

Size Matters: Endotracheal Tube Sizing Preferences and Familiarity of Glottic Stenosis Among Intubating Physicians



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INTRODUCTION

- Acute laryngeal injury (ALGI) has been shown to occur in ~57% of patients intubated with an endotracheal tube (ETT) for ≥12 hours and is associated with posterior glottic stenosis (PGS).¹
- There is compelling evidence that height is the primary determinant of tracheal morphology,²⁻³ but no widely accepted guidelines for adult ETT sizing exist.
- “Smaller-for-height” ETTs have been shown to have little impact on ventilator pressure during anesthesia and are also associated with better laryngeal functional outcomes in critical-care settings.⁴
- “Large-for-height” ETTs lead to greater risk of ALGI.¹

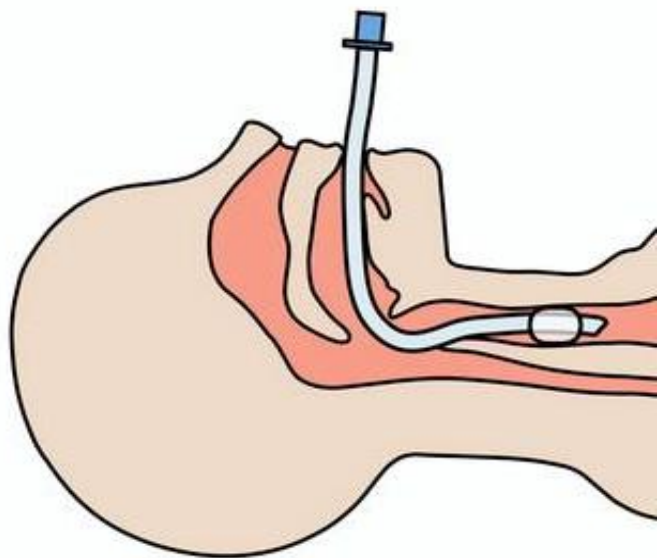
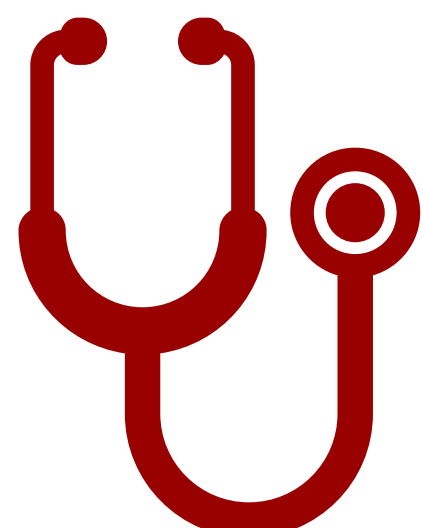
STUDY AIM

- Understand how factors driving ETT size selection differ across non-otolaryngology specialties who intubate patients frequently: Anesthesiologists, Intensivists, and Emergency Medicine physicians.
- Characterize familiarity of posterior glottic stenosis among these physicians.

METHODS

- Anonymous, online 14-question Qualtrics survey distributed to all faculty Anesthesiologists, Intensivists, and EM physicians at a single tertiary care institution from January 2024 – June 2024.
- Non-faculty physician providers (e.g., residents, CRNAs) were not invited to participate.
- Participants completed questions pertaining to their training, ETT sizing preferences, factors considered in decision-making, and familiarity regarding risk factors of posterior glottic stenosis.

RESULTS

	ANESTHESIOLOGISTS	INTENSIVISTS	EMERGENCY MDs	P
				
	(N=55)	(N=20)	(N=28)	
ETT Size - Male	7.48 (±0.21)	7.63 (±0.32)	7.55 (±0.25)	0.107
6.0 mm	0 (0.0%)	0 (0.0%)	0 (0.0%)	
6.5 mm	0 (0.0%)	0 (0.0%)	0 (0.0%)	
7.0 mm	6 (10.9%)	1 (5.0%)	2 (7.1%)	
7.5 mm	45 (81.8%)	14 (70.0%)	21 (75.0%)	
8.0 mm	4 (7.3%)	4 (20.0%)	5 (17.9%)	
8.5 mm	0 (0.0%)	1 (5.0%)	0 (0.0%)	
ETT Size - Female	6.96 (±0.27)	7.30 (±0.41)	7.20 (±0.31)	<0.001*
6.0 mm	1 (1.8%)	0 (0.0%)	0 (0.0%)	
6.5 mm	7 (12.7%)	1 (5.0%)	2 (7.1%)	
7.0 mm	42 (76.4%)	8 (40.0%)	13 (46.4%)	
7.5 mm	5 (9.1%)	10 (50.0%)	13 (46.4%)	
8.0 mm	0 (0.0%)	0 (0.0%)	0 (0.0%)	
8.5 mm	0 (0.0%)	1 (5.0%)	0 (0.0%)	
P (Sex)	<0.001*	<0.001*	<0.001*	

