

BLF22 Surgical Protocol

Bronchotracheal Perfusion Measurement in Sheep

APPLICATION BASICS

Site: Tracheobronchial wall
 Species: Sheep
 Weight: 36 - 61 kg
 Duration: Acute

PROBE TYPE: E with modification: a rigid sleeve is applied one inch from the end, forming a permanent 45° angle in the flexible teflon coated endoscopic cable.

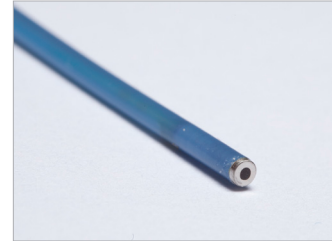
Application

A technique for diagnosing inhalation injury in the early post-burn phase. After smoke insufflation of the right lung, the following blood flow measurements were obtained: right lung: 51.7 ± 2.1 TPU; left lung, unchanged from baseline

Surgical Approach

1. Anesthetize the animal with ketamine (5 mg/kg).
2. Perform a tracheostomy, insert a 10 mm tracheostomy tube and connect to a ventilator. Ventilate with a tidal volume of 15 ml/kg and a positive end expiratory pressure of 5 cm H₂O. Maintain end-tidal carbon dioxide between 30 and 35 mmHg by adjusting the respiratory rate and the minute volume. Maintain anesthesia with halothane at 2 - 3% when the effect of the ketamine wears off. Adjust halothane anesthesia to maintain mean arterial pressure of 80 mmHg.
3. Insert the Laser-Doppler Probe through the tracheostomy tube and place it at the mucosal surface of the wall of the second generation bronchi. Verify positioning of the Probe by bronchoscopy.
4. Verify that the Probe is not putting pressure on the tissue by:
 - Connecting the Probe to the Tissue Perfusion Monitor and observing the Monitor reading.
 - Press the probe against the tissue.
 - Then, in successive small steps, move the Probe back from the tissue, reducing the pressure. After each step, wait for the motion artifact to dissipate and then note the reading. Continue the steps until the reading no longer increases (indicating that the vessels are not occluded by pressure from the Probe).
5. Record the flow on a chart recorder or computer using the analog or digital ports on the Tissue Perfusion Monitor or manually record the high, and low values from the front panel during a 30-second period and average the values.

TYPE E (Endoscopy) (ABLPHE)



Diameter: 1.8 mm
 Head: Teflon coated cable with 1 mm titanium disc at tip of endoscopy segment; Length: 2 meters
 Cable: flexible; 2 meters
 Total length: 4 meters

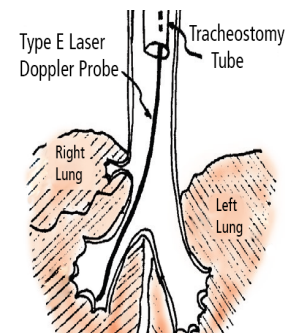


Fig. 1: Type E Probe shown emerging from the tracheostomy tube and placed against the second generation bronchus wall.

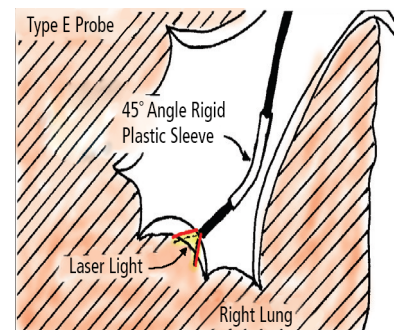


Fig. 2: End of Laser-Doppler Probe with rigid plastic sleeve applied over teflon coating to provide a 45° angle.

Bronchotracheal Perfusion Measurement in Sheep cont.

Perfusion Ranges Observed

SECOND GENERATION BRONCHUS WALL	
Right Lung	35.1 ± 2.6 TPU
Left Lung	35.1 ± 2.6 TPU

ACKNOWLEDGEMENT

Protocol and data courtesy of D.N. Traber, PhD, University of Texas Medical Branch & Schriners Burns Institute, Galveston, TX 77550 and H.M. Loick, Klinik und Poliklinik für Anästhesiologie und op. Intensivmedizin, Universität Münster, Germany.

REFERENCES

Loick HM, Traber LD, Hurst C, Herndon DN, Traber, D.L., "Endoscopic Laser Flowmetry: A Valid Method for Detection and Quantitative Analysis of Inhalation Injury," J. of Burn Care Rehabilitation, Vol. 12, No. 4, pp 313-318, 1991.

Kimura R, Traber LD., Herndon DN, Linares HA, Lubbesmeyer HJ, Traber DL, "Increasing Duration of Smoke Exposure Induces More Severe Lung Injury in Sheep," J. of Applied Physiology, Vol. 64 pp 1107-1113, 1988.



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