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Sistema Sanitario Regione Liguria



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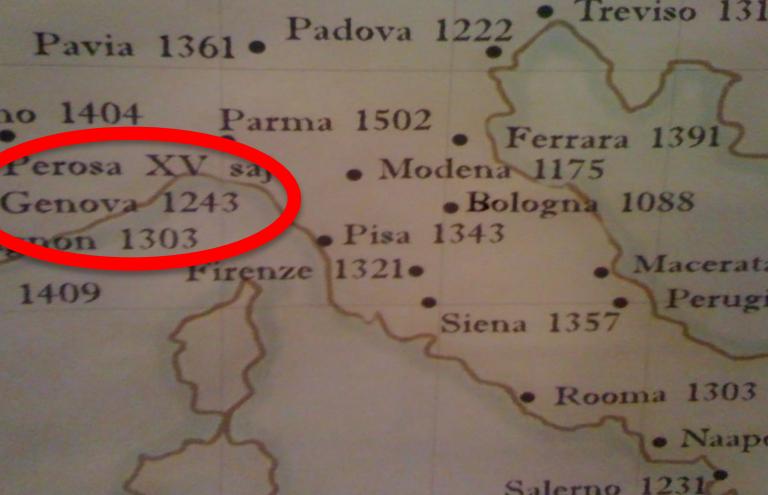
Tracheostomy in critically ill patients: new insights

PAOLO PELOSI, MD, FERS

Department of Surgical Sciences and
Integrated Diagnostics (DISC)
IRCCS AOU San Martino IST
University of Genoa, Italy

ppelosi@hotmail.com

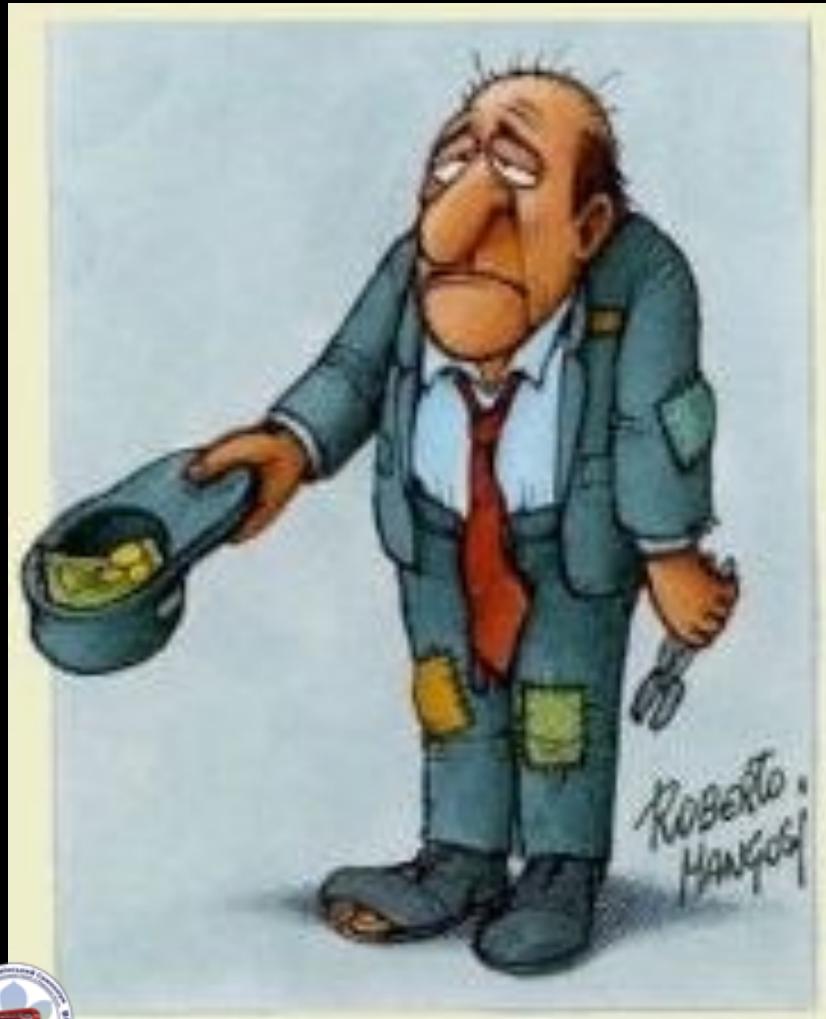
British – Ukrainian Symposium
Kiev – Ukraine – April 2018



Paolo Pelosi. 10-й Британсько-Український Симпозіум. Київ, 2018

Conflicts of interest

I declare **NO** conflicts of interest



Percutaneous Tracheostomy in Critically Ill Patients

Giuseppe Servillo
Paolo Pelosi
Editors



Paolo Pelosi. 10-й Британсько-Український Симпозіум. Київ, 2018

1	Tracheostomy: From Surgical to Percutaneous Techniques	1
	G. Servillo and P. Pelosi	
2	Anatomical and Sonographic Landmark	5
	M.G. Valerio and P. Pelosi	
3	Indication and Timing	17
	Andrea Cortegiani, Vincenzo Russotto, and Cesare Gregoretti	
4	Surgical Tracheostomy	29
	G. Dell'Aversana Orabona, M. Iannuzzi, and L. Califano	
5	Percutaneous Tracheostomy: The Claglia Techniques	37
	Christian Byhahn	
6	Balloon Dilation Tracheostomy	43
	E. De Robertis, F. Cirillo, G.M. Romano, and G. Servillo	
7	Percutaneous Tracheostomy: The Guide Wire Dilating Forceps Technique	51
	Christian Byhahn	
8	Frova's Rotational Technique and Fantoni's Translaryngeal Tracheostomy	57
	I. Brunetti and P. Pelosi	
9	Choice of the Appropriate Tracheostomy Technique	67
	Luca Cabrini, Margherita Pintaudi, Dario Winterton, Giovanni Landoni, and Alberto Zangrillo	
10	Complications of Percutaneous and Surgical Tracheostomy in Critically Ill Patients	79
	A. Marra, M. Vargas, and G. Servillo	
11	Emergency Percutaneous Tracheotomy	91
	S. Schmitz and M. Hamoir	
12	Tracheostomy Tube	97
	Types and Criteria of Choice E. Arditi, G. Russo, and P. Pelosi	
13	Airway Management During Tracheostomy	111
	Conventional Device Laryngeal Mask Airway Double Lumen Endotracheal Tube M. Vargas, A. Perrone, and G. Servillo	
14	Medical and Nursing Management of Tracheostomy	119
	A. Negro, M. Greco, and L. Cabrini	
15	Quality of Life and Complications After Percutaneous Tracheostomy	131
	Giuseppe Bello, Francesca Di Muzio, and Massimo Antonelli	
16	Clinical Practice of Informed Consent for Percutaneous Tracheostomy	149
	M. Vargas, A. Marra, G. Servillo, and P. Pelosi	
17	Tracheostomy in Intensive Care Unit: The Need of European Guidelines	155
	A. Marra, M. Danzi, M. Vargas, and G. Servillo	



Agenda

- ❖ Surgical or percutaneous tracheostomy
- ❖ Intra -post op/early-late Complications
- ❖ Early or Late Tracheostomy
- ❖ Mechanical ventilation during tracheostomy
- ❖ Mortality of tracheostomized patients
- ❖ Functional abnormalities
- ❖ Quality of Life
- ❖ Conclusions



Surgical vs Percutaneous Tracheostomies

Putensen C. et al. Crit Care. 2014 Dec 19;18(6):544



Intraoperative

- Less total bleeding
- More technical difficulties

Post-operative

- Less major bleeding
- Less stoma infection and inflammation

PT vs ST:

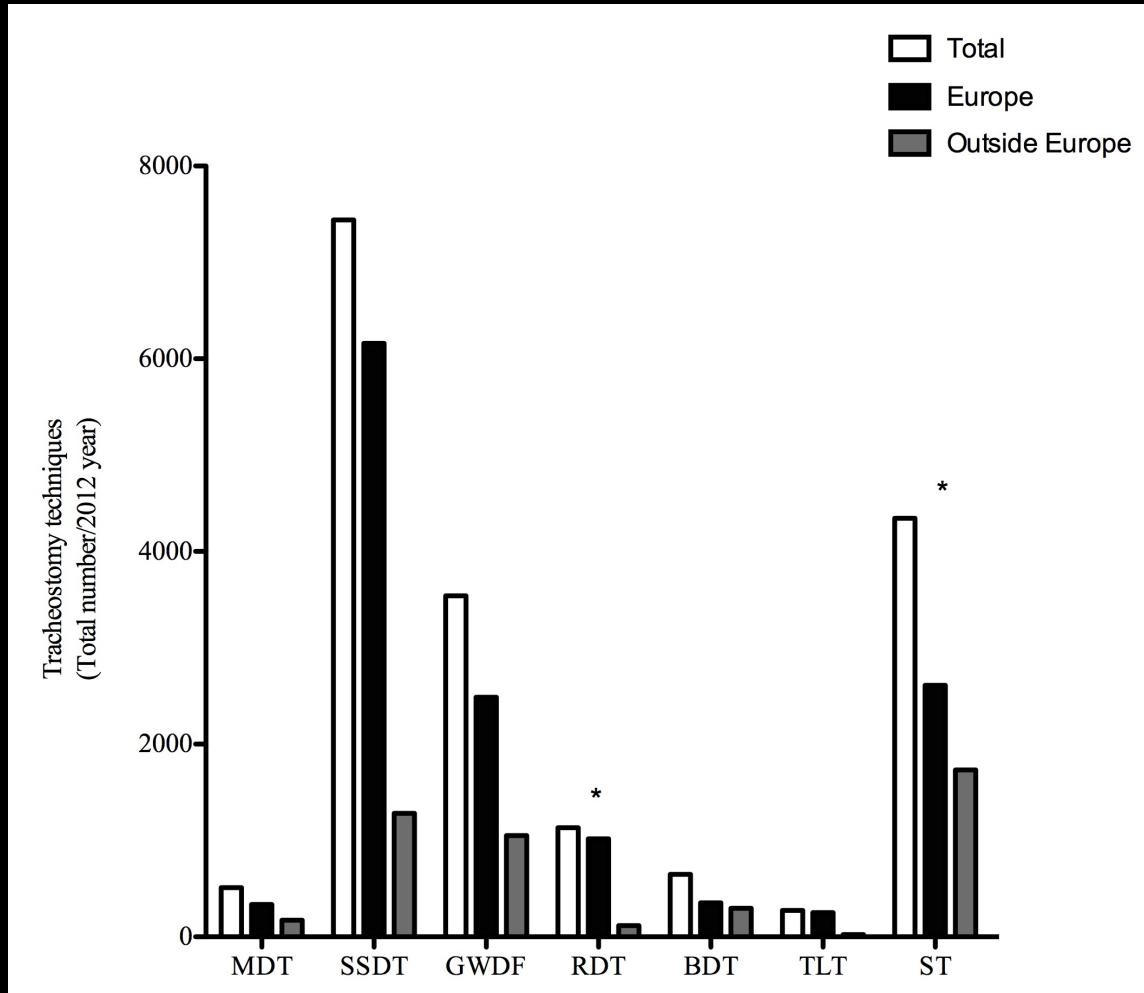
- Griggs with higher risk of intraop major bleeding
- Griggs higher risk of PNX
- Griggs lower risk of tube dislocation during the procedure

