


The COVID-19 Pandemic Impact on Pediatric Endoscopies in a Single Center

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Shannon Moyer¹ , Sinan Aktay²,
and Samra Blanchard³

Abstract

Pediatric endoscopic procedures are considered at high risk for coronavirus disease 2019 (COVID-19) transmission, as it can be aerosolized during the upper and lower endoscopy. The data on the pediatric endoscopy experience during the COVID-19 pandemic is scarce. Our research goal is to explore the influence of the pandemic on our endoscopy practice. We retrospectively reviewed the charts of pediatric patients ages 1 to 21 years during the first year of the pandemic and compared it to the previous year. We found that procedural volumes were only impacted in the first 2 months of the pandemic and then returned to normal monthly procedural volumes. We also surveyed personal protective equipment (PPE) requirements and pre-procedural screening protocols. One percent of all pediatric endoscopy patients tested positive for COVID-19 during the pandemic year. We demonstrate that the combination of pre-procedural testing and infection control precautions enabled pediatric endoscopies to be performed safely in children.

Keywords

Coronavirus Disease 2019, COVID-19, Pediatric Gastroenterology, Severe Acute Respiratory Syndrome Coronavirus 2, Endoscopy

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Introduction

Nationwide and globally, many pediatric endoscopy centers had to rapidly adjust to the coronavirus disease 2019 (COVID-19) pandemic. Specifically, endoscopies are considered high-risk procedures for viral transmission, as they can aerosolize patients' mucosal secretions. The severe acute respiratory syndrome corona virus 2 (SARS CoV-2 virus) is also often present in the stool of infected patients, making colonoscopies high-risk. Several studies have sought to characterize both the local and international impact of the COVID-19 pandemic on the endoscopy workflow and have continuously published on updated preprocedural guidelines, personal protective equipment (PPE) recommendations, and transmission rates in endoscopy suites.

In a large, international survey of pediatric gastroenterology divisions and group heads, it was noted that 97.4% of respondents answered that endoscopies at their institution were affected during the initial months of the pandemic, with 92.9% noting a postponement in

elective endoscopies.¹ As institutions resumed elective endoscopies in the subsequent months and endoscopy numbers increased, the top priorities reported by most division group heads included adequately triaging postponed procedures, making preprocedural testing available, and maintaining workspace safety and patient spacing.¹ Several centers came out with added pre-procedural screening protocols, which included a COVID-19 symptom questionnaire and a nasopharyngeal swab test within 24 to 72 hours prior to a patient's endoscopy.² In Wuhan, China, it was found that between February and March 2020, 7 out of 159 endoscopy patients were previously infected with or were suspected

¹University of Maryland School of Medicine, Baltimore, MD, USA

²University of Michigan, Ann Arbor, MI, USA

³University of Maryland Medical Center, Baltimore, MD, USA

Corresponding Author:

Shannon Moyer, University of Maryland Medical System, 22 S. Greene Street, Baltimore, MD 21201, USA.
Email: shannon.moyer@som.umaryland.edu



carriers of the virus, but strict infection control measures like screening of incoming patients, PPE usages, and disinfection protocols led to zero reported cases of transmission to other patients or to providers.³ Additionally, it was reported at Mount Sinai Hospital in New York City, another large epicenter for the COVID-19 virus, that from May to June 2020 only 0.96% (or 6 out of 623 adults) of ambulatory endoscopy patients had a positive PCR test, suggesting that endoscopies in adults are a safe procedure with strict preprocedural testing and universal infection control precautions.⁴ Although promising, these results remain ambiguous in pediatrics, because the accuracy of RT-PCR testing in children may be limited due to difficulty obtaining adequate viral material during nasopharyngeal testing, increased likelihood of lower viral shedding, and an increased chance of falsely negative results in the beginning and at the end of the disease.⁵ Accordingly, this study advocates that providers wear appropriate PPE regardless of RT-PCR testing results in pediatric endoscopy facilities.

For those centers that use preprocedural questionnaires, the 3 most common questions reported in 93.9% of 163 adult endoscopists representing 48 countries were: history of fever of more than 37.5°C, history of occupational exposure, and history of large group gatherings.⁶ Some pediatric endoscopy centers then used the answers to the such pre-endoscopy questions and results of RT-PCR tests to guide PPE utilization: for patients who tested positive, endoscopists were recommended to use N95 respirators, double layer gloves, water-resistant gowns, eye protection, and hair coverings.² For patients who tested negative for COVID-19, only a single layer of gloves and individual discretion for use of an N95 respirator versus a surgical mask was recommended. Across multiple endoscopy centers, the vast majority of endoscopists (>95%) reported being trained on infection control measures such as hand hygiene, and >80% reported training on proper donning and doffing of PPE.⁶

