

## Background

- Pediatric tracheostomy (trach) tube placement can have life-threatening complications, with a 2020 systematic review finding mortality rates of up to 6% for the procedure in studies reviewed between January 1978 and June 2020<sup>1</sup>
- Complications have been associated with age, birth weight, prematurity and comorbidities<sup>2</sup>
- Additional research is needed to identify modifiable risk factors and help reduce post-trach complications<sup>2</sup>
- Age has traditionally been used to guide trach tube size for placement to prevent complications<sup>1</sup>
- Weight-based formulas have also been tested but require further exploration<sup>3</sup>

## Aims

- Investigate weight as an alternative guide for trach tube choice
- Evaluate complications 3-months post-trach and associations with patient and trach tube factors

## Methods

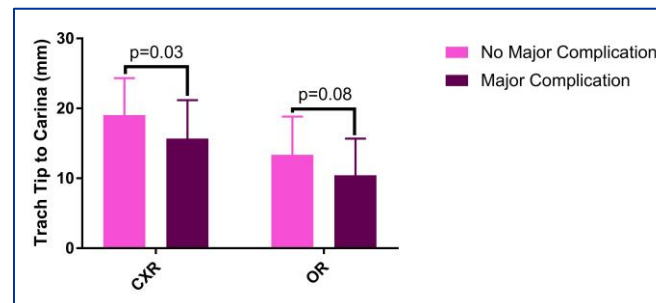
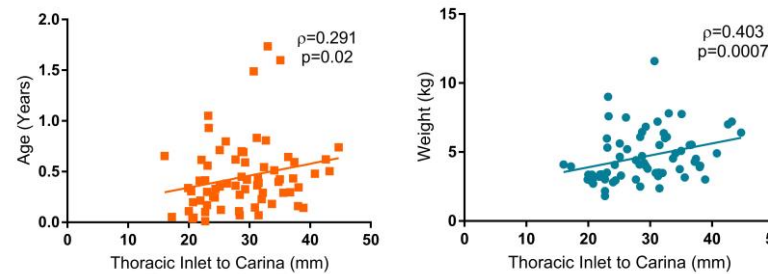
- A retrospective review was performed on patients <2 years old who underwent a trach from 2017-2022 at a tertiary care children's hospital
- Demographics, trach size/length, chest x-ray (CXR) measurements and complications within 3 months post-trach were collected
- Associations between these variables were evaluated using Chi-squared, Fisher's exact, Wilcoxon rank-sum, and t-tests and Spearman rank correlation

## Tables & Figures

Table 1. Demographics and Clinical Characteristics

Age, n(%)	
<2.5 months	17/68 (25%)
2.5-4.4 months	17/68 (25%)
4.5-7.3 months	17/68 (25%)
7.4-23 months	17/68 (25%)
Gender, n(%)	
Male	35/68 (51.5)
Female	33/68 (48.5)
Distance from Trach to Carina – OR (mm), mean (SD)	12.6 (5.5)
Trach Length – CXR (mm), mean (SD)	29.0 (6.6)
Distance from Trach to Carina (mm) – CXR, mean (SD)	18.2 (5.5)
Age at Time of Procedure, median (range)	4m (1d-20m)
Weight at Time of Procedure (kg), median (range)	4.1 (1.8-9.0)
Size of Trach Tube Placed, median (range)	3.5 (3-3.5)
Length of Trach Tube Placed (mm), median (range)	34 (26-44)

CXR: chest X-ray, OR: operating room



## Results

- A total of 68 patients were included, with a median age at procedure of 4 months
- Major complications occurred in 16/68 (24%) patients and were associated with being male ( $p=0.006$ ) and shorter distance from the distal end of the trach tube to carina on CXR ( $p=0.03$ )
- Distance from the thoracic inlet to carina on CXR was more closely associated with weight ( $p=0.403$ ,  $p=0.0007$ ) than with age ( $p=0.291$ ,  $p=0.02$ )
- There was no correlation between distance from trach tube to carina measured intraoperatively and on intensive care unit (ICU) CXR ( $p=0.248$ ,  $p=0.06$ ). There was no association between complications and comorbidities, stoma dressing/maturation, or use of post-operative paralytics.

## Conclusions

- CXR calculation was more associated with complications as compared to intraoperative calculations and was more associated with weight rather than age.
- Though intraoperative scope findings may indicate adequate placement, positional changes once in the ICU may change, and CXR findings there may be more indicative of true trach placement.
- A prospective evaluation of a weight-based algorithm for trach size choice and comparison of intraoperative scope findings and CXR calculations may aid in reducing post-trach complications.

## References

1. Lubianca Neto JF, Castagno OC, Schuster AK. Complications of tracheostomy in children: a systematic review. *Brazilian Journal of Otorhinolaryngology (English Edition)*. doi:10.1016/j.bjorl.2020.12.006
2. D'Souza JN, Levi JR, Park D, Shah UK. Complications Following Pediatric Tracheotomy. *JAMA Otolaryngology-Head & Neck Surgery*. 2016;142(5):484. doi: 10.1001/jamaoto.2016.0173
3. Eipe N, Barrowman N, Writer H, Doherty D. A weight-based formula for tracheal tube size in children. *Paediatric anaesthesia*. 2009;19(4):343-348. doi:10.1111/j.1460-9592.2008.02916.x