Blue Rhino
vs Griggs



Tracheostomy procedures in the intensive care unit: an international survey

Vargas et al. Critical Care (2015) 19:291



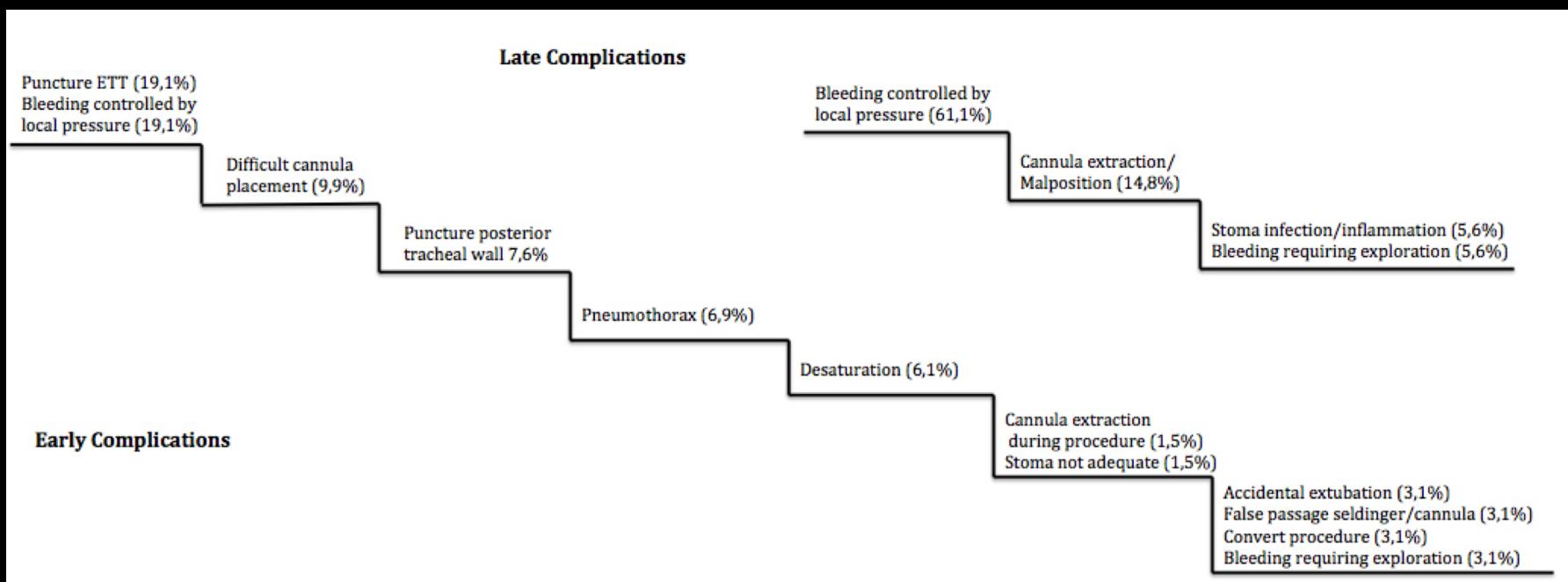
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- ❖ Surgical or percutaneous tracheostomy
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Complications for tracheostomy: the Italian Survey

Vargas M et al. Minerva Anestesiol. 2013 Feb;79(2):156-64



The most frequent
early and late complication was

“bleeding controlled by compression”



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Tracheostomy procedures in the intensive care unit: an international survey



Vargas et al. Critical Care (2015) 19:291

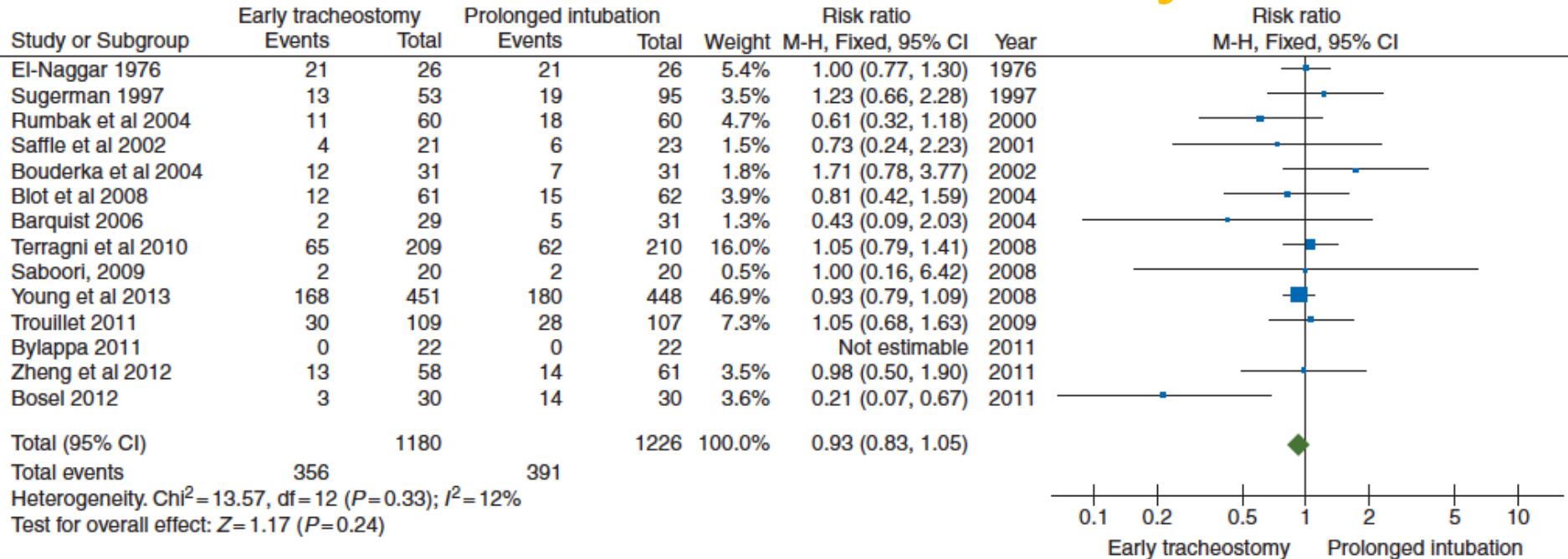
	Total	Europe	Outside Europe
Most frequent indication			
- Prolonged mechanical ventilation	151/281 (53.7 %)	107/208(51.4 %)	44/73 (60.3 %)
- Difficult/prolonged weaning	68/281 (24.2 %)	55/208 (26.4 %)	13/73 (17.8 %)
- Neurocritical disease (medical, disease, surgical or trauma involving the neurologic system)	41/281 (14.6 %)	32/208 (15.4 %)	9/73 (12.3 %)
- Inability to perform airway protection	12/281 (4.3 %)	8/208 (3.8 %)	4/73 (5.5 %)
- Inability to cough and swallow	5/281 (1.8 %)	4/208 (1.9 %)	1/73 (1.4 %)
- Improvement of patient respiratory mechanics	3/281 (1.1 %)	1/208 (0.5 %)	2/73 (2.7 %)
- Copious secretions	1/281 (0.4 %)	1/208 (0.5 %)	0
Most frequent timing			
- <7days	55/281 (19.6 %)	47/208 (22.1 %)	9/73 (12.3 %)
- 7–15 days	153/281 (54.4 %)	108/208 (51.9 %)	45/73 (61.6 %)
- 15–21 days	58/281 (20.6 %)	43/208 (20.7 %)	15/73 (20.5 %)
- 21–30 days	11/281 (3.9 %)	7/208 (3.4 %)	4/73 (5.5 %)
- >30 days	4/281 (1.4 %)	4/208 (1.9 %)	0



Effect of early tracheostomy (< 10 days) on resource utilization and clinical outcomes in critically ill patients: meta-analysis of RCTs

Szkamany T et al. British Journal of Anaesthesia 114 (3): 396–405 (2015).

