemy, and take care of yourself as well as your paediatric surgical patients.

This study highlights the challenges and procedures adopted to ensure safe paediatric surgery services

during corona crisis at Dhaka Medical College Hospital. During the COVID-19 pandemic Dhaka Medical College Hospitalis serving as the largest Covid-19 Medical wing (DMCH-2 Building), Covid-19 surgical wing with separate OT complex (Burn unit Building), Non-Covid-19 wing (DMCH-1 Building) in Bangladesh. Here we describe our experience in surgical decision-making during the COVID-19 pandemic at the paediatric surgery department in non-Covid-19 wing of Dhaka Medical College Hospital-1.

## Materials and methods:

**Design:** Retrospective study.

**Setting:** Department of paediatric surgery in non-Covid-19 wing of Dhaka Medical College Hospital-1, a tertiary care academic medical center in Dhaka, Bangladesh.

**Participants and Duration:** All patients who were admitted in the department of paediatric surgery in Dhaka Medical College Hospital-1 from March 1 to June 30, 2020.

**Methods:** We identified patients with or without a rRT-SARS-CoV-2 PCR receiving care at the department of paediatric surgery. World Federation Association of Paediatric Surgeons (WOFAPS) and the American College of Surgeons (ACS), had created their own guidelines for COVID-19 for the paediatric surgeons of all over world.<sup>5, 6</sup> So far this was thought to be a general guideline to be followed. The COVID-19 crisis had set into motion a series of essential changes in the hospital delivery of services including the paediatric surgery department. However, we made our local departmental guidelines considering these two guidelines plus our national guidelines depend on our local available resources, facilities, supply and other logistics with the following guiding principles:

- The goal was to provide timely surgical care to children with emergent and urgent paediatric surgical issues while optimizing patient care resources and preserving the health of caregivers.
- There was no substitute for sound surgical judgment.
- Thermal screening was done at the entrance of department.
- Only essential staffs were on duty with all other non-essential staffs were stayed at home.
- All the patients were screened with a series of questions about history of fever, cough, shortness of breath, chills, sore throat, loss of smell and

taste, diarrhea and headache or travel history to pandemic or contact with COVID positive person.

- The stay of patients was kept as short as possible.
- Daily disinfection of floor and hardware of the department was carried out.
- The confirmed cases were shifted to corona isolation Unit/ Hospital.
- All OT tables and surfaces should be cleaned with alcohol-based liquids/sodium hypochlorite 1000 ppm and treated with hydrogen per oxide after each use.
- Surgery was performed only if delaying the procedure is likely to cause harm to the patient or prolong hospital stay.
- Children who had failed attempts at medical management of a surgical condition should be considered for surgery to decrease the future use of resources.
- Shared multidisciplinary decisions regarding surgical scheduling was made in the context of available institutional resources.
- Telemedicine and teleconsultation services were used for patient and physician interaction.
- The healthcare professionals were trained to clean, disinfect, and use of PPEs.
- PPEs and other wastes were disposed of as per waste management protocols.

Screening and PCR testing before all emergency/emergent surgery was a challenge to us at that time. If suspected, PCR was done before surgery. All Covid-19 was shifted to Covid-19 Surgical wing with separate OT complex, where our faculties dedicated to Covid-19 unit performed the surgeries as per Covid-19 protocol. The shifting team were in complete PPEs protection and obey general precautions of hand hygiene and social distances dutifully. A comprehensive training program for use of PPEs was completed for every healthcare workforce.<sup>7</sup> Usually in that initial phase of this pandemic, It was highly recommended not to do laparoscopy and prefer open surgery to reduce the risk of aerosol spread.<sup>8,9,10&11</sup>

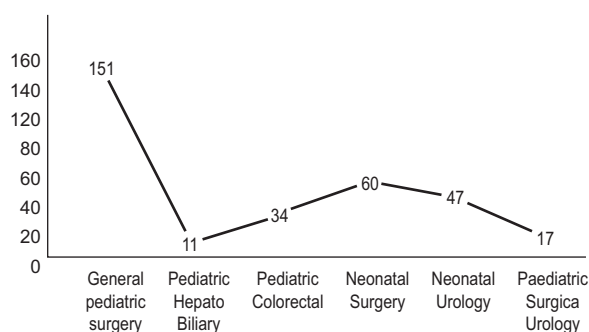
#### Data collection & analysis:

Patient data were manually abstracted from the medical record for evaluation. Responses were analysed using Microsoft Excels & SPSS, and presented as categorical data and percentages.

