

Tracheal stenosis in prolonged mechanically ventilated patients: prevalence, risk factors, and bronchoscopic management

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Figure S1: Myer-Cotton classification of subglottic tracheal stenoses [1]

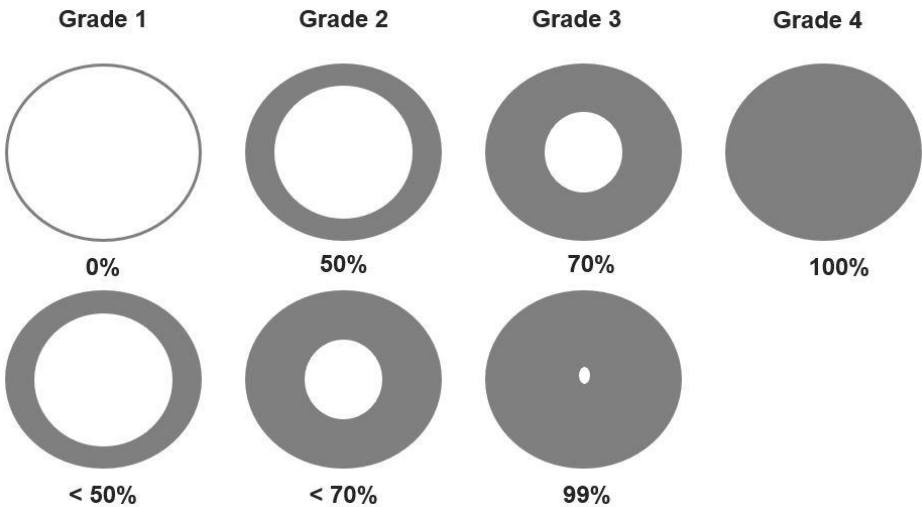
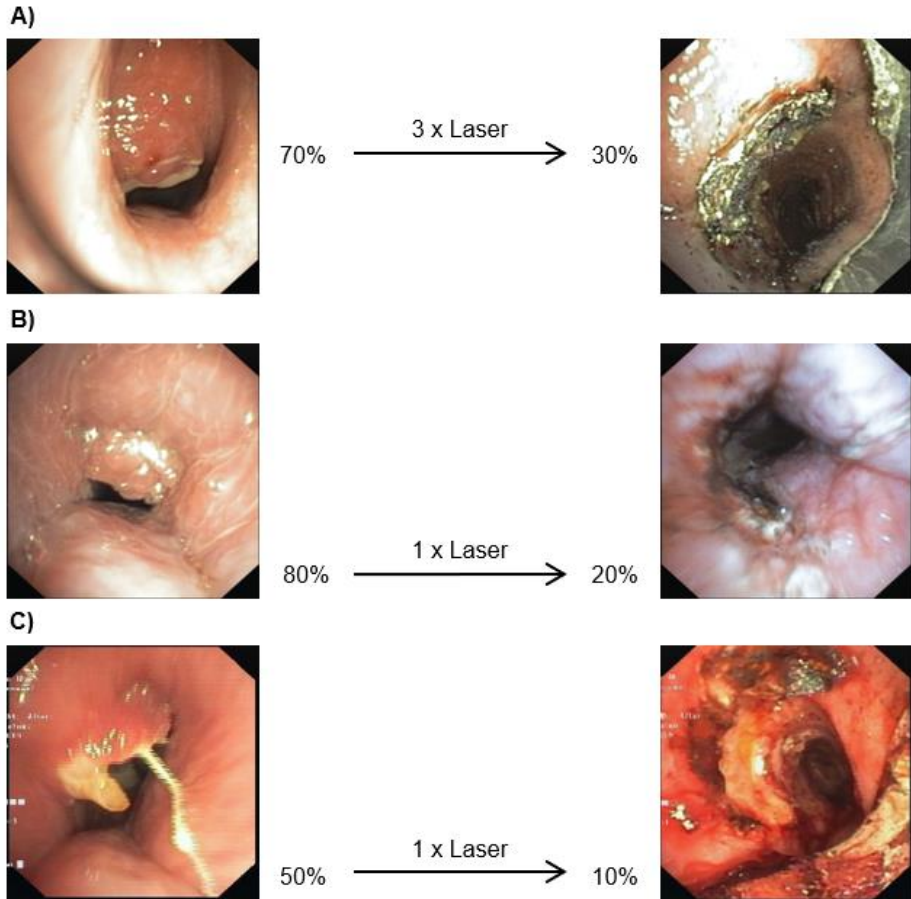


