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ORIGINAL ARTICLE

Gastrointestinal symptoms as an early sign of COVID-19 in pediatric patients

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Abstract

Initial research on SARS-COV 2 (Severe Acute Respiratory Syndrome Coronavirus 2) appeared to demonstrate that children infected with the virus remained asymptomatic or had only mild to moderate conditions. The most common symptoms were fever and cough. However, in a later phase of the pandemic, numerous other aspects of clinical presentation in the pediatric public were observed, especially gastrointestinal conditions. In the present study, patients monitored at the Pediatric Intensive Care Unit of the *Hospital Estadual Adão Pereira Nunes* from April 17, 2020 until June 17, 2020, who had detectable PCR-RT (Polymerase Chain Reaction - Transcription) or positive serology for COVID 19 (Coronavirus disease 19). This is a hospital unit that is not a reference for COVID 19, and its target audience is trauma victims. The initial symptoms of most hospitalized patients with clinical suspicion were fever and gastrointestinal symptoms, with significant abdominal pain standing out, mimicking acute abdomen. Signs and symptoms that differ from adults, who have respiratory manifestations as a starting point. Based on the recognition of the different clinical presentations of SARS-COV 2 in the pediatric population, an early diagnosis is possible, with better conduction and outcome.

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INTRODUCTION

The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) was first identified in Wuhan, China, in December 2019. The virus spread to other countries and the World Health Organization (WHO) elevated the Coronavirus Disease 2019 (COVID-19) to the status of a pandemic on March 11, 2020. Children were initially described as mostly asymptomatic or presenting mild to moderate symptoms after contracting the disease, with fever and respiratory symptoms as the most frequent clinical manifestations.¹

In April 2020, the United Kingdom Society of Pediatrics issued a warning to report a new clinical manifestation seen in children and adolescents with COVID 19 that carried strong similarities with Kawasaki syndrome, incomplete Kawasaki disease, and/or toxic shock syndrome. Other accounts of extra-pulmonary complications included gastrointestinal (severe abdominal pain, fever, vomiting) and dermatological (urticarial-like lesions, acral ischemia, lesions consistent with vasculitis) symptoms.²⁻⁵

In this context, the present study aimed to discuss the gastrointestinal manifestations observed as early symptoms of children with SARS-CoV-2 infection admitted to a pediatric intensive care unit (PICU).

METHODS

This study analyzed the data from the charts of eight patients diagnosed with COVID-19 after reverse transcription-polymerase chain reaction (RT-PCR) or serology testing admitted to the PICU at our hospital from April 17, 2020 to June 17, 2020.

RESULTS

Eight patients were admitted to the PICU for presenting symptoms consistent with COVID-19. Diagnosis was confirmed subsequently with RT-PCR or serology tests.

Six patients (75%) were males. Their ages ranged from four to 14 years. Patient mean age was 6.7 years. One child was aged less than a year.

Only three patients (37.5%) were admitted for respiratory symptoms. The remaining patients were admitted for abdominal pain mimicking acute abdomen and fever. Two of the patients with respiratory symptoms had been hospitalized previously for asthma. One of the patients with gastrointestinal symptoms was on postoperative care for an appendectomy and had a drop in oxygen saturation levels; two had symptoms consistent with appendicitis; one with intussusception; and one with cholestatic liver disease with Murphy's sign. All had fever.

One of the patients with symptoms consistent with appendicitis underwent an exploratory laparotomy, which found enlarged mesenteric lymph nodes without evidence of inflammation of the appendix. A four-year-old had ileo-ileal intussusception, an uncommon finding in subjects of this age.

Polyps and other potential causes of intussusception were not found during surgery. The patient with Charcot's triad (jaundice, right upper quadrant pain, and fever with rigors) had perivesicular edema without signs of obstruction of the biliary tract.

Five patients (62.5%) required invasive mechanical ventilation for an average of 9.6 days.

Six patients (75%) had positive RT-PCR tests. The remaining patients (25%) had positive serology and negative RT-PCR tests. The latter group had symptoms consistent with multisystem inflammatory syndrome in children (MIS-C).

Two deaths (25%) of patients showing early respiratory symptoms were recorded during the study period. One patient died within less than 24 hours of hospitalization of amine-refractory septic shock and multiple organ failure; the cause of death of the other patient was brain death by anoxic encephalopathy secondary to pre-admission cardiorespiratory arrest.