No effect on Mortality



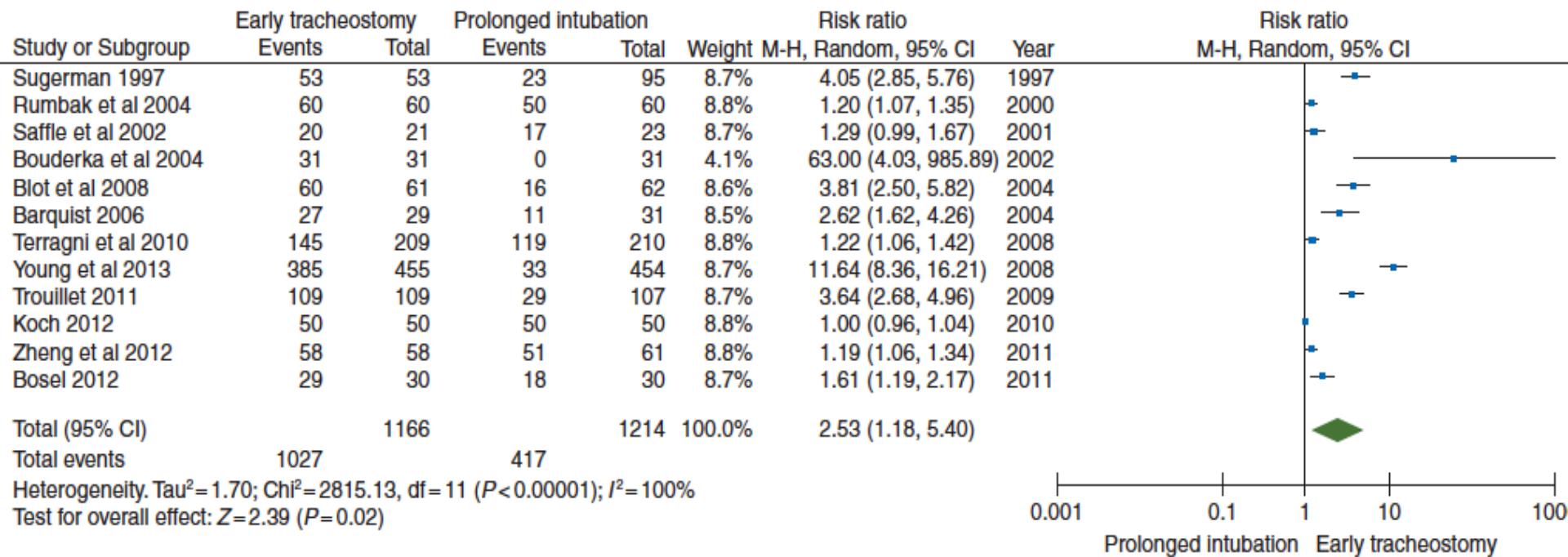
No effect on LOS, VAP, Duration of MV



Effect of early tracheostomy (< 10 days) on resource utilization and clinical outcomes in critically ill patients: meta-analysis of RCTs

Szkamany T et al. British Journal of Anaesthesia 114 (3): 396–405 (2015).

Tracheostomy procedures performed



Increased !



Agenda

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- ❖ Functional abnormalities
- ❖ Quality of Life
- ❖ Conclusions



Percutaneous tracheostomy: it's time for a shared approach!

Vargas M, Pelosi P, Servillo G Crit Care. 2014 Jul 7;18(4):448

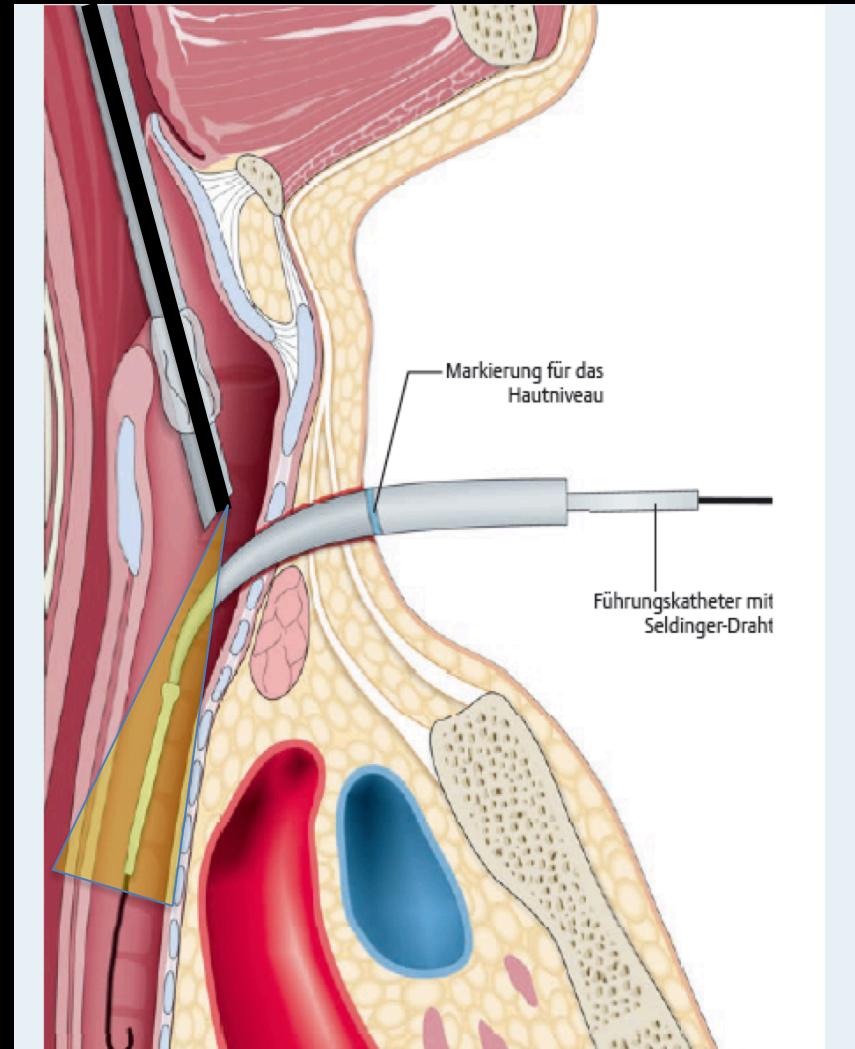
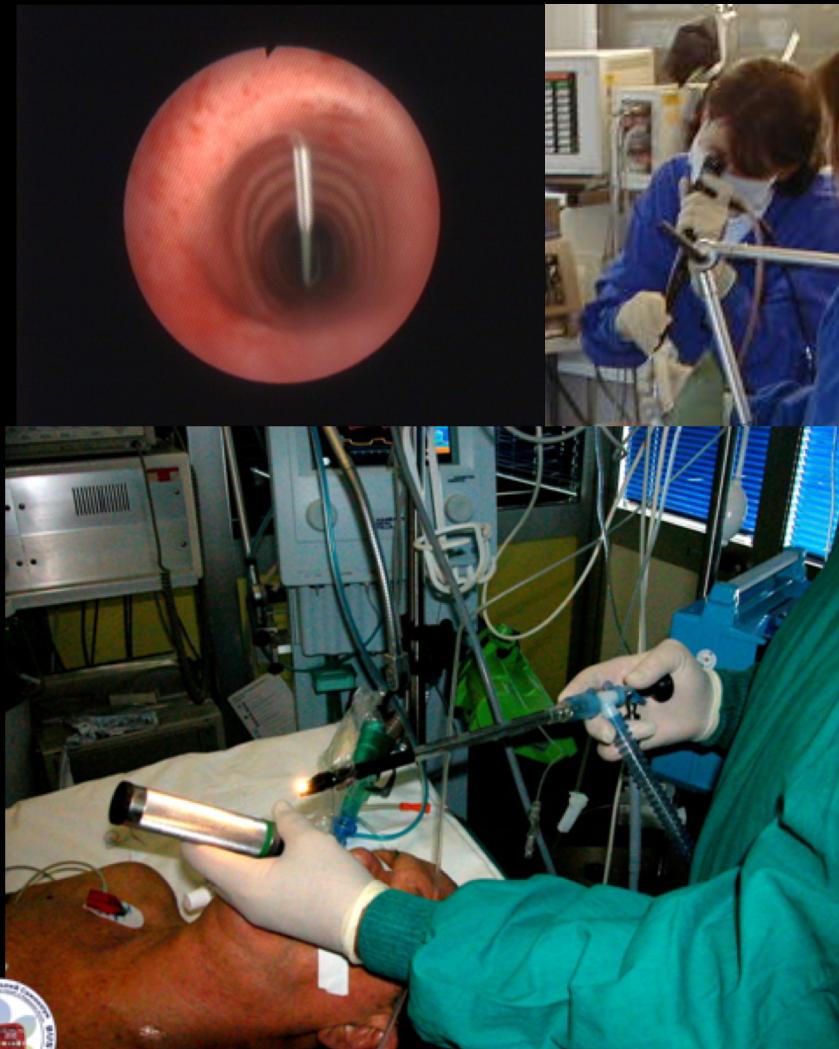
Shared clinical practice for percutaneous tracheostomy from an analysis of seven national surveys in Europe

Findings	Most common practice
Indications	Long-term mechanical ventilation, weaning failure, and upper airway obstruction
Techniques	Ciaglia single dilator and guide-wire dilating forceps
Timing	7 to 15 days after intensive care unit admission
Involved physicians in percutaneous tracheostomy	Intensivists; ear, nose, throat specialist; and general surgeon
Neck ultrasound evaluation	Screening before the procedure to assess at-risk structure
Ventilation protocol	Largely used with volume-controlled ventilation
Sedation protocol	Largely used in association with local anesthesia, analgesia, and neuromuscular blocking
Airway management	Endotracheal tube in place
Fiberoptic bronchoscopy	Largely used
Diameter of fiberoptic bronchoscope	3 to 5 mm
Procedural complications	Minor bleeding



