



# Analysis of Pediatric Intubations Using Video Review

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## BACKGROUND

- Tracheal intubation is a fundamental procedure for critically ill patients but is less successful and with more complications in children.
- Video review studies report a higher first attempt failure rate (50%) and higher oxyhemoglobin desaturation rate (33%) than prior studies based on self-report.
- Better understanding of the risks and outcomes of emergency intubations will improve patient safety in this vulnerable population.

## OBJECTIVE

- This study aimed to identify factors associated with successful first intubation attempt and adverse events during pediatric emergency intubations.

## METHODS

- We conducted a retrospective, video review of all pediatric intubations at Children's National Hospital from 07/01/2020 to 06/31/2021.
- Data on essential intubation steps and outcomes were abstracted.
- All data was summarized descriptively.
- Unadjusted univariate analysis was performed using chi-square analysis for categorical variables.

Glottic Visualization Adjuncts (GVA):



## FUNDING SOURCE

George Washington University School of Medicine and Health Sciences Health Services Scholarship Program

## RESULTS

Overall Findings:

- 62 children underwent intubation; total of 74 attempts; 2 were excluded for incomplete data.
- Median age was 48 months.
- The majority (70.0%) were intubated for medical reasons.
- More than half were intubated by Pediatric Emergency Medicine physicians.
- 81.7% (49/60) experienced first attempt intubation success.
- The only factor associated with first attempt success was the chief complaint of trauma (p=0.0172).
- Patient age, the use of NG/OG or GVA, intubation device and techniques used, intubator specialty, and bedside coaching were not significant.

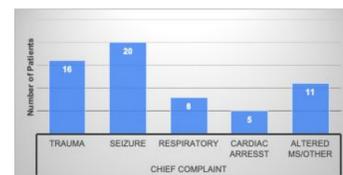


Figure 1. Chief complaint

Intubation Process:

- The CMAC<sup>®</sup> video laryngoscopy device was used in 79.7% of attempts.
- The majority used direct visualization to find the glottic opening (55.4%) and indirect visualization during tube insertion (62.2%).
- An NG or OG was in place in 9.5%.
- Glottic visualization aids (GVA) (e.g. cricoid pressure or external laryngeal manipulation [ELM]) were used in 55.4%, with cricoid pressure most frequently utilized (80.5%).
- Less than half had bedside coaching (40.5%).
- 10% (6/60) were associated with complications: 3 profound desaturation <75% SpO<sub>2</sub>, 3 esophageal intubations, and 1 bradycardia.

First Attempt Intubation Success:

- Median age, 48 months vs 24 months
- Median laryngoscopy time, 31.5 seconds; 35 sec for infants <12 mo vs 30 sec for ≥12 mo

Table 2: Factors Associated with First Attempt Success

	First Attempt Success, n (%)	P value	95% CI
<b>Patient Age</b>			
<12 month	7/11 (63.6%)	0.0897	[-2.46, 51.25]
≥ to 12 months	42/49 (85.7%)		
<b>Reason for Intubation</b>			
Trauma*	18/18 (100%)	0.0172	[5.51, 41.08]
Medical	31/42 (73.8%)		
Respiratory	5/8 (62.5%)	0.4232	[-14.95, 47.80]
Other [seizures, cardiac arrest, altered mental status/shock]	26/34 (76.5%)		
<b>NG/OG Tube</b>			
Yes	3/4 (75%)	0.7250	[-16.59, 52.70]
No	46/56 (82.1%)		
<b>Glottic Visualization Adjunct</b>			
<i>Any GVA used</i>			
Yes	24/31 (77.4%)	0.6043	[-15.21, 25.0]
No	24/29 (82.76%)		
<i>Cricoid pressure vs no GVA</i>			
Yes	22/28 (78.6%)	0.6903	[-16.41, 24.7]
No	24/29 (82.8%)		
<i>ELM vs no GVA</i>			
Yes	2/3 (66.7%)	0.5029	[-16.10, 63.01]
No	24/29 (82.8%)		

NG = nasogastric tube; OG = orogastric tube; ELM = external laryngeal manipulation; CMAC<sup>®</sup> Storz

\*designates significance at the level of p<0.05

Table 2.cont			
Factors Associated with First Attempt Success			
	First Attempt Success, n (%)	P value	95% CI
<b>Intubation Techniques</b>			
<i>Glottic Visualization</i>			
Direct	27/34 (79.4%)	0.6091	[-15.64, 23.86]
Indirect	22/26 (84.6%)		
<i>Tube Insertion</i>			
Direct	18/22 (81.8%)	0.9847	[-22.12, 18.73]
Indirect	31/38 (81.6%)		
<b>Intubator Specialty</b>			
Anesthesia	24/27 (88.9%)	0.1955	[-7.32, 31.38]
Other [Pediatric Emergency Medicine; Critical Care Medicine]	25/33 (75.8%)		
<b>Bedside Coaching</b>			
Yes	18/24 (75%)	0.2804	[-8.58, 32.48]
No	31/36 (86.1%)		

## CONCLUSIONS

- The majority of pediatric intubations in this study experienced higher first-time intubation success and lower complication rates than previously reported in the literature.
- Chief complaint of trauma was the only factor associated with first attempt success.
- Pediatric trauma intubations are protocolized at our institution and performed by anesthesiologists, though there was no difference in intubation success rates by intubator type.
- This data will be used to establish baseline intubation data for a multi-institutional quality improvement collaborative for the purpose of improving intubation safety.