DISCUSSION

In line with international statistics, our hospital has had significantly fewer children and adolescents admitted for COVID-19 than adults. Children are believed to have predominantly asymptomatic or mild to moderate disease. However, subjects with preexisting comorbidities and children aged less than a year are at greater risk of severe disease and death. Cases of children presenting with significant systemic inflammatory response and developing severe involvement with Kawasaki-like disease and early gastrointestinal symptoms have been reported since late April 2020.¹⁻⁴

The most prevalent symptom in individuals with COVID-19 is fever, followed by coughing. All our patients had fever, but gastrointestinal symptoms were more prevalent than respiratory ones, with severe abdominal pain mimicking acute abdomen topping the list.⁵⁻⁷

One of the factors explaining the pathophysiology of gastrointestinal manifestations is the entry of coronavirus in cells using specifically the angiotensin-converting enzyme 2 receptor. This receptor is found abundantly in lung cells, but also in the epithelial cells of the esophagus, ileum, and colon.⁸

The alterations normally found in the abdomen computed tomography (CT) scans of individuals with gastrointestinal symptoms include small amounts of free fluid in the abdominal cavity and thickening and edema of the gallbladder wall and segments of the bowels. The CT scans of PICU patients admitted with severe abdominal pain included the following findings: small amounts of free fluid in the pelvis; distended small bowel with fluid; perivesicular edema; enlarged mesenteric lymph nodes; and ileo-ileal intussusception.⁹

Six of the eight patients included in the study had positive RT-PCR tests and two had negative RT-PCR tests for COVID-19, although the latter two had positive serology tests and symptoms consistent with MIS-C.

Another interesting finding was that even patients without exuberant respiratory symptoms required invasive mechanical ventilation, mostly for hemodynamic decompensation.⁴

The observed death rate was elevated. However, the patients included in this study had prognostic scores consistent with severe involvement. One of the deceased had severe asthma and should have been taken to hospital sooner. The other was aged less than a year and died within less than 24 hours of admission.

CONCLUSION

COVID-19 is a recent disease that produces predominantly respiratory symptoms in adults. However, the development of the pandemic brought other symptoms with it, including gastrointestinal ones, often seen in the early stages of the disease in pediatric patients.

Early acknowledgement of the different symptoms stemming from COVID-19 in children and adolescents is required for the identification of SARS-CoV-2 infection as an element in differential diagnosis and clinical investigation. Cases of the disease should be managed based on the knowledge and experience acquired at health care centers from all over the world tasked with providing care to the individuals affected by the pandemic.

REFERENCES

1. Dong Y, Mo X, Hu Y, Qi X, Jiang F, Jiang Z, et al. Epidemiology of COVID-19 among children in China. *Pediatrics*. 2020 Jun;145(6):e20200702.
2. Whittaker E, Bamford A, Kenny J, Kaforou M, Jones CE, Shah P, et al. Clinical characteristics of 58 children with a pediatric inflammatory multisystem syndrome temporally associated with SARS-CoV-2. *JAMA*. 2020 Jun;324(3):259-69.
3. Verdoni L, Mazza A, Gervasoni A, Martelli L, Ruggeri M, Ciuffreda M, et al. An outbreak of severe Kawasaki-like disease at the Italian epicentre of the SARS-CoV-2 epidemic: an observational cohort study. *Lancet*. 2020 Jun;395(10239):1771-8.
4. Riphagen S, Gomez X, Gonzalez-Martinez C, Wilkinson N, Theocharis P. Hyperinflammatory shock in children during COVID-19 pandemic. *Lancet*. 2020 May;395(10237):1607-8.
5. Tullie L, Ford K, Bisharat M, Watson T, Thakkar H, Mullassery D, et al. Gastrointestinal features in children with COVID-19: an observation of varied presentation in eight children. *Lancet Child Adolesc Health*. 2020 Jul;4(7):e19-e20.
6. Henderson LA, Canna SW, Friedman KG, Gorelik M, Lapidus SK, Bassiri H, et al. Clinical guidance for pediatric patients with multisystem inflammatory syndrome in children (MIS-C) Associated with SARS-CoV-2 and hyperinflammation in COVID-19. *Am Coll Rheumatol*. 2020 Jul 23; [Epub ahead of print]. DOI: <https://doi.org/10.1002/art.41454>
7. Belot A, Antona D, Renolleau S, Javouhey E, Hentgen V, Angoulvant F, et al. SARS-CoV-2-related paediatric inflammatory multisystem syndrome, an epidemiological study, France, 1 March to 17 May 2020. *Euro Surveill*. 2020 Mar;25(22):1-6.
8. Wong S, Lui RN, Sung JJ. Covid-19 and the digestive system. *J Gastroenterol Hepatol*. 2020 May;35(5):744-8.
9. Tang L, Cheng X, Tian C, Wang R, Zhou H, Wu W, et al. Computed tomography (CT) intestinal alterations of coronavirus disease 2019 (COVID-19) from the imaging perspective: a case description. *Quant Imaging Med Surg*. 2020 May;10(5):1145-9. DOI: <https://doi.org/10.21037/qims.2020.04.09>