Retrograde nasotracheal intubation with a new tracheal tube: a feasibility study

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We have assessed the feasibility of retrograde nasotracheal intubation using a flexometallic tracheal tube with a detachable pilot balloon and connector in a study of 20 consecutive adult patients undergoing oropharyngeal surgery. The technique consisted of: (1) laryngoscope-guided orotracheal intubation; (2) insertion of an 18-gauge Foley catheter through the nose and retraction into the mouth; (3) detachment of the anaesthesia circuit, pilot balloon and connector; (4) insertion of the Foley catheter tip into the proximal end of the tracheal tube and inflation of the Foley catheter cuff; (5) withdrawal of the Foley catheter and attached tracheal tube back through the nose; (6) deflation of the Foley catheter cuff; and (7) reattachment of the pilot balloon, connector and anaesthesia circuit. The technique was successful at the first attempt in all patients. Mean time taken to insert the Foley catheter and retract it into the mouth was 19 (range 12–30) s. Mean time taken from disconnection to reconnection of the anaesthesia circuit was 8 (6–10) s. Heart rate increased after intubation, but there were no significant changes in arterial pressure. Nasal bleeding, airway problems and hypoxic events did not occur. No anatomical abnormalities or nasal trauma were detected at rhinoscopy. We conclude that retrograde nasotracheal intubation is feasible using a flexometallic tracheal tube with a detachable pilot balloon and connector.

Keywords: equipment, Foley catheter; equipment, tubes tracheal; intubation nasotracheal, technique; surgery, oropharyngeal

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Conversion of oral to nasotracheal intubation usually involves passage of a second tracheal tube through the nose and removal of the orotracheal tube. Limitations of this technique are that direct laryngoscopy is required and the airway is not protected during the exchange. We considered that retrograde nasal passage of the proximal portion of an orally placed tracheal tube might be better if a suitable tracheal tube were available. We have assessed the feasibility of retrograde nasotracheal intubation in 20 anaesthetized patients using a new flexometallic tracheal tube which has a detachable pilot balloon and connector.

Methods and results

We studied 20 consecutive adult patients requiring nasal intubation for elective oropharyngeal surgery after obtaining approval from the Ethics Committee and written informed consent. Patients were excluded if they were less than 18 yr, had a predicted or known difficult airway or had nasal pathology. The patency of each nostril was tested by asking the patient to sniff. Premedication comprised midazolam 0.04 mg kg⁻¹ i.v., approximately 30 min before anaesthesia. Standard monitoring was applied, including an ECG, pulse oximeter, capnograph, non-invasive arterial pressure monitor and a peripheral nerve stimulator. Xylometazoline 0.1% vasoconstrictor nasal spray was applied to each nostril. Anaesthesia was induced with fentanyl 3 μg kg⁻¹ and propofol 3 mg kg⁻¹ and maintained with 1.5% isoflurane and 67% nitrous oxide in oxygen. Neuromuscular block was produced with vecuronium 0.1 mg kg⁻¹.

Laryngoscope-guided orotracheal intubation was performed when the train-of-four count was one or less using a flexible tracheal tube with a detachable pilot balloon and connector (Agro Tube, Dar-Mallinckrodt, Modena, Italy) (Fig. 1). A size 7.5 tracheal tube was used for females and a size 8.0 for males. Two consultant
Heart rate and arterial pressure were recorded immediately before the Foley catheter was inserted and immediately after retrograde nasal intubation was complete. Nasal bleeding, airway problems or hypoxic events (SpO₂ <95%) were documented. The tracheal tube was removed at the end of surgery when the patient was awake. Bilateral rhinoscopy was performed in both nostrils before intubation and after extubation. Statistical analysis was performed using the paired t test. Significance was taken as P<0.05.

Mean age, height and weight were 42 (range 20–68) yr, 178 (168–185) cm and 75 (58–90) kg, respectively. The male:female ratio was 16:4. Intubation was successful at the first attempt in all patients. There was no resistance felt during retrograde passage of the tracheal tube. The mean time taken to insert the Foley catheter and pull it from the mouth was 19 (range 12–30) s. Mean time from disconnection to reconnection of the anaesthesia circuit was 8 (6–10) s. Duration of surgery was 97 (45–180) min. Mean heart rate increased (72 (SD 11) vs 81 (16) beat min⁻¹; P=0.05), but no significant changes were noted in systolic (120 (23) vs 123 (15) mm Hg) or diastolic (63 (10) vs 68 (10) mm Hg) arterial pressures. There were no episodes of nasal bleeding, airway problems or hypoxic events. No anatomical abnormalities or nasal trauma were detected at rhinoscopy.

Comment

We found that retrograde nasal intubation was feasible in anaesthetized patients using a tracheal tube with a detachable pilot tube and balloon. Epistaxis has been noted in 5–80% and mucosal bruising in 54% of nasally intubated patients.1,2 We observed no cases of epistaxis or mucosal bruising, but our small sample size means that the true incidence of these and other complications is unknown. Retrograde nasal intubation may be useful where mid-surgery conversion to nasotracheal intubation is planned (e.g. major maxillofacial surgery) or might be required (e.g. malocclusion testing after molar teeth extraction). It may also be useful if conventional anterograde nasotracheal intubation has failed because an unfavourable angle of approach causes repeated impaction of the tracheal tube tip against the anterior glottis or trachea.

Possible advantages over conventional nasotracheal intubation are a lower incidence of trauma to the posterior pharyngeal wall and a lower incidence of tracheal tube obstruction caused by impaction of mucus or nasal tissues.3 Potential disadvantages are that retrograde nasal intubation requires use of a specific tracheal tube and that accidental extubation is possible during withdrawal of the Foley catheter or while manoeuvring the tracheal tube in the oropharynx. A potential disadvantage of a detachable pilot catheter to disconnection of the anaesthesia circuit; and (3) time from disconnection to reconnection of the anaesthesia circuit.
balloon is a leak from the junction, but this was not observed.

We conclude that retrograde nasotracheal intubation is feasible using a flexometallic tracheal tube with a detachable pilot balloon and connector.

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References