USE OF SUCTION CATHETERS AS AN ALTERNATIVE TO TRACHEAL TUBES IN ADULTS

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SUMMARY

A 16-gauge suction catheter (i.d. 4.0 mm) was used to intubate the trachea in two patients in whom the larynx was narrowed as a result of pathological lesions, and normal, small diameter tracheal tubes were too short. (Br. J. Anaesth. 1992; 69: 657–658)

KEY WORDS

Equipment: suction catheter. Intubation, trachea.

Narrowing of the airway in adult patients is a relatively uncommon occurrence. When it occurs, it may result in severe difficulties in airway management. We report the use of a suction catheter to intubate the trachea in two such patients.

CASE REPORTS

Patient No. 1

A 15-yr-old girl weighing 50 kg presented for direct laryngoscopy and excision of a laryngeal web. She had previously received multiple surgical and laser treatments for recurrent laryngeal polyps. Her presenting complaints were shortness of breath and inspiratory stridor after walking up a flight of stairs. At indirect laryngoscopy before operation, the ENT surgeons failed to see the larynx. At the patient's previous general anaesthetic 2 years previously, a size 4.0 mm i.d. tracheal tube had been used.

The patient was premedicated with temazepam 20 mg orally 90 min before induction of anaesthesia. After cannulation of a vein, anaesthesia was induced with an increasing percentage of halothane in oxygen. When an adequate depth of anaesthesia had been reached, direct laryngoscopy was performed. This showed that the anterior parts of the vocal cords were fused and the laryngeal inlet was small, approximately 4.0 mm in diameter. There appeared to be no movement of the cords in relation to ventilation, therefore a neuromuscular blocker was not given to facilitate intubation. A size 4.0 mm i.d. tracheal tube was passed through the laryngeal inlet. This was the largest tracheal tube that would pass through the narrowed larynx. However, the distal end of the tracheal tube was only 1.0 cm past the laryngeal inlet, with the proximal end abutting the teeth. It was considered that the tube could be dislodged easily from the trachea as a result of surgical manipulation or neck movement. It was decided, therefore, to intubate the trachea with a 16-gauge suction catheter (4.0 mm i.d.). A 15-mm Portex tracheal tube connector which is normally attached to a size 4.0 mm tracheal tube was attached to the suction catheter. This was connected to a catheter mount. The suction catheter was passed with ease and its position adjusted. The lungs were inflated manually without difficulty and bilateral air entry was confirmed. Neuromuscular block was produced with atracurium 25 mg and intermittent positive pressure ventilation commenced using a Manley MP2 ventilator. A tidal volume of 350 ml with a fresh gas flow of 4.0 litre was delivered to the patient. Anaesthesia was maintained with nitrous oxide and enflurane in oxygen, and fentanyl 50 μg. Tracheotomy was performed and the suction catheter removed. A laryngoplasty was then performed and residual neuromuscular block antagonized with neostigmine 2.5 mg and atropine 1.2 mg. The patient made a good recovery and was discharged from hospital 5 days later.

Patient No. 2

A 65-yr-old man was admitted with severe inspiratory stridor after radiotherapy to a laryngeal tumour. Emergency laryngectomy was planned: he was fasted and no premedication was prescribed. After cannulation of a vein, anaesthesia was induced with nitrous oxide and an increasing percentage of halothane in oxygen. When the depth of anaesthesia was adequate, direct laryngoscopy was performed. This revealed a large circumferential tumour which obscured most of the laryngeal inlet, except for a small posterior aperture of approximately 4.5 mm in diameter. Attempts to intubate the trachea with a size 4.0 mm tracheal tube failed, as the tube was not long enough to pass into the trachea, therefore a 16-gauge suction catheter (4.0 mm i.d.) was passed into the trachea and a 15-mm Portex tracheal tube connector attached to it. The lungs were inflated manually without difficulty and the correct position of the catheter confirmed by auscultation. Neuromuscular block was produced with atracurium 30 mg and intermittent positive pressure ventilation commenced. Anaesthesia was maintained with nitrous oxide and enflurane in oxygen and fentanyl 75 μg. A minute volume of 4.5 litre was delivered to the patient by a Manley MP2 ventilator.
without difficulty. Tracheotomy was then performed and the suction catheter removed. Laryngectomy was carried out subsequently and the residual neuromuscular block antagonized with neostigmine 2.5 mg and glycopyrronium 0.5 mg. The patient was transferred to the high dependency unit, where he stayed for 24 h. He was discharged from hospital 2 weeks later.

**DISCUSSION**

As far as we are aware, the use of a suction catheter to intubate the trachea in adults has not been described. Suction catheters have been used to assist blind nasal intubation [1,2] and to change a nasotracheal tube [3].

Previous experience had led a senior operating department assistant to prepare a trolley with moderately rigid plastic suction catheters (Pennine Healthcare Products) for use in the anaesthetic room of the ENT theatre. An aluminium, plastic-coated stillete was well lubricated to facilitate both insertion and removal from the suction catheter. The stillete was used to obtain the desired curvature of the catheter. In addition to the 16-gauge suction catheter (i.d. 4.0 mm, o.d. 5.0 mm), a 14-gauge catheter (i.d. 3.5 mm, o.d. 4.5 mm) is kept on the trolley. The latter has never been used in our hospital. Both these catheters are 44 cm long and have two marks, 2 cm and 3 cm from the distal end, which allow the anaesthetist to pass the catheter tip to a known distance beyond the cords. For future use, if required, both catheters have been cut to a length of 25 cm to minimize resistance to gas flow. In comparison, a size 4.0 Portex tracheal tube is 21 cm long and a size 5.0 tracheal tube 24.5 cm long. A size 4.0 mm tracheal tube (uncut length of 21 cm) should normally be long enough to intubate the trachea of an adult female. It is possible that the tube used in the first patient had been cut, but this was not checked at the time. Portex manufacture tracheal tubes (Croup tube: Ref. No. 100/112 size of tube) that would have been suitable in both these patients. The Croup tube is available in size ranges 2.5 mm i.d. (22 cm long) to 5.0 mm i.d. (33 cm long). These tracheal tubes are not available in our hospital. A suction catheter proved to be a suitable alternative.

In both of our patients, deep anaesthesia was induced using a mask to enable direct laryngoscopy to be performed. It would have been possible to proceed with the tracheotomy under mask anaesthesia, but we felt there was a risk of losing the airway. In both patients the airway was maintained relatively easily and safely by correct placement of the suction catheters in the trachea. The decision to proceed to laryngectomy after tracheotomy was made before operation by the consultant ENT surgeon.

Cricothyroid puncture and high-frequency jet ventilation were not considered because the cannula might have interfered with the surgery. Intubation either under local or general anaesthesia using an adult fibroptic bronchoscope would not have been possible, because the smallest tracheal tube that can be passed over the bronchoscope with care is a 6.0-mm i.d. tube. We do not possess a paediatric fibroptic bronchoscope, and therefore could not have used a smaller tracheal tube. Tracheotomy under local anaesthesia could have been used and would have been necessary had the technique failed.

We recommend that either suction catheters, or a selection of Croup tubes, are available when adults with upper airway obstruction are being anaesthetized.

**REFERENCES**