Endotracheal Tube Cuff Pressure in the Pediatric Emergency Department

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Overview

• **Question:** How many children who are emergently intubated are exposed to a high pressure in their ETT cuff?

• **Study:** Prospective Cohort study

• **Answer:** a little over half
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What is known?

• Cuff pressure can’t be accurately estimated
• High ETT cuff pressure is associated with adverse effects
• Cuffed ETT use is common in children
• Cuffed ETT use is recommended in children
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The question:

• How many children are exposed to a high ETT cuff pressure after emergency intubation?
• Do any factors correlate with a high ETT cuff pressure?
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Setting:

• Emergency Department of an urban, tertiary care pediatric hospital
• Level 1 Trauma center
• >100,000 Annual visits
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Study Design:
- Prospective cohort
- IRB-approved, informed consent was waived
- 12 months of data collection
- Data collection performed by certified RT’s
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Cohort:

- 104 patients enrolled
- 42 girls and 62 boys
- 10 days to 20 years old
- 2.3kg to 102kg
- 87 intubations in the study institution emergency department, 7 in the field and 10 at outlying hospitals
Primary Outcome: Cuff Pressure

Cuff Pressure in 104 Endotracheally Intubated Children

≤29 cmH₂O: 44%
N=46

≥30 cmH₂O: 56%
N=58
Primary Outcome: Cuff Pressure

Number of children vs. Cuff pressure groups

- <20cmH₂O: 13
- 20-29cmH₂O: 32
- 30-60cmH₂O: 44
- >60cmH₂O: 15
Secondary Outcomes

What was investigated:
• Person performing intubation
• Person performing cuff inflation
• Endotracheal tube size
• Patient age
• Patient gender
• Patient weight
• Diagnostic category (medical or trauma)
• Month & time of day
Secondary Outcomes

What we found to be statistically significant:

- Person performing intubation
- **Person performing cuff inflation**
- Endotracheal tube size
- **Patient age**
- Patient gender
- **Patient weight**
- Diagnostic category (medical or trauma)
- Month & time of day
Secondary Outcome: Cuff Inflator
OR 3.12, CI 1.1-8.6, p=0.028

Average pressure vs Cuff Inflator

- Respiratory Therapist: 33cmH₂O
- All Others: 51cmH₂O
Secondary Outcome: Patient Age
OR 2.0, CI 1.3-3.2, p=0.002

Average cuff pressure vs age group

- < 1 month: 24 cmH₂O
- 1 month - 1 year: 37 cmH₂O
- > 1 year: 45 cmH₂O
Secondary Outcome: Patient Weight

OR 0.9, CI 0.8-0.97, p=0.007

Average Cuff Pressure vs Weight

- <10kg: 27 cmH$_2$O
- 10kg-20kg: 42 cmH$_2$O
- >20kg: 54 cmH$_2$O
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What was learned:

• Emergently intubated children are likely to be exposed to high ETT cuff pressure

• Regular use of a manometer in the ED may help limit exposure to excessive ETT cuff pressure
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References:

• J Bryant, et al, Can the intracuff pressure be estimated by palpation of the pilot balloon? *ICU Director*, (2013) 4: 170-172


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