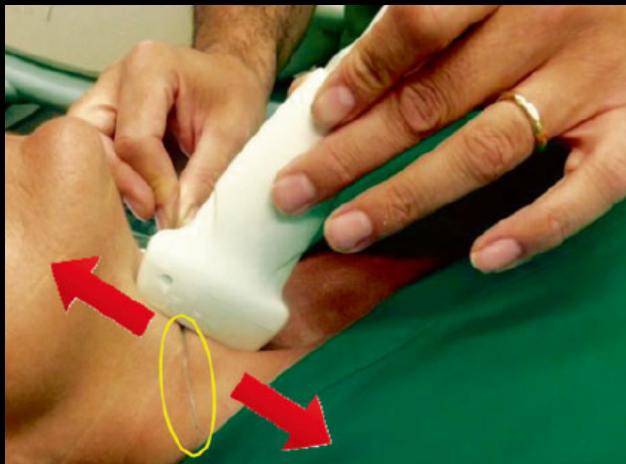
Fiberoptic Guidance during PCT

Putensen C. et al. Crit Care. 2014 Dec 19;18(6):544

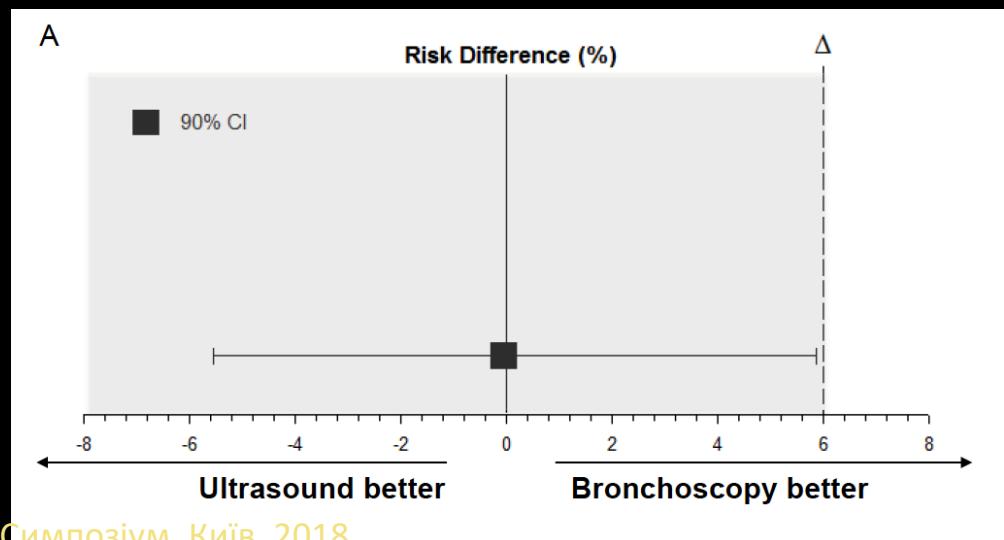
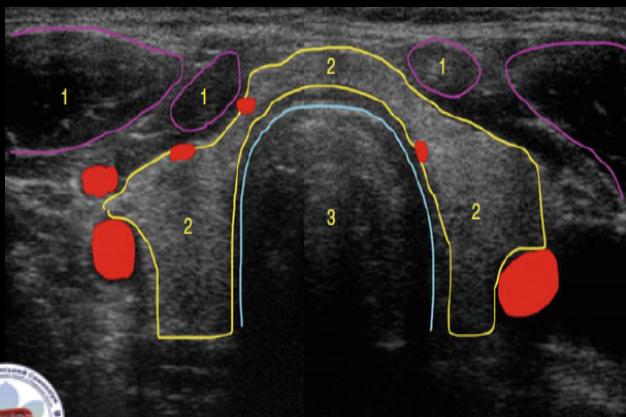


Ultrasound-Guided Percutaneous Dilational Tracheostomy versus Bronchoscopy-Guided Percutaneous Dilational Tracheostomy in Critically Ill Patients (TRACHUS): A RCT

Gobatto A et al. Intensive Care Med 2016 Mar;42(3):342-51



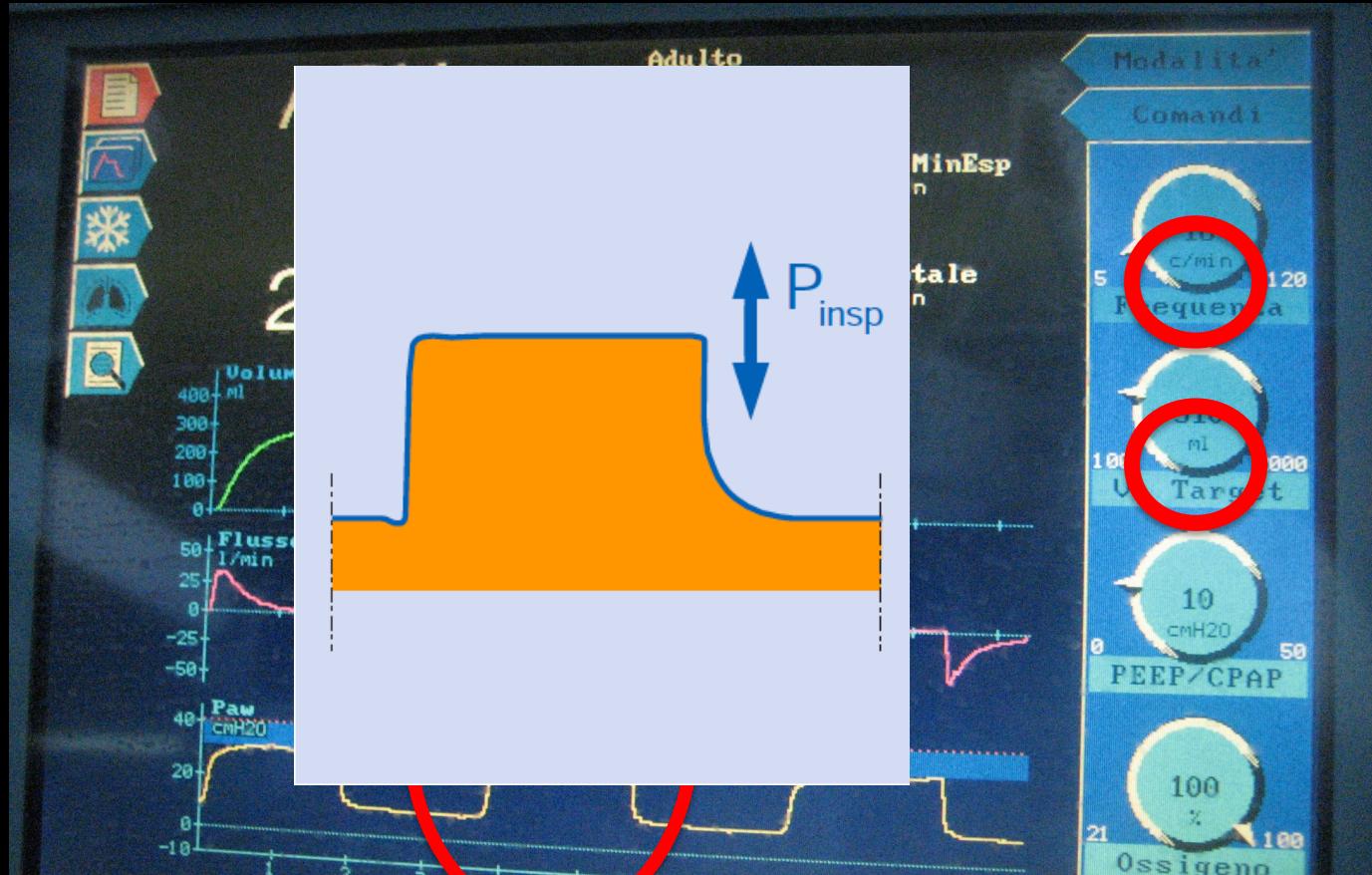
- ✓ 118 Critically ill patients
- ✓ Primary Outcome: procedure failure
 - conversion to a surgical trach
 - unplanned associated use of bronchoscopy or ultrasound during PDT
 - the occurrence of a major complication



Pressure Regulated Volume Control (PRVC)

Adaptive Pressure Ventilation (APV)

Autoflow (Volume Assured Pressure Control)

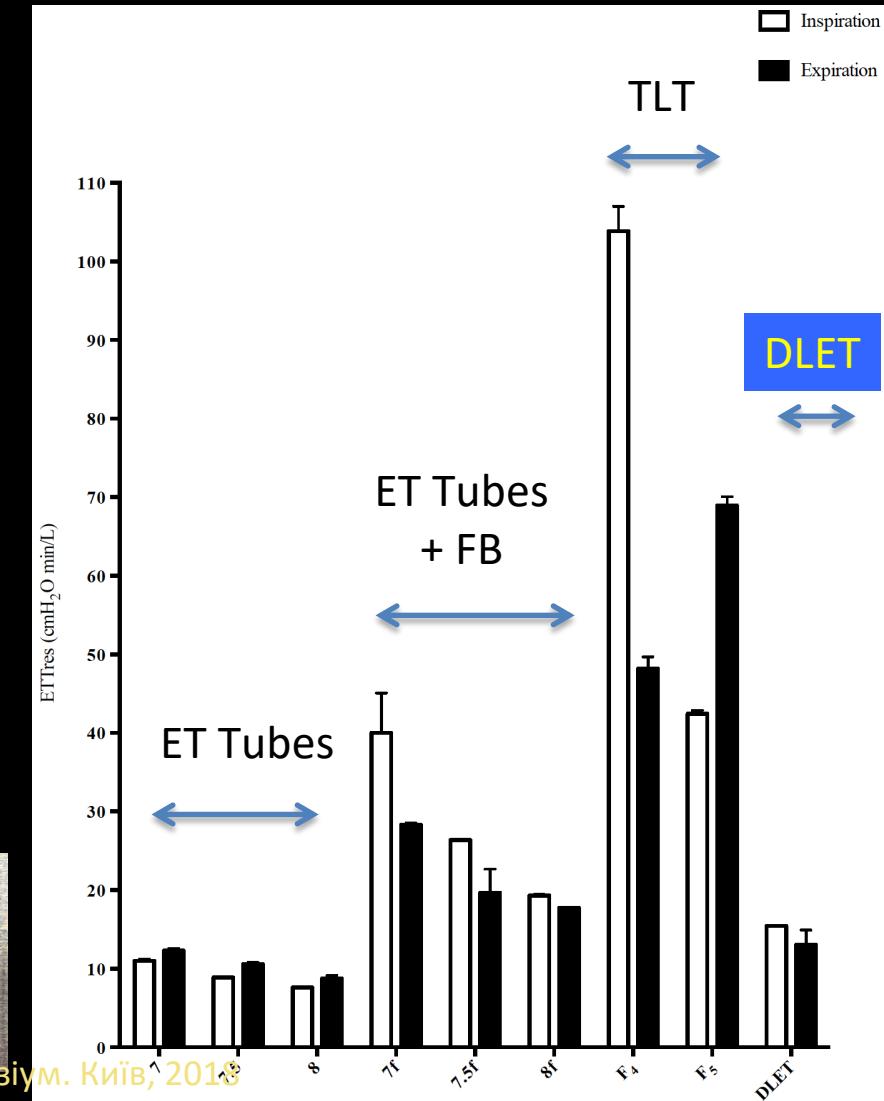
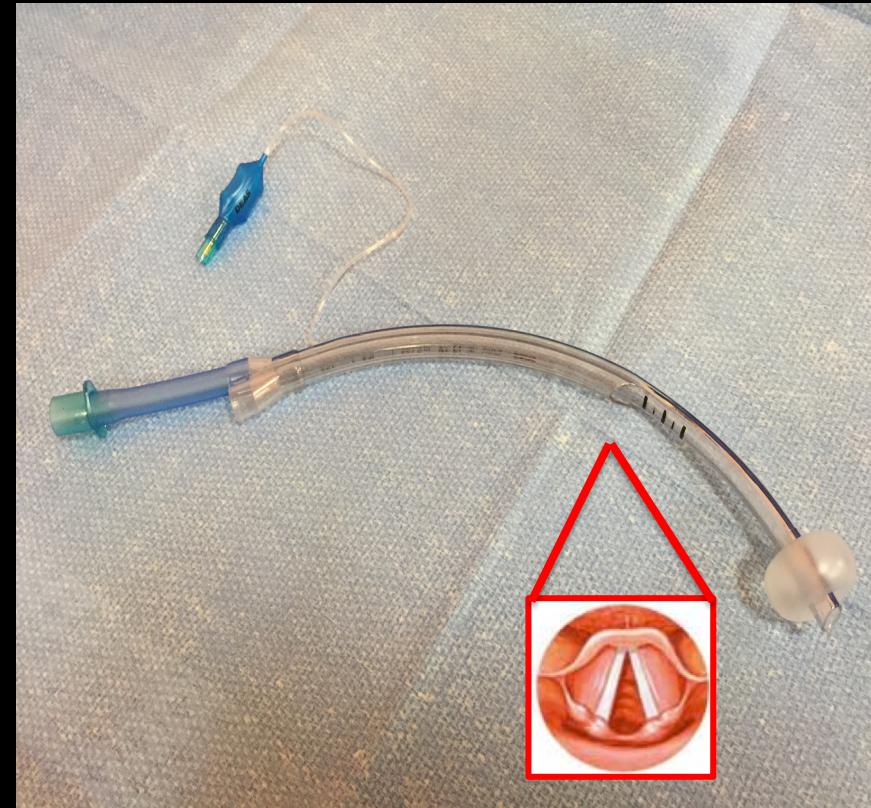