**Main outcome measures:** We described patient characteristics including demographics, presenting symptoms, type of treatment (surgery vs non surgery), outcomes (morbidity & mortality), hospital stay, and distance travelled for treatment.

#### Results:

Elective surgeries had been suspended at the time of study and a total of 320 paediatric surgical patients were included in this study, with a mean age of 4.5 years in surgery group and 5.2 years in non-surgery group. Among all patients about 66.87% patients were male child and 79.06% patients required surgeries (Table-I). Majority of patients were belonging to general paediatric surgery followed by neonatal surgery and paediatric urology and paediatric surgical oncology subspecialty (Fig:1).



**Figure 1:** Patients of different subspecialty

There were 5 patients with confirmed COVID-19, who were transferred to the Covid-Surgical unit and surgeries were performed by our paediatric surgeons dedicated to Covid-19 duty with precaution as per protocol. In confirmed COVID-19 Patients, the most common presenting symptoms were cough (100%), fever (100%), and dyspnea (80%).

During this period, there were 4 (1.25%) children who died due to non-COVID related causes and COVID-19 related deaths in the department of paediatric surgery was none. In surgical group only 24 (7.5%) patients developed postoperative complications, who were cured after proper treatment. At our institution one doctor, four nursing staff were positive for corona virus and were safely quarantined to re-return to work on testing negative for COVID-19. Length of hospital stay of 44 (13.75%) of non-surgical patients were less than 72 hours, whereas 141 (40.06%) of surgical patients were more than 72 hours. Majority of patients of both groups travelled more than 100 km distance for treatment (Table-I).

**Table-I.** Surgery and non-surgery patients demographics with clinical characteristics.

Characteristic	Surgery n (%)	Non-surgery n (%)
Total patients	253 (79.06)	67 (20.94)
Sex (%)		
Male	173 (54.06)	41 (12.81)
Female	80 (25.00)	26 (08.13)
Type of surgical procedure (%)		
General paediatric surgery	114 (35.63)	37 (11.56)
Paediatric hepato biliary	09 (2.81)	02 (0.63)
Paediatric colorectal	30 (9.38)	04 (1.25)
Neonatal surgery	49 (15.31)	11 (3.44)
Paediatric urology	39 (12.19)	8 (2.5)
Paediatric surgical oncology	12 (3.75)	5 (1.56)
Age at operation (years)		
Mean	4.5	5.2
Length of hospital stay (%)		
<72 h	112 (35.0)	44 (13.75)
>72 h	141 (40.06)	23 (7.18)
Distance travelled for procedure (%)		
<100 km	94 (29.37)	13 (4.06)
100-300 km	108 (33.75)	43 (13.44)
>300 km	51 (15.94)	11 (3.44)

**Discussions:**

It has been a hard time since the novel corona virus pandemic in late 2019, which has demanded a change in the approach to health-care delivery. This has affected also the paediatric surgical department in prioritizing the management of patients. Our hospital has ascended with our national guidelines regarding elective and emergency surgeries. Moreover, when taking decision regarding every paediatric surgical patient, we must considered a balance between the patient's needs, available resources and the risks of deferring surgery.

Due to triage of patients in ED, almost all subspecialties showed a decreased admission during this period. Among these general paediatric surgery and neonatal surgery were most common. As emergency in general paediatric patients and congenital deformities in neonates were the most common indication for surgery during this period. Besides, nonperformance of elective cases such as pelvi-ureteric junction obstruction, hypospadias,

exstrophy–epispadias bladder, asymptomatic urinary stones in urinary system; and tumors were operated on a semi-emergency basis, that comparable to other studies<sup>12, 13</sup>.

The validation for performing a surgical intervention should be based on thorough history, signs, symptoms, contact evaluation and properly counsel with parents or guardians. As per the national guidelines of Bangladesh, all cases that needed surgery were undergone RT-PCR test for COVID-19 before surgery. Afterwards, if any patient's PCR test was negative, he/she undergone surgery with precautions as per surgical protocol. On the other side if PCR test was positive, the patient was sent to COVID-19 positive surgical block and operated with tertiary protection measures for anesthesia and surgery. In the postoperative period, patient was also managed in isolation ward. There was a shortage of PCR testing and free availability of PPEs in early stage in Bangladesh. So to get PCR done before emergency or emergent surgery was a challenge to paediatric

surgeons, dissimilar to Chinese and European studies<sup>14,15</sup>.

