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TITLE: THE GUIDE WIRE DILATING FORCEPS *VERSUS* THE TRANSLARYNGEAL TECHNIQUE OF PERCUTANEOUS TRACHEOSTOMY
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Objective: Elective tracheostomy is widely considered the preferred airway management in patients on long-term ventilation (1). Besides open tracheostomy, a number of percutaneous procedures have been introduced within the last two decades, among them the techniques according to Griggs (GWDF) (2) and Fantoni (TLT) (3). The aim of the study was to evaluate these two techniques in terms of perioperative complications, risks and benefits in critically ill patients.

Methods: After approval of the institutional ethics committee, 100 critically ill adult patients on long-term ventilation received elective percutaneous tracheostomy, either according to Griggs (n=50) or Fantoni techniques (n=50). Tracheostomy was performed at the patient's bedside and under general anesthesia. The fraction of inspired oxygen was set to 1.0 5 minutes prior to tracheostomy, and the PEEP-level was reduced to a maximum of 5 mmHg if necessary. Under every instance, flexible fiberbronchoscopy was used throughout puncture, stoma dilation, and cannula placement. Intraoperative monitoring consisted of electrocardiogram, arterial line, central venous pressure, and pulse oximetry.

Results: Mean operating times were short, 9.2±3.9 (TLT) and 4.8±3.7 (GWDF) minutes on the average ($p<0.05$). 4 perioperative complications were noted. During GWDF, massive bleeding required administration of coagulation factors in one patient, but no packed red blood cells were needed. Mediastinal emphysema occurred in another patient a few hours after uneventful GWDF, but resolved spontaneously within the next 72 hours. When TLT was performed, a posterior tracheal wall injury required emergency conversion to open tracheostomy, and in another patient pretracheal placement of the tracheostomy tube resulted in TLT abortion. Uncomplicated PDT was performed instead. With regard to gas exchange, pre- and postoperative PaO_2 and $PaCO_2$ did not vary significantly (see Table), and no intraoperative hypoxia was noted either, regardless of the technique used.

	TLT (n=50)		GWDF (n=50)	
	before	after	before	after
FiO_2	0.52±0.18*	0.62±0.21*	0.58±0.21	0.63±0.26
	(0.21-1.0)	(0.30-1.0)	(0.30-1.0)	(0.30-1.0)
PaO_2	104.3±26.8	103.7±29.3	100.1±22.0	94.5±26.9
(mmHg)	(64.5-210.0)	(66.0-219.1)	(67.0-171.3)	(51.0-207.5)
$PaCO_2$	34.2±4.1	33.8±3.7	35.3±4.2	35.2±4.0
(mmHg)	(26.7-51.4)	(29.5-49.3)	(29.3-58.4)	(29.1-53.7)

Data are means±SD and (range)
*: $p<0.05$ (Wilcoxon-Mann-Whitney-Test)

Conclusion: We conclude that both TLT and GWDF represent attractive and safe alternatives to conventional tracheostomy or other percutaneous procedures if carefully performed by experienced physicians and under bronchoscopic control.

References:
(1): Heffner et al., Chest 1986;90:269-274
(2): Griggs et al., Surg Gynecol Obstet 1990;170:261-263
(3): Fantoni and Ripamonti, Intensive Care Med 1997;23:486-492

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TITLE: THE DEVELOPMENT OF NOVEL MRI TECHNIQUES: COMPARISON WITH STANDARD METHODS
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As novel techniques of magnetic resonance imaging (MRI) are being developed into potentially quantifiable methods, we are comparing them to the standard, well-accepted anatomic technique of the single photon emission computed tomography (SPECT), and the physiologic test of the multiple inert gas elimination technique (MIGET).

After institutional approval (Office of Research Administration, Univ. of Pennsylvania, PA), Yorkshire pigs (25 kg) were sedated with im ketamine (20 mg/kg), xylazine (1 mg/kg), and atropine (0.04 mg/kg). Pigs were intubated and maintained with isoflurane anesthetic. A pulmonary artery catheter and arterial line were placed.

Hyperpolarized ^{3}Helium (^{3}He), produced by optical pumping via spin-exchange collision techniques (1), is a novel contrast agent of the airways. Before MRI imaging, hyperpolarized ^{3}He was delivered through an O-ring sealed valve during end-inspiration. For MRI imaging of pulmonary vessels, we first injected 5 cc gadolinium. Anatomic comparison with the SPECT was performed with 20 mCi of ^{133}Xe for airway images, and 2 mCi of Tc-99 MAA for pulmonary vessel images. For MIGET, 6 inert gases were infused, and samples (expired gas, arterial, and mixed venous blood) were analyzed with the Micropore Membrane Inlet Mass Spectrometer (MMIMS) technique (2).
RESULTS: Hyperpolarized ^{3}He imaging shows a normal airspace distribution (Figure). Both hyperpolarized ^{3}He and gadolinium images showed a distribution similar to the SPECT. MIGET results depicted a normal V/Q distribution.
CONCLUSION: The ability to perform MRI imaging, SPECT, and the MIGET in the same animal provides a powerful tool to assess promising new MRI techniques for the imaging of ventilation and perfusion.

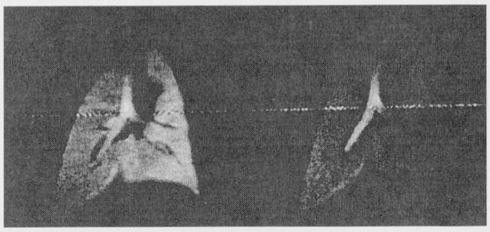

Figure. Novel hyperpolarized ^{3}He MRI images in the normal, anesthetized pig.

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1. Middleton H, et al. Magn. Reson. Med., 1995; 33:271-75.
2.Baumgardner JE, et al. J Mass Spectrom., 1995; 30:563-71.
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