Airway management in patients presenting with stridor

Stridor is caused by turbulent flow through a narrow airway. Common causes of stridor are deep neck infection, malignancy, angioneurotic oedema, trauma and congenital anomalies like laryngomalacia. The majority of these conditions can progress rapidly to complete airway obstruction. These conditions are traditionally managed with one of the following techniques: inhalational induction, awake tracheostomy, awake fibreoptic intubation or blind nasal intubation. The success and safety of each of these techniques continues to be debated.

Problems with these techniques

This article will briefly examine the problems encountered with each of these techniques. Although considered the safest option, an awake tracheostomy in a severely compromised airway with distorted anterior neck anatomy can be difficult. In addition patients may not be able to lie still in the supine position, compounding the problems of surgical access. Tracheostomy carries the risk of bleeding, spread of infection and seeding of tumour. The risk of complications is far higher if tracheostomy is performed in an emergency situation, when compared to a planned procedure (Rees and Mason, 2002).

Blind nasal intubation is a simple technique, but has two major limitations: infrequent success on the first pass and increased risk of trauma with repeated attempts. Inhalational induction is slow in the presence of airway obstruction and can be difficult even in experienced hands.

Awake fibreoptic intubation can be difficult because of tissue oedema, distorted airway, copious secretions and bleeding. The fibrescope can also occlude an airway which is already narrow. Laryngospasm and complete airway obstruction following topical local anaesthesia and during manipulation of the fibrescope has also been reported.

The role of supraglottic devices in patients with severe airway distortion is uncertain. Giraud et al (1997) described their inability to ventilate or view the glottic aperture by fibrescope passed through the laryngeal mask airway, in patients who had received cervical radiotherapy. But Joo et al (2001) reported success with the use of an intubating laryngeal mask airway both for tracheal intubation and as a conduit for fibreoptic guided tracheal intubation. However, none of the patients in this case series had severe anatomical airway distortion.

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Which is safest?

The question that arises is which technique is safest in managing these patients. Unfortunately, there is no universal answer that applies to all patients with an obstructed airway. Each patient has to be considered individually depending on the level and nature of the obstruction and the degree of symptoms. Airway examination and additional investigations such as computed tomography, magnetic resonance imaging and nasal endoscopy should be performed if the patient's clinical condition permits. Management of the airway should be a joint decision between the anaesthetist and surgeon in this situation.

Patients with critical obstruction who present with stridor at rest, are unable to lie flat and have gross anatomical distortion of the larynx are best managed by an awake surgical tracheostomy. This is particularly true if the glottic aperture is not visible at nasal endoscopy. Sedation should be avoided as it predisposes to increased airway compromise, compounding respiratory obstruction with respiratory depression.

Patients with moderate stridor, who can assume the supine position and where the head and neck surgeon has been able to view the larynx at diagnostic nasal endoscopy, may be managed by either an awake fibreoptic intubation or inhalational induction, depending on the experience and training of the anaesthetist and the availability of equipment. Fibreoptic intubation should be performed by anaesthetists who have adequate expertise and skill in the technique. Inhalational induction is slow and a nasopharyngeal airway may be used to deepen anaesthesia before intubation.

Pre-emptively placing a cricothyroid cannula under controlled circumstances, before induction of anaesthesia, provides a reasonable option for ventilation in case of an emergency (Boyce et al, 2005). In all cases where the balance of evidence suggests that an attempt at awake intubation or inhalational induction is justified, the personnel and equipment for an emergency surgical airway (in the form of a rigid bronchoscope and a double set-up) should be on standby.

Conclusions

Patients presenting with airway obstruction present a challenge to anaesthetists. Future developments in airway adjuncts, videolaryngoscopy and imaging such as virtual bronchoscopy could perhaps influence the management of these patients (Gillespie and Farling, 2005). BJHM

Boyce JR, Peters GE, Carroll WR, Magnuson JS, McCrory A, Boudreaux AM (2005) Preemptive vessel dilator cricothyrotomy aids in the management of upper airway obstruction. *Can J Anaesth* **52**(7): 765–9

Gillespie S, Farling PA (2005) Preoperative assessment of the airway: should anaesthetists be making use of modern imaging techniques? *Br J Anaesth* **93**(6): 758–60

Giraud O, Bourgain JL, Marandas P, Billard V (1997) Limits of laryngeal mask airway in patients after cervical or oral radiotherapy. *Can J Anaesth* **44**(12): 1237–41

Joo HS, Kapoor S, Rose DK, Naik VN (2001) The intubating laryngeal mask airway after induction of general anesthesia versus awake fiberoptic intubation in patients with difficult airways. *Anesth Analg* **92**(5): 1342–6

Rees L, Mason RA (2002) Advanced upper airway obstruction in ENT surgery. *BJA CEPD Reviews* **2**(5): 134–8

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