

Evaluation of the negative predictive value of the SARS CoV-2 PCR in asymptomatic children undergoing surgery

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BACKGROUND

- Limited information regarding the transmission risks of SARS-CoV-2 infection from patients undergoing AGP
- Clinical performance of SARS-CoV-2 PCR testing in a largely asymptomatic population of children is unknown.
- **Objectives:** 1) determine reliability of a single preoperative upper respiratory tract sample to rule out asymptomatic or paucisymptomatic infection for children and young adults undergoing elective or semi-elective procedures
- 2) calculate the negative predicative value of a preoperative nasopharyngeal specimen using an intraoperatively collected nasopharyngeal wash as the clinical reference standard.

METHODS

Collected 3 samples from patients undergoing planned procedures under general anesthesia at CHCO from April 19-May 15, 2020

1) Preoperative nasopharyngeal swab (NS) or nasopharyngeal wash (NW) within 48h of procedure

- Intraoperative nasopharyngeal wash 2)
- Intraoperative tracheal aspirate (TA) 3)
- Negative predictive value (NPV) and positive predictive value (PPV) of preoperative and intraoperative samples using intraoperative NW as reference standard
- Percent agreement (Cohen's Kappa) between all sample types; differences in percent agreement (McNemar's test) using SAS v9.4

RESULTS





Pre-operative na
Intra-operative
•
Intra-operative trach aspirate positive (n =

Table 1. Sociodemographic and clinical characteristics among study population

Characteristic	N (%)
	n = 364
Age (years) ^a	6 (2,13)
Female sex	165 (45.5)
Race	
American Indian or Alaska Native	3 (0.8)
Asian	56 (15.4)
Black or African American	21 (5.8)
White	246 (67.6)
Native Hawaiian or Other Pacific Islander	3 (0.8)
Race Other	63 (17.4)
Race Unknown	24 (6.6)
Ethnicity	
Hispanic or Latino	92 (25.3)
Ethnicity Unknown	28 (7.7)
Respiratory symptoms within 1 week prior to	9 (2.5)
procedure	
Documented fever within 1 week prior to procedure	17 (4.8)
Admitted post-operatively	152 (42.7)
Length of Stay (days) ^{ab}	4 (2, 6)
Underlying comorbidity	147 (41.3)
Preoperative sample type	
Nasopharyngeal swab	238 (65.6)
Nasopharyngeal wash	124 (34.2)
Tracheal aspirate	1 (0.3)

a-all continuous variables are presented as Median (

Table 2. Comparison of preoperative and intraoperative NS and NW samples

		Intraoperative nasopharyngeal wash		Total
		Positive	Negative	
Preoperative	Positive	4	0	4
nasopharynx swab/wash	Negative	4	355	359
Total		8	355	363

Positive Predictive Value 100% (95%CI 40-100%) Negative Predictive Value 98.9% (95% CI 97-100%) Kappa 0.66 (95%CI 0.35-0.97) McNemar's test p = 0.125

Table 3. Comparison of intraoperative NW and intraoperative TA samples

		Intraoperative nasopharyngeal wash		Total			
		Positive	Negative				
Intraoperative	Positive	3	0	3			
tracheal aspirate	Negative	5	340	345			
Total		8	340	348			
Positive Predictive Value 100% (95% CI 29-100%)							

Negative Predictive Value 98.6% (95% CI 97-100%) Kappa 0.54 (95% CI 0.18-0.90) McNemar's test p = 0.063



CONCLUSIONS

Study period

- High PPV and NPV of a single preoperative nasopharyngeal sample in asymptomatic and paucisymptomatic children
- No significant difference in detection between preoperative vs intraoperative sampling
- No significant difference in detection from the upper and lower respiratory tract
- Asymptomatic rate of SARS-CoV-2 in children in our population is low (1.5%)

IMPLICATIONS

- **Overall transmission risk of SARS-CoV-2** to a health care worker wearing appropriate PPE from a patient with a negative test from a nasopharyngeal specimen is extremely low
- Data help inform sustainable testing policies and guidelines regarding appropriate PPE usage for health care workers performing high risk procedures in asymptomatic or paucisymptomatic patients.

ACKNOWLEDGEMENTS

We would like to acknowledge DiaSorin Molecular LLC for donating 15 Simplexa[™] COVID-19 Direct test kits to complete testing on a subset of samples, and to Karin Underberg, for her assistance in the co-ordination of intraoperative sample collection. We would also like to acknowledge Children's Hospital Colorado perioperative team, Department of Anesthesiology, Scientific Advisory Council, Incident Command Center, and Clinical Microbiology laboratory.