- ✓ The inspiratory pressure level is regulated until the preset volumes are delivered
- ✓ P increments: max 3 cmH₂O (PRVC), max 1 cmH₂O (APV), max 3 cmH₂O (Autoflow)
- ✓ Max P: 5 cmH₂O (PRVC), 10 cmH₂O (APV and Autoflow) below the set upper limit and alarm



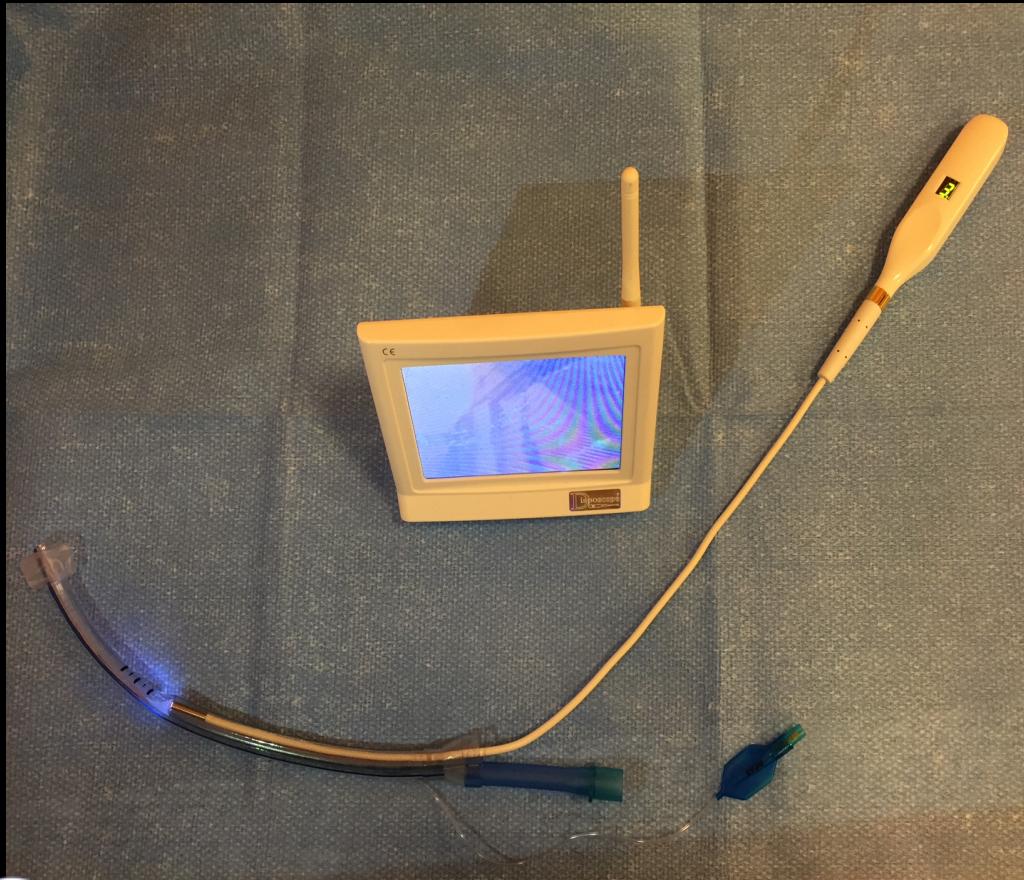
DLT- Endotracheal Tube Resistance with and without Fibroscope

Vargas M et al. Respir Care. 2014 Nov;59(11):1652-9



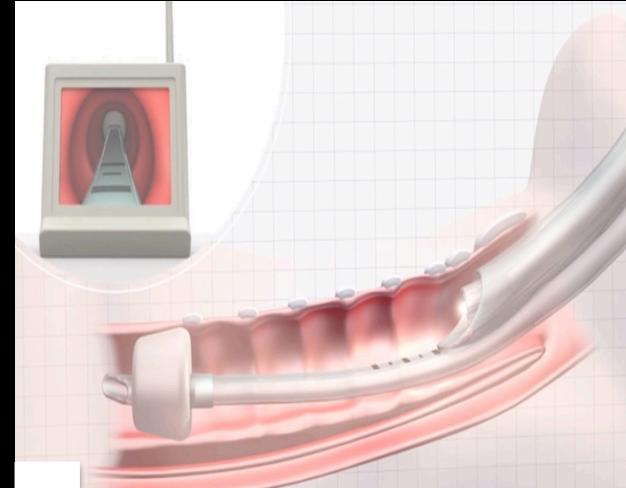
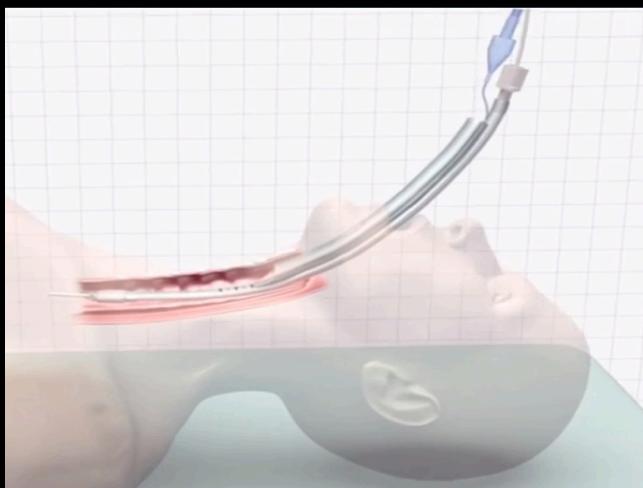
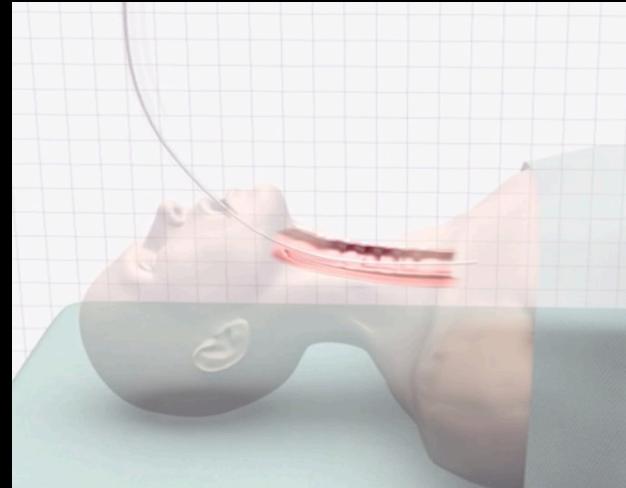
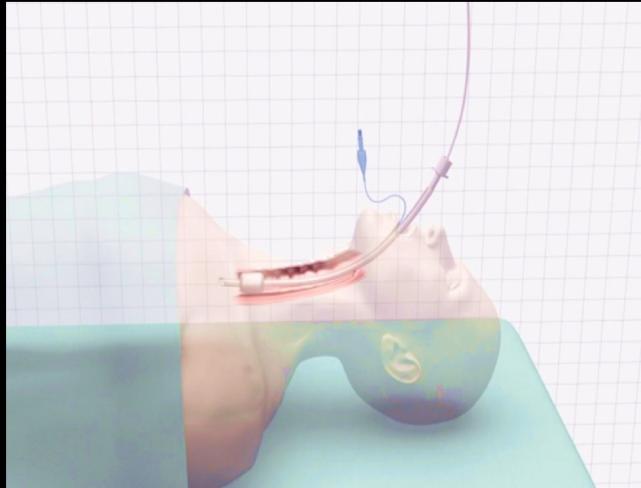
Double Lumen Endotracheal Tube For Percutaneous Tracheostomy