As the pandemic has passed with time and with the aforementioned practices in place, institutions have reported a 70.7% increase in pediatric endoscopy volumes (vs 80% of institutions previously postponing all elective cases as of April 2020), and 76% are no longer postponing elective procedures.⁷ Increasing numbers of pediatric institutions (41.3%) are including more symptoms in the preprocedural questionnaires, and the majority (89.3%) have a protocol established to address patients who screen positive.⁷ However, with the vaccine available for only children ages 5 and older and with the upsurge of the delta and omicron variant of the SARS CoV-2 virus causing another wave of infections, pediatric endoscopists must remain vigilant to

reduce the spread of COVID-19. Our group aims to contribute to the increasing body of work characterizing the impact of the COVID-19 virus on the pediatric endoscopy workflow by using a single center as an example as children remain a high-risk group for infection.

Methods

We conducted a retrospective chart review of pediatric patients undergoing endoscopies during March 01, 2019 to March 01, 2021. The target population included any child from ages 1 through 21. All testing was performed at the University of Maryland Medical System in Baltimore, Maryland. Endoscopic procedures performed from March 01, 2019 to March 01, 2020 were designated “pre-pandemic,” while those performed from March 02, 2020 to March 01, 2021 were assigned as “pandemic.” Pandemic endoscopies by month were then tabulated and compared to pre-pandemic endoscopy numbers. If a procedure was canceled during the pandemic year, the cancellation reason was noted. Endoscopy pre-procedural testing, screening questions, and information on personal protective equipment worn during procedures were provided by perioperative and operative staff.

Ethical Approval and Informed Consent

This research was conducted with approval from IRB at the University of Maryland Medical System, reference number HP-00095662. Informed consent was not necessary because the information of human subject identities was masked using a linking table that was stored separately from the data.

Results

Workflow Changes in Response to COVID-19

To minimize COVID-19 transmission, required personal protective equipment worn in the endoscopy suite included an N95 facial mask, face shield or eye protection, gloves, full body water resistant isolation gown and a hairnet. All patients were tested for COVID-19 within 48 to 72 hours prior to the procedure with nasopharyngeal COVID-19 polymerase chain reaction (PCR). A telephone COVID-19 screening questionnaire was completed within 2 to 3 days prior to the procedure. Any person who gave a positive screening answer was removed from the schedule. Only one family member could stay in the pre-operative area with the patient. Patients and family members were required to wear face masks throughout their stay in the hospital.

Impact on Endoscopy Services

In the pre-pandemic year, 608 patients were scoped; 175 patients were canceled. In the pandemic year, 592 patients had endoscopies and 221 patients were canceled. In the first 2 months of the pandemic, only urgent procedures were allowed in order to conserve PPE and minimize the transmission of COVID-19. Most cases were canceled by the hospital during this period. Fewer than 10 monthly procedures were done in March and April of 2020, compared to 52 average monthly procedures in the pre-pandemic period. However, procedure volumes in the following months were similar to the pre-pandemic year (Figure 1). Fifty-seven percent of the cancellations in the pandemic year were related to COVID-19 infection (Figure 2). Only 1% of total patients tested positive for COVID-19. None of the endoscopists or trainees tested positive for COVID-19 infection.

Discussion

Our results demonstrate that the procedure volumes in the pediatric endoscopy suite at the University of Maryland Medical Center decreased for the first 2 months of the pandemic but increased to standard levels in

subsequent months. The ability to increase procedural volumes quickly and successfully to normal rates was due to the implementation of pre-procedural screening and the strict guidelines in personal protective equipment protocol for staff. Although the vast majority (57%) of cancellations at our center were related to COVID-19, this effectively minimized hospital-acquired infection for pediatric patients obtaining an endoscopy and providers performing the endoscopy.

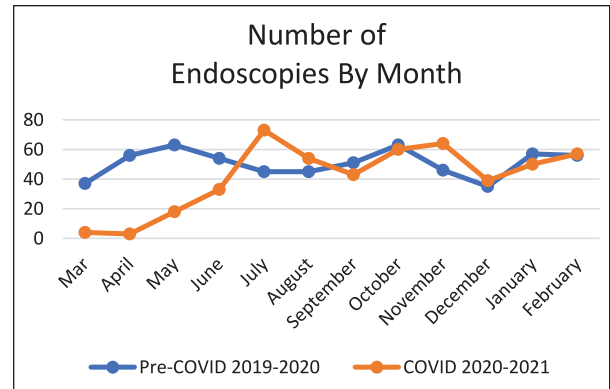


Figure 1. Procedure volumes by month in pre-pandemic and post-pandemic periods.