We defined how we have adapted our current treatment of multiple facets of paediatric surgical disease because of the surge in COVID patients, that had also contributed no significant morbidity and mortality. In surgical group only 24(7.5%) patients developed postoperative complications(morbidity), which were managed well. There were no COVID-19 related deaths and only 4(four) children died due to non-COVID related causes, which is better than other study<sup>16</sup>.

Our hospital is the highest tertiary catchment area for COVID-19 positive paediatric patients, and could not differed any patient. So, patients from whole country were referred to this hospital. Bulk of patients travelled more than 100 km distance for treatment that are dissimilar to other study<sup>17</sup>. In Bangladesh although the medical resources are relatively insufficient at the beginning of epidemic. It was generally advised that length of hospital stay should be minimum to reduce the risk of cross-infection, and to make the treatment of more children timely and safely. In this study, length of hospital stay of majority of non-surgical patients were less than 72hours, whereas most of surgical patients were more than 72 hours, which are similar to other studies<sup>15,18, 19</sup>.

Challenges for restructuring of paediatric surgical services and way forward:

1. Covid-19 pandemics are known to cause increased fear and anxiety among the public.<sup>20</sup> This state of fear, in addition to the ongoing practices of social distancing, self-isolation and country-wide lockdown has led to reduced patient inflow at our hospital. Moreover, there was a significant decrease in referrals from other hospitals.
2. Paediatric surgery is a mostly difficult sector. Due to the challenges of the frequent necessity for general anesthesia (GA), all paediatric operations will need to be managed as high-risk cases. With uncertainty about the risks of surgery in the presence of COVID-19 infection, challenges for paediatric surgeons will need to carefully consider the safety.
3. Following the hospital new guidelines, postoperative management, and partial patient capacity of the ward, the provision of regular

surgical admission has become limited. and children planned for elective procedures have to wait for longer period of time. By means of the government has withdrawn the lockdown and with resumption of regular activities at the hospital- the space constraints are increasing with more challenges in the days to come.

4. Medical students' rotation on the paediatric surgery were discontinued by the authority due to social distancing, and its negative impact on medical student education was recognized.<sup>21</sup> They did not participate in the wide spectrum of patient care like in-patient, out-patient and in the operation room (OR). Besides, with the closure of medical college, on-line lectures, virtual patient exposure and discussions were conducted via zoom at our institution.
5. The decline in the volume of surgical patients, it has been a considerable challenge to provide precise post-graduate resident education and training<sup>22</sup>. Although, many residents were coopted in covid-19 roster being a part of the healthcare force in the pandemic. The department of paediatric surgery started some changes to the residents' training program, which included online classes, journal clubs, surgical grand rounds and other educational sessions with the faculty over Zoom.
6. Many factors caused stress among healthcare professionals including the emotional burden related to the risk of transmission of COVID to their family members<sup>15</sup>. Our department recognized the need to safeguard the physical and mental health of the faculties, residents. For residents and staff's wellness, our department were conducted multiple wellness sessions among ourselves.
7. The cost for expansion of Covid-19 diagnostic testing capacity, establishment of separate Covid-19 screening site, provision of essential PPE and investment into tele-medicine etc. extra expenses incurred in following Covid-specific protocols,<sup>23</sup> which ultimately increased the total cost of patient care significantly.

#### Conclusions:

Our paediatric surgery department had to productively and efficiently adjust national guidelines, and health workforce to not only serve our paediatric population

but also combine ourselves with our entire hospital system during the Covid-19 pandemic. This study will offer an invaluable support to all paediatric surgeons, as well as national policy makers. There is an exceptional need to weigh the risks of operating versus delaying intervention in our paediatric patients. Therefore, children who really need surgical intervention should not be delayed.

This corona crisis has provided an opening for rational health care and formulating global policies. So that future such pandemics can be tackled more carefully and consistently with advancing knowledge and better prepared.

**Conflicts of interest:** None.

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