Optical fibre sensing of endotracheal tube cuff contact pressure and trachea mucosa perfusion

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1 - Introduction

- **Endotracheal tube (ETT):** disposable medical device used to deliver humidified gas into the lungs during mechanical ventilation.
  - ETT’s cuff sits in the trachea and has two functions: 1) to provide sealing and avoid leakage of the gas delivered around the tube; and 2) to act as a physical barrier to prevent aspiration of secretions from the airways to the lungs.
  - Traditionally, clinicians measured the intra-cuff pressure as a surrogate of contact pressure. Intra-cuff pressures > 4.8 kPa impede capillary blood flow and the mucosal lining of the trachea may be damaged (long term stenosis). Intra-cuff pressures < 2.5 kPa may increase the risk of aspiration of mucosal secretions (causing a higher incidence of ventilator associated pneumonia) [1-3].

2 - Sensors working principle

![Diagram showing the principles of FBG sensor and PPG signal](image)

3 - Results

![Graphs showing pressure changes inside and outside the trachea](image)

REFERENCES


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