

Case Report

Nasotracheal intubation: look before you leap

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Nasotracheal intubation is frequently used for airway management during maxillofacial surgery. Complications such as haemorrhage occur more frequently with this route of intubation than with the orotracheal route. This case report describes a male patient aged 51 yr who developed severe epistaxis after the tube had passed the nares. As an additional complication laryngoscopy and endotracheal intubation failed because of difficult airway (Cormack–Lehane grade 4). Attempts using an intubating laryngeal mask airway and a Bonfils intubating fibrescope did not succeed. The airway was finally managed by cricothyroidotomy. A modified sequence of nasotracheal intubation is proposed to avoid similar life-threatening complications.

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Nasotracheal intubation is commonly used in patients undergoing maxillofacial surgery. If a difficult airway is not anticipated, the tracheal tube is passed through the nose after induction of anaesthesia and neuromuscular blockade. This is followed by direct laryngoscopy to forward the tube into the trachea under direct vision by either manipulating the tube directly or using Magill forceps.¹ Various complications resulting from nasal passage of the tube, such as turbinectomy or retropharyngeal dissection, have been reported.^{2,3} The most common complication of nasotracheal intubation is epistaxis, which occurs with an incidence of 18–66%.^{4,5}

Case report

A male patient aged 51 yr was scheduled for ambulatory minor intra-oral surgery under general anaesthesia and nasotracheal intubation. During pre-anaesthetic evaluation, no abnormalities were noted with the exception of increased body mass. The specific examination of the upper airway did not indicate potential difficulties in managing the airway, and the patient was assigned a modified Mallampati score of grade 1.⁶ Abnormalities of nasal anatomy such as septal deviation or hypertrophy of turbinates were excluded. A mixture of lidocaine 2% and phenylephrine was applied into both nostrils 30 min before induction of anaesthesia.⁷

After 4 min of breathing 100% oxygen via facemask, anaesthesia was induced with fentanyl 0.15 mg and thiopental 450 mg. Because ventilation via a facemask was

easy to accomplish, atracurium 45 mg was administered to facilitate laryngoscopy. Following a 3-min period of mask ventilation, a 7.0-mm cuffed nasotracheal tube was inserted into the patient's right nostril. No force had to be applied to advance the tip of the tube into the hypopharynx.

Bleeding from the nasopharyngeal region was noticed during laryngoscopy using a Macintosh blade 4. Visualizing the epiglottis was impossible, corresponding to a Cormack–Lehane grade 4 airway.⁸ Following the institutional emergency airway algorithm,⁹ the nasal tube was removed and the lungs were ventilated using a facemask. At this time, ventilation became difficult and it was only possible to achieve tidal volumes <300 ml.

A straight Henderson blade was used in a second attempt to direct laryngoscopy. Despite suctioning and applying backward upward rightward pressure (BURP) to the larynx,¹⁰ the epiglottis could not be visualized. Another attempt using a laryngoscope to elevate the base of the tongue in conjunction with a rigid Bonfils fibrescope also had to be abandoned. The progressive bleeding prevented the use of any fibreoptic technique. Another attempt was made using a size 5 intubating laryngeal mask airway, but sufficient ventilation could not be achieved. Because the intermittent mask ventilation became progressively inadequate, an interdisciplinary decision was made to control the airway by cricothyroidotomy.

Upon completion of cricothyroidotomy, ventilation and oxygenation improved significantly, with arterial oxygen saturation increasing from 52% to 95% within 60 s. The

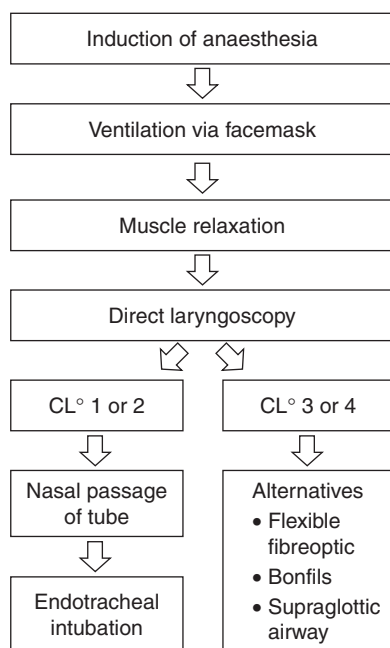


Fig 1 Suggested algorithm for nasotracheal intubation. CL, Cormack–Lehane classification for difficult airway.

bleeding was stopped by tamponade of both turbinates; fiberoptic bronchoscopy was performed to remove any aspirated blood.

