SARS-CoV-2 infection is not associated with pediatric appendicitis

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Summary

The impact of the novel SARS-CoV-2 (CoV2) pandemic on human health and disease has yet to be fully realized. Although CoV2 is spread via respiratory route, the virus has tropism for extra-pulmonary sites like the gastrointestinal (GI) tract. In fact, published studies have suggested a connection between CoV2 infection and appendicitis [1,2]. We hypothesized that acute GI infection with CoV2 can cause appendicitis. To test this, we looked at the epidemiology of appendicitis cases at TCH relative to reported CoV2 cases in Harris County (Fig 3). Using appendectomy samples, we performed RT-PCR (Table 1) and co-culture with Vero cells (Fig 4) and found no evidence of CoV2 genome or cytopathic effect, respectively. Taken together, our data suggests that acute CoV2 infection is not associated with appendicitis.

Background

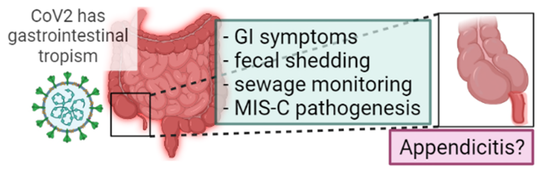

Fig 1. Rationale. Although CoV2 is spread via respiratory droplets and aerosols, the virus has tropism for extra-pulmonary sites including the gastrointestinal tract, which has significant epidemiologic and clinical implications. We tested the hypothesis that CoV2 infection of the appendix can cause appendicitis.

Results

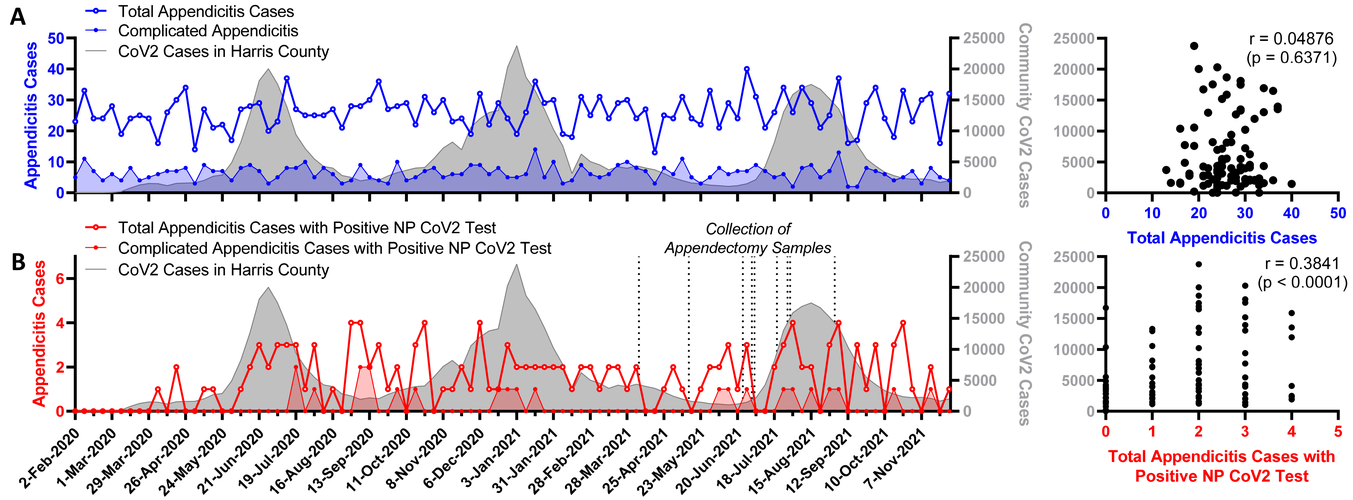

Fig 2. Epidemiology of appendicitis at a TCH. A) Weekly total appendicitis cases (blue) and B) weekly appendicitis cases who tested positive for CoV2 by NP swab (red) were graphed relative to community CoV2 cases in Harris County (gray). Blue and red shaded areas represent weekly numbers of complicated appendicitis cases. Correlations between appendicitis cases and community cases are shown on the right. Community cases are derived from a publicly available database curated by Harris County (https://covid-harriscounty.hub.arcgis.com/). NP = nasopharyngeal.

Date of Collection	Age & Sex	Resp Sxs	Complicated Appendicitis	NP CoV2 RT-PCR at presentation	First Positive CoV2 test	Stool RT-PCR	Appendix RT-PCR	Appendix Co-Culture	Serum anti-CoV2 IgG
04/06/21	18 M	-	-	+	34 days ago	-	-	-	+
05/14/21	16 M	-	-	+	24 days ago	-	-	-	+
06/24/21	11 M	-	-	+	At presentation	-	-	-	+
07/01/21	7 F	-	+	+	At presentation	-	-	-	+
07/03/21	14 F	-	+	+	At presentation	-	-	-	+
07/20/21	14 F	+	-	+	At presentation	-	-	-	-
07/28/21	10 F	+	-	+	At presentation	+	-	-	-
07/30/21	15 M	-	-	+	15 days ago	-	-	-	-
09/02/21	17 M	+	-	+	At presentation	+	-	-	-
Select Clinical Characteristics						Research-level testing			

Table 1. Biospecimens from patients with appendectomies who were CoV2+ by surveillance nasopharyngeal swab. We collected surgical appendectomy tissue, serum, plasma, stool, and saliva for 9 cases. All appendectomy tissue was negative for virus by co-culture and RT-PCR for CoV2 E gene. Many patients were positive for anti-CoV2 spike IgG, suggesting prior infection.

Literature Review

Case report	Case summary	NP RT-PCR	Appendix RT-PCR
Ahmad et al., 2020	28 yo male presenting with fever, abdominal pain x 5d found to have acute appendicitis and underwent midline laparotomy whose course was complicated by post-op sepsis necessitating repeat laparotomy	-	+
Serra et al., 2021	9 yo male presenting with abdominal pain, diarrhea, fever x 4d found to have a perforated appendix and pelvic abscess who underwent exploratory laparotomy	+	+
Wolf et al., 2020 preprint	25 yo female presenting with abdominal pain, fever, nausea, vomiting x 1.5d found to have acute appendicitis on explorative laparoscopy	+	-
Ngaserin et al., 2020	21 yo male presenting with abdominal pain and vomiting x 1d found to have acute appendicitis with appendicolith who underwent laparoscopic appendicectomy.	+	Not done, Peritoneal washing negative

Table 2. Appendix infection with CoV2 possible. Two out of four case reports found evidence of CoV2 virus in the appendicitis tissue.

Conclusion

Incidence of appendicitis at a single tertiary pediatric hospital did not change during the pandemic, and we did not find evidence of CoV2 infection of appendix tissue in our cohort. While CoV2 infection of the appendix is possible, our study suggests that CoV2 infection of the appendix is not a common etiologic cause of pediatric appendicitis.

References

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