Vargas M et al. Respir Care. 2014 Nov;59(11):1652-9



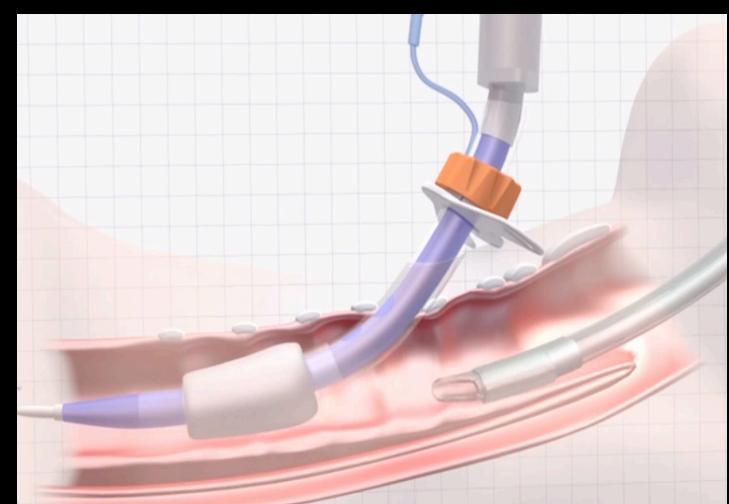
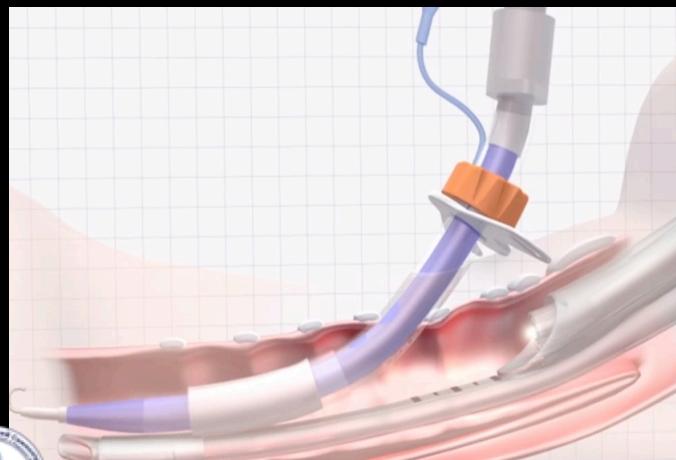
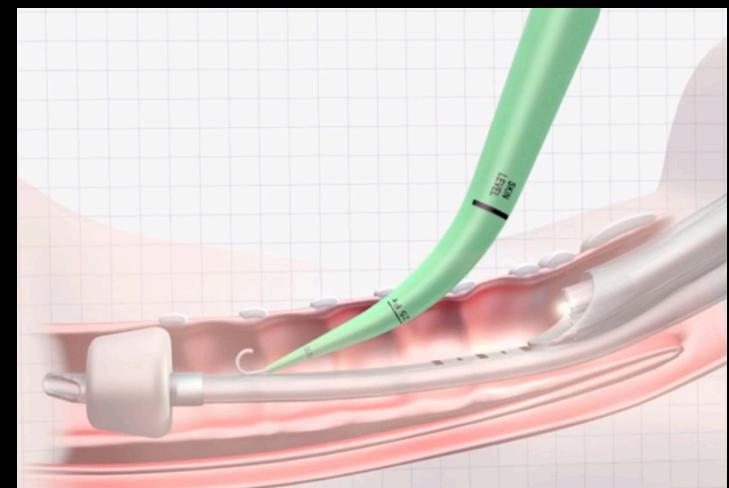
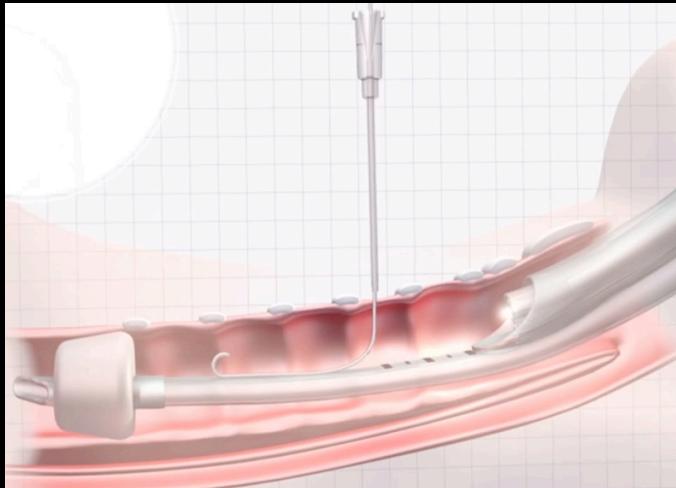
Percutaneous tracheostomy in ICU with a double lumen endotracheal tube: In-vivo evaluation

Vargas M et al. Chest. 2015 May;147(5):1267-74.



Percutaneous tracheostomy in ICU with a double lumen endotracheal tube: In-vivo evaluation

Vargas M et al. Chest. 2015 May;147(5):1267-74.



Different available kits with double-lumen endotracheal tube (DLET)

Vargas M et al. Percutaneous Tracheostomy in Critically Ill Patients, Chapter 13, pp 112-118, Springer Verlag 2016.



Ciaglia
single-step
tracheostomy



Griggs guide wire
dilating forceps
tracheostomy

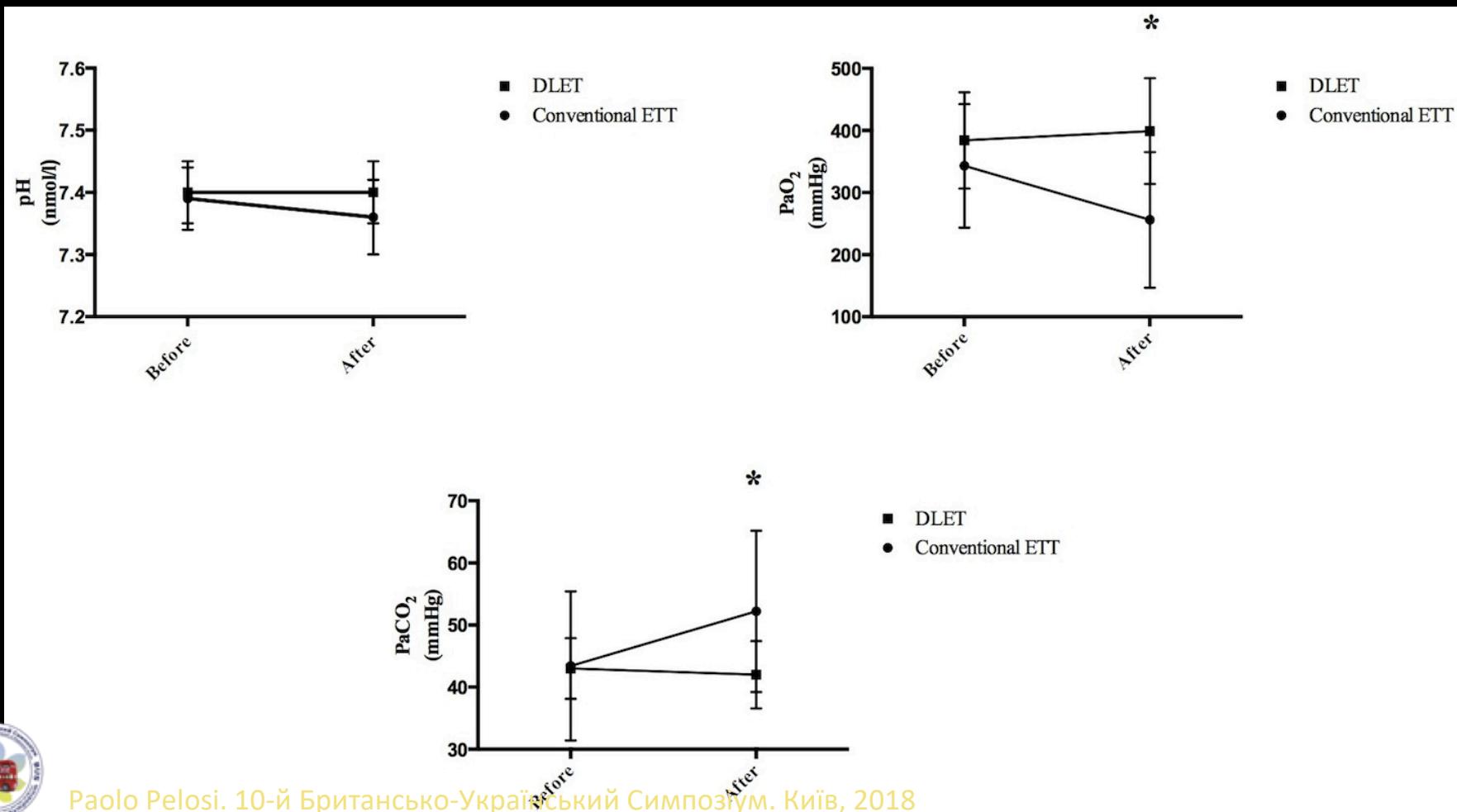


Tracheostomy
tube for DLET

Percutaneous tracheostomy in ICU with a double lumen endotracheal tube: In-vivo evaluation

Vargas M et al. Chest. 2015 May;147(5):1267-74.

Gas-exchange before and after PDT



Mechanical Ventilation during Tracheostomy: How Can We Do Better ?