Figure S2: Tracheal stenoses following percutaneous and surgical tracheostomies



Legend

A) Subglottic stenosis (PT), B) Upper tracheal stenosis (ST), C) Upper tracheal stenosis with a tracheal cartilage ring fracture (PT); each case reported with the percentage of area stenosis before and after interventional bronchoscopy using Nd:YAG photocoagulation.

Abbreviations: PT, percutaneous tracheostomy; ST, surgical tracheostomy

Figure S3: Different types of tracheostomy tubes used during weaning

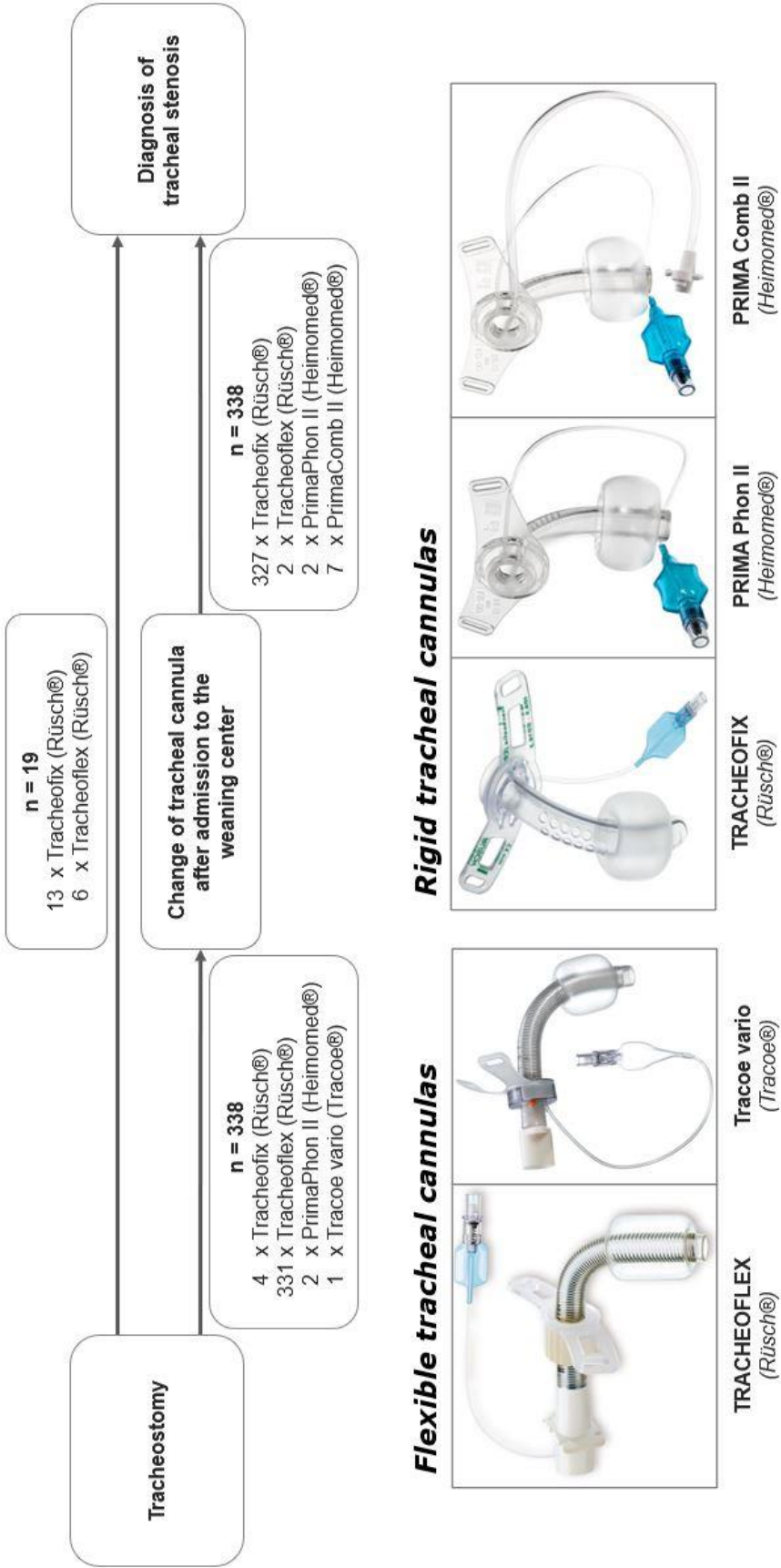


Table S1: Variables associated with tracheal stenosis – Results of univariable and multivariable binary logistic regression analysis