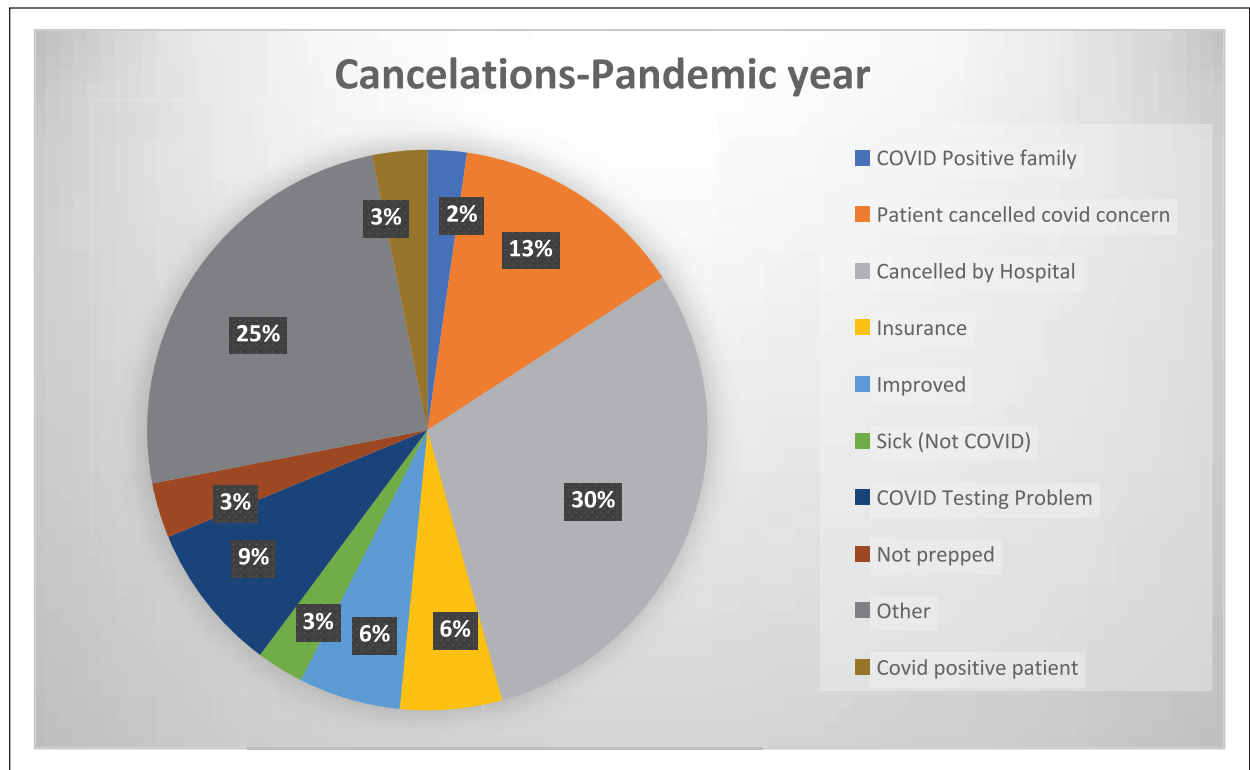


Figure 2. Cancellation reasons during the covid-19 pandemic year.

Furthermore, only 7 of 221 (3%) canceled procedures scheduled during the pandemic were due to a COVID-19 positive patient detected via PCR testing. Given the low positive detection rates during the first year of the pandemic, when the COVID-19 vaccine was not available to most of the age group studied, it is worth considering whether pre-procedural PCR testing is necessary for all patients, and if questionnaires alone may suffice. Furthermore, with the vaccine now available to patients ages 5 and older, a proof of vaccine card may be an additional effective screening tool for patients. Future studies are needed to assess the effectiveness of screening with a proof of vaccine card alone to minimize COVID-19 transmission in endoscopy suites.

In conclusion, our study adds a pediatric perspective to the body of work of hospital systems analyzing how their endoscopy workflow was impacted by the COVID-19 pandemic. Through robust pre-procedural screening and PPE guidelines, our center rapidly adjusted to the pandemic and successfully prevented further spread of infection in the pediatric endoscopy suite.

Author contributions

Shannon Moyer, MD (Conceptualization: Equal; Data Curation: Supporting; Formal Analysis: Supporting; Investigation: Lead; Methodology: Equal; Writing: Lead). Sinan Aktay, student (Conceptualization: Equal; Data Curation: Lead; Formal Analysis: Lead; Methodology: Equal; Writing: Supporting). Samra Blanchard, MD (Investigation: Supporting; Supervision: Lead; Writing: Supporting).

Declaration of Conflicting Interests

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ORCID iD

Shannon Moyer  <https://orcid.org/0000-0002-6537-4949>

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