- Sedation, Analgesia and Neuromuscular Blocking Protocol
- Minimize the procedural time (“Best Team” available) in high risk pts
- Use the smallest FOB
- Pressure Regulated Volume Guaranteed (V_T 7 ml/Kg) with low RR (10 breaths/minute) and I:E=1:2
- FiO_2 100% --- -or less ?
- New devices available to improve safety and ventilation



Agenda

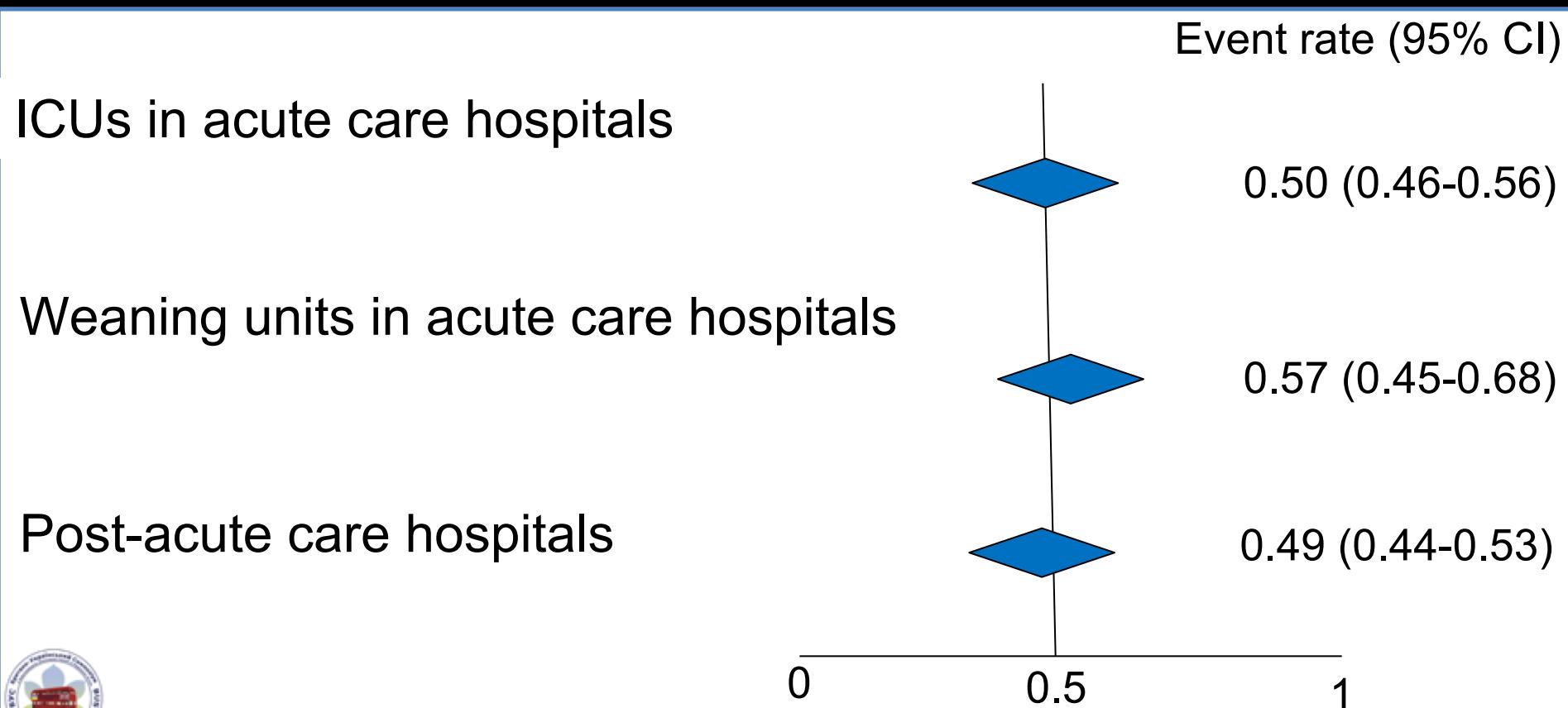
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Long-term survival of critically ill patients treated with prolonged mechanical ventilation: a systematic review and meta-analysis

Damuth E et al. Lancet Respir Med 2015;3: 544–53

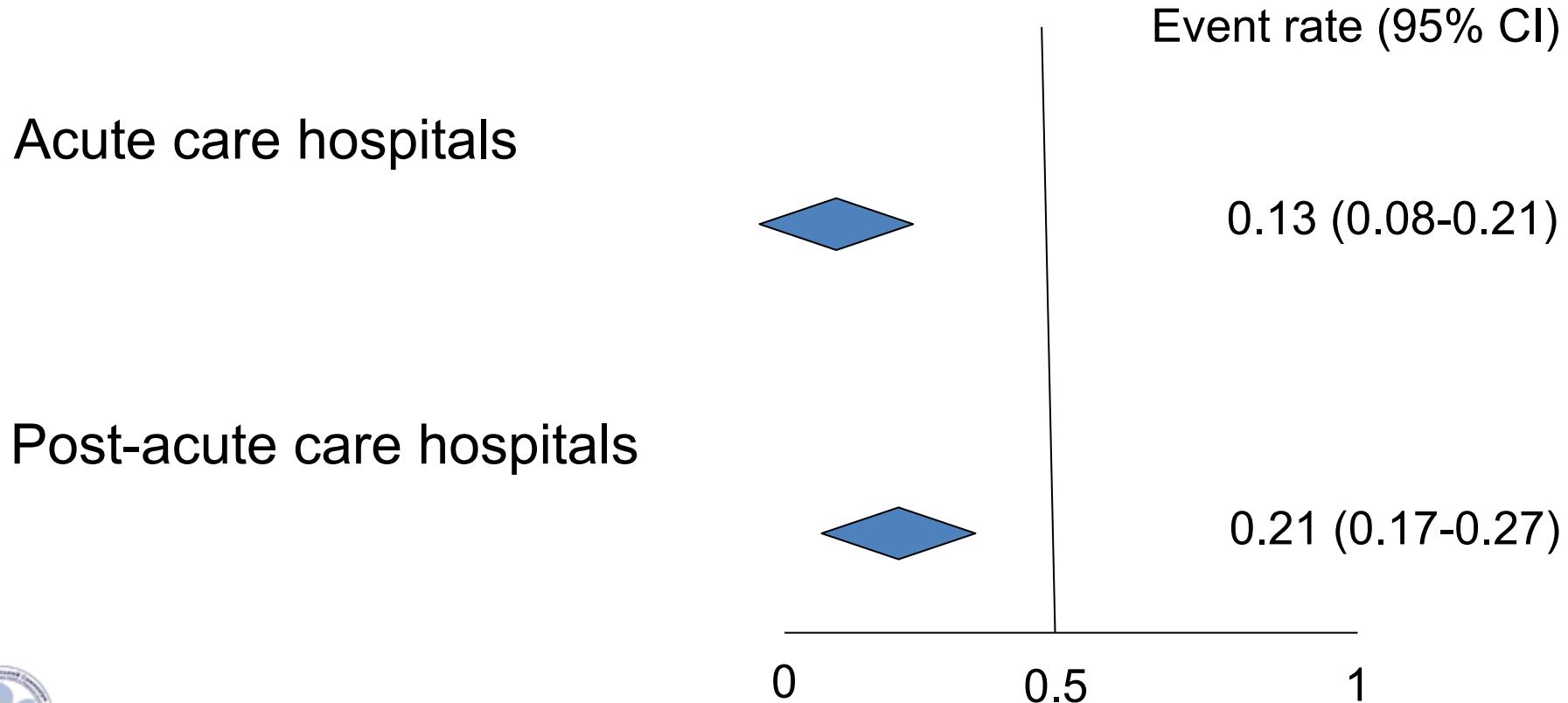
Pts successfully liberated from the ventilator in the hospital



Long-term survival of critically ill patients treated with prolonged mechanical ventilation: a systematic review and meta-analysis

Damuth E et al. Lancet Respir Med 2015;3: 544–53

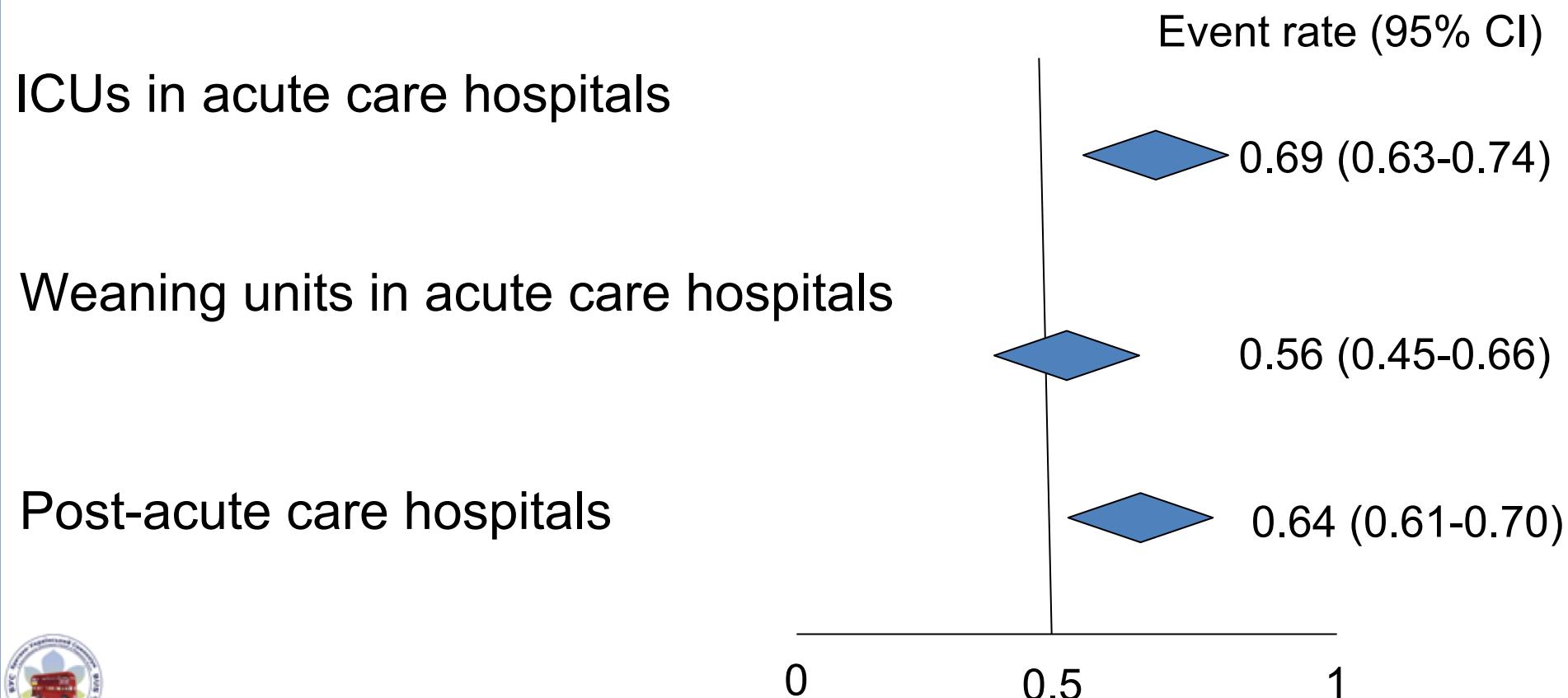
Proportion of patients discharged to home from the hospital



Long-term survival of critically ill patients treated with prolonged mechanical ventilation: a systematic review and meta-analysis

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Mortality at timepoints beyond 1 year



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Functional abnormalities after Percutaneous Tracheostomy

Fikker BG et al. Intensive Care Med 2011 Jul;37(7):1103-9

Vargas et al. Critical Care (2015) 19:291

❖ Speech difficulties	51%
❖ Coughing	30%
❖ Shortness of breath	30%
❖ Swallowing difficulties	18%
❖ Sore Throat	14%
❖ Wheezing	13%
❖ Scar problems	10% (40%)
❖ Painful	6%



Tracheostomy does not improve the outcome of patients requiring prolonged mechanical ventilation: A propensity analysis

Clech'h C et al. Crit Care Med 2007; 35:132–138.