Variables	Univariable analysis		Multivariable analysis	
	OR (95%CI)	P value	OR (95%CI)	P value
Age	1.01 (0.99–1.03)	0.181	–	n.s.
Male gender	0.85 (0.54–1.34)	0.490	–	n.s.
Albumin	1.44 (0.92–2.25)	0.110	–	n.s.
Obesity (defined as BMI > 30 kg/m ²)	1.94 (1.19–3.16)	<0.01	2.16 (1.29–3.63)	<0.01
Diabetes mellitus	1.56 (0.97–2.51)	0.064	–	n.s.
Interstitial lung diseases	0.38 (0.13–1.15)	0.087	–	n.s.
Surgery	0.70 (0.40–1.21)	0.198	–	n.s.
Steroids	0.58 (0.26–1.32)	0.192	–	n.s.
Immunosuppression	0.65 (0.35–1.19)	0.164	–	n.s.
Cannula outer diameter (mm)	0.94 (0.76–1.18)	0.607	–	n.s.
Cannulation duration (days)	1.00 (0.99–1.01)	0.941	–	n.s.
Percutaneous tracheostomy	1.72 (0.98–3.00)	0.059	2.02 (1.12–3.66)	0.020
Cricothyrotomy status	5.53 (2.07–14.8)	<0.01	5.35 (1.96–14.6)	<0.01

Legend

The regression model variables include demographics, baseline clinical characteristics, tracheal cannula features, tracheostomy technique, and cricothyrotomy status.

Abbreviations: OR, odds ratio; 95%CI, 95% confidence interval; n.s., not significant; BMI, body mass index

Table S2: Multivariable regression model [2]

Log-odds	L = - 1.63 + (0.77 * obesity) + (0.70 * PT) + (1.68 * cricothyrotomy)			
OR (95%CI); P value	obesity	2.16 (1.29–3.63)		<0.01
	PT	2.02 (1.12–3.66)		0.020
	cricothyrotomy	5.35 (1.96–14.6)		<0.01
Hosmer & Lemeshow	0.902			
Nagelkerke R ²	0.095			
AUROC (95%CI)	0.63 (0.57 – 0.68)			
2 x 2 table	TP 14	FP 6		
	FN 100	TN 237		
Metrics from 2 x 2 table (95%CI)	Sensitivity	12% (7–20)	PLR	5.0
	Specificity	98% (95–99)	NLR	0.9
	PPV	70% (48–86)	DOR	6
	NPV	70% (69–72)	F ₁ score	0.20
	Accuracy	70% (65–75)	MCC	0.20

Legend

Abbreviations: L, log-odds; PT, percutaneous tracheostomy; OR, odds ratio; 95%CI, 95% confidence interval; AUROC, area under the receiver operating characteristic curve; TP, true positive; FP, false positive; FN, false negative; TN, true positive; PPV, positive predictive value; NPV, negative predictive value; PLR, positive likelihood ratio; NLR, negative likelihood ratio; DOR, diagnostic odds ratio; MCC, Matthews correlations coefficient [3]

References

1. Myer CM, O'Connor DM, Cotton RT. Proposed grading system for subglottic stenosis based on endotracheal tube size. *Ann Otol Rhinol Laryngol* 1994;103: 319–323
2. Leisman DE, Harhay MO, Lederer DJ, et al.. Development and reporting of prediction models: Guidance for authors from editors of respiratory, sleep, and critical care journals. *Crit Care Med* 2020;48:623–33
3. Chicco D, Jurman G. The advantages of the Matthews correlation coefficient (MCC) over F1 score and accuracy in binary classification evaluation. *BMC Genomics* 2020;21:6