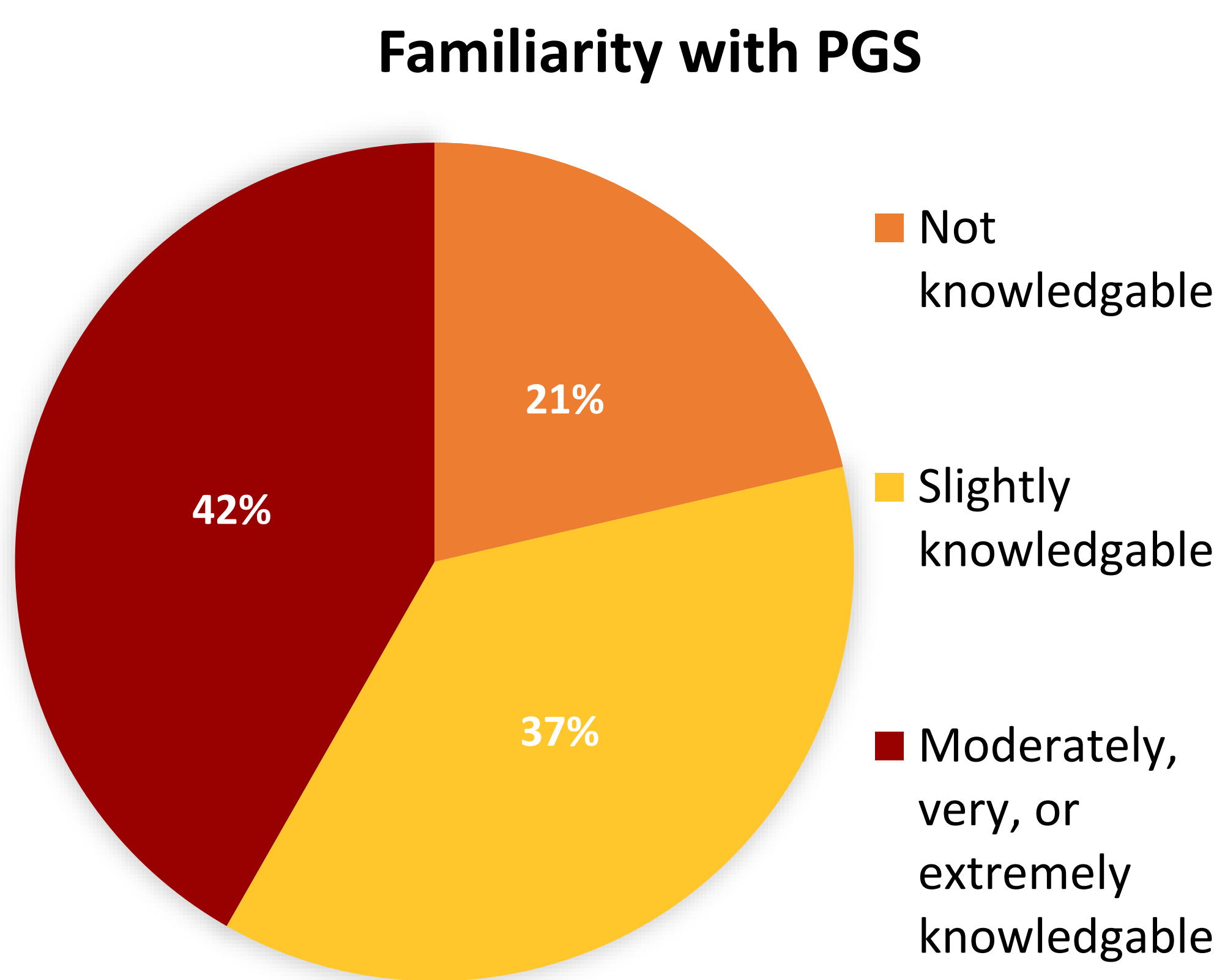
Top Selection Factors Across All Specialties

- Need for bronchoscopy
- Potential for complications
- Concerns about mucus plugging

Top PGS Risk Factors by Respondents

- Length of intubation (68.0%)
- Cuff pressure (62.1%)
- ETT size (60.2%),
- Multiple intubations/re-intubation (59.2%)
- Ischemia (31.1%)

- Standard ETT size was reported by **94 (91.3%)** respondents to be **7.5 mm** or larger in males and by **92 (89.3%)** respondents to be **7.0 mm** or larger in females.
- There was a significant difference among specialties in preferred ETT size for females (P<0.001). **Anesthesiologists tended to prefer smaller ETT sizes in females** compared to both Intensivists (P=0.001) and EM physicians (P=0.003).
- All respondents preferred a significantly **larger ETT for males compared to females** (P<0.001).



DISCUSSION

- Recent literature supports attempts to intubate with smaller ETTs unless there is a compelling reason to do otherwise.⁴ ~20-30% of patients may be intubated with an **inappropriately large ETT** (≥1.0mm larger than recommended based on patient height).²
- ~83% of patients that develop iatrogenic ALGI-related laryngotracheal stenosis are female.² Providers preferred larger ETT size for males compared to females, which may be attributed to use of **potentially unreliable sex-based heuristics**.
- Standard bronchoscopes are ~5.7mm, so ETTs ≥7.5mm may be preferred to provide access while maintaining safe airway pressures.
- Only ~4%** of mechanically ventilated ICU patients **required bronchoscopy** in the US annually,⁵ and use of narrower bronchoscopes can circumvent ventilatory complications with smaller ETTs.³
- Cuff pressure was erroneously identified** as a PGS risk factor by a significant proportion of respondents. Providers may falsely equate PGS to tracheal stenosis.
- Our findings should motivate **future quality improvement initiatives** aimed at reducing ALGI incidence.

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