Odds ratios for post-intensive care unit mortality associated with tracheostomy in patients matched on propensity scores

	OR	95% CI	p Value
Model 1			
All patients	2.57	1.20–5.48	.01
Patients decannulated before discharge	1.43	0.42–4.90	.56
Patients not decannulated before discharge	3.73	1.41–9.83	.008
Model 2			
All patients	2.12	1.003–4.40	.049
Patients decannulated before discharge	0.86	0.26–2.86	.80
Patients not decannulated before discharge	4.63	1.68–12.72	.003

- ❖ Tracheostomy may represent an additional risk of death after intensive care unit discharge



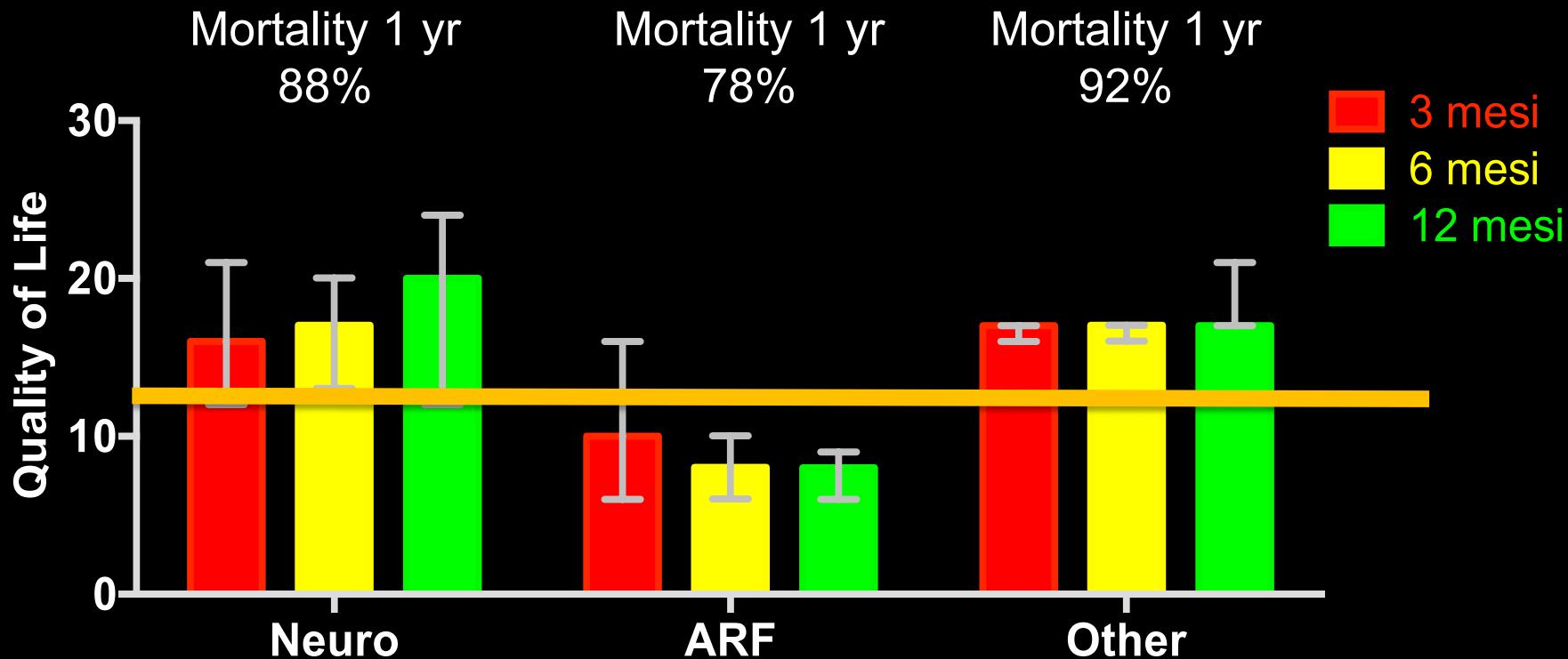
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Mortality and QoL after percutaneous tracheostomy in ICU: An observational study

Vargas M et al. Minerva Anestesiologica 2018 Jan 16



QoL = 11: mild disability

QoL = 12-15: moderate disability

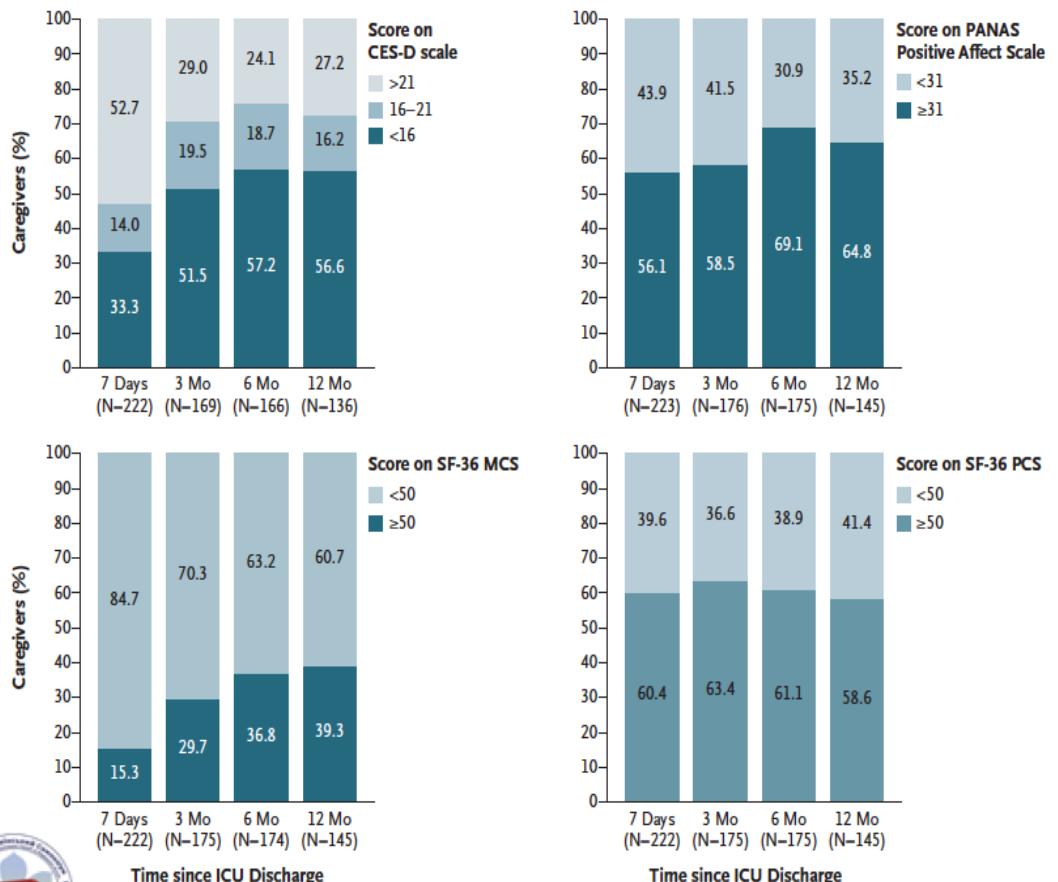
QoL >15: severe disability



One-Year Outcomes in Caregivers of Critically Ill Patients

Cameron JI et al. N Engl J Med 2016;374:1831-41

A



- ❖ Center for Epidemiologic Studies Depression (CES-D)
- ❖ Positive Affect Scale of the Positive and Negative Affective Schedule (PANAS)
- ❖ Mental Component Summary (MCS)
- ❖ Physical Component Summary (PCS)



Conclusions

- ❖ Percutaneous tracheostomy is first choice
- ❖ Indications: Prolonged MV, difficult weaning, neuro-muscular diseases
- ❖ Intra -post op/early-late Complications
- ❖ Late (after 10 days)
- ❖ General bundles to optimze tracheostomy procedure, including ECHO and MV setting
- ❖ QoL is poor and Mortality is high
- ❖ Ethical issues



Conclusions

- ❖ Percutaneous tracheostomy is first choice
 - ❖ Indications: Prolonged MV, neuro-muscular disease
 - ❖ Intra -post op / post extubation situations
 - ❖ Late (after 1 month) indications
 - ❖ Go for percutaneous tracheostomy, minimize tracheostomy duration ECHO and MV setting
 - ❖ Poor survival and Mortality is high - Follow-up
 - ❖ Ethical issues
- TRACHEOSTOMY:
ONLY WHEN ABSOLUTELY NEEDED !**



Let's make things simple LESS IS MORE

**REDUCE THE NUMBER
OF TRACHEOSTOMIES**

**Tracheostomy in intensive care:
patients and families will never walk alone!**

Pelosi P, Ball L, Brunetti I, Vargas M , Patroniti N .

Anaesth Crit Care Pain Med. 2018 Mar 17

Paolo Pelosi. 10-й Британсько-Український Симпозіум. Київ, 2018