No further complications occurred, and the patient was transferred in a stable condition to an intensive care unit. Extubation was performed without complications 24 h after the event and the patient did not suffer from any sequelae.

Discussion

Epistaxis is the most frequent complication of nasotracheal intubation,¹¹ and several recommendations have been made to reduce its incidence. These include local application of vasoconstrictive drugs, softening of the tube, and use of a nasopharyngeal airway as a pathfinder,^{4,5,12} but this problem cannot be avoided entirely.¹³

The sequence of actions performed in this patient, i.e. prelaryngoscopy manoeuvres including insertion of the nasotracheal tube, laryngoscopy, and endotracheal intubation, is generally accepted.¹ The present case illustrates that complications caused by the nasal passage of the tube in conjunction with unanticipated airway difficulties may severely endanger the patient. Blood in the airways can produce a dramatic deterioration in conditions by obscuring the view during laryngoscopy and by aspiration of blood into lungs. If fiberoptic intubation is considered, blood and secretions may obscure the view.¹⁴

The potential danger of causing bleeding by passing the tube through the nares in a patient with unanticipated airway difficulties can easily be avoided. After induction of anaesthesia, facemask ventilation and muscle relaxation, an attempt should be made to estimate any potential problems in visualizing airway by direct laryngoscopy using the Cormack–Lehane classification. The tube should then be passed through the nose only in patients with a grade 1 or 2 view (Fig. 1). This new sequence of actions leaves an option for alternative techniques. If laryngoscopy is difficult, fiberoptic or supraglottic techniques can be used without bloody secretions in the hypopharynx. On the other hand, if direct laryngoscopy can be performed but the passage of the tube causes bleeding, the trachea can be intubated rapidly using either the nasal or the oral route.

In summary, the new sequence of action provides additional safety during nasotracheal intubation.

References

- 1 Benumof JL. Conventional (laryngoscopic) orotracheal and nasotracheal intubation (single-lumen tube). In: Benumof JL, ed. *Airway Management—Principles and Practice*. St Louis, MO: Mosby–Year Book, 1996; 261–76
- 2 Moore DC. Middle turbinectomy: a complication of IMPROPER nasal intubation? *Anesthesiology* 2000; **92**: 1504–5
- 3 Williams AR, Burt N, Warren T. Accidental middle turbinectomy: a complication of nasal intubation. *Anesthesiology* 1999; **90**: 1782–4
- 4 Watanabe S, Yaguchi Y, Suga A, Asakura N. A bubble-tip (Airguide®) tracheal tube system—its effects on incidence of epistaxis and ease of tube advancement in the subglottic region during nasotracheal intubation. *Anesth Analg* 1994; **78**: 1140–3
- 5 Kim YC, Lee SH, Noh GJ, *et al.* Thermosoftening treatment of the nasotracheal tube before intubation can reduce epistaxis and nasal damage. *Anesth Analg* 2000; **91**: 698–701
- 6 Samsoun GLT, Young JRB. Difficult tracheal intubation: a retrospective study. *Anaesthesia* 1987; **14**: 17–27
- 7 Latorre F, Otter W, Kleemann PP, Dick W, Jage J. Cocaine or phenylephrine/lignocaine for nasal fiberoptic intubation? *Eur J Anaesthesiol* 1996; **13**: 577–81
- 8 Cormack RS, Lehane J. Difficult tracheal intubation in obstetrics. *Anaesthesia* 1984; **39**: 1105–11
- 9 Thierbach AR. Advanced prehospital airway management techniques. *Eur J Emerg Med* 2002; **9**: 298–302
- 10 Takahata O, Kubota M, Mamiya K, *et al.* The efficacy of the ‘BURP’ maneuver during a difficult laryngoscopy. *Anesth Analg* 1997; **84**: 419–21
- 11 Tintinalli JE, Claffey J. Complications of nasotracheal intubation. *Ann Emerg Med* 1981; **10**: 142–4
- 12 Enk D, Palmes AM, Van Aken H, Westphal M. Nasotracheal intubation: a simple and effective technique to reduce nasopharyngeal trauma and tube contamination. *Anesth Analg* 2002; **95**: 1432–6
- 13 Smith JE, Reid AP. Identifying the more patent nostril before nasotracheal intubation. *Anaesthesia* 2001; **56**: 258–62
- 14 Coe TR, Human M. The peri-operative complications of nasal intubation: a comparison of nostril side. *Anaesthesia* 2001; **56**: 447–50