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Key Clinical Topics in Anaesthesia

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Airway – the emergency airway

Key points

- The airway is rarely the only factor which requires consideration in these cases
- Always involve senior colleagues early, including an experienced ENT surgeon
- Any patient likely to require a tracheostomy in this situation should have their airway management commenced in theatre with a surgeon prepared to perform that procedure

The emergency airway can be defined as that situation in which the patient is at imminent risk of potentially fatal airway obstruction. Causes of such an obstruction can be classified as follows:

- Intraluminal, e.g. blood, vomit, tumour, foreign body, soft tissue
- Mural, e.g. oedema, tumour, abscess
- Extramural, e.g. haematoma, oedema, abscess, tumour

These patients represent a particular challenge and have a high incidence of airway management difficulty. A senior anaesthetist and assistant and experienced ENT surgeon should be involved from an early point and good teamwork is key. Any patient who is likely to require surgical tracheostomy as part of their airway management should be moved to the operating theatre prior to induction of anaesthesia. Careful reassurance of a conscious patient is vital as extreme anxiety is typical and contributes to further airway compromise.

Problems

Patient factors:

- Anxiety
- Rapid desaturation
- Comorbidity, e.g. trauma, brain injury, pulmonary disease
- Inability to lie supine

Specific airway factors:

- Secretions, blood, vomit
- Airway reactivity
- 'Cork in bottle' effect
- Fixed airway tissues especially following radiotherapy
- Friable airway tissue
- Spinal immobility, i.e. trauma
- Airway injury – fractures, trismus, laryngotracheal collapse, loose teeth

Clinical features

The predominant three pathologies are trauma, infection and tumour. With trauma, the airway is seldom the only problem but is frequently compromised (fractures, loose teeth, blood, and vomit). It is rarely practical or appropriate to move the patient to theatre. Spinal immobilisation and agitation associated with a concomitant traumatic brain injury (TBI) add to problems. Nearly 50% of significant maxillofacial trauma is associated with TBI.

With airway infection the systemic effects, most notably hypotension, need consideration. Retropharyngeal and peritonsillar abscess affect any age but predominate in children. Presentation includes neck and retrosternal pain, fever, drooling, torticollis and stridor. Intubate carefully to avoid rupture of the abscess with airway soiling. Bacterial tracheitis is becoming more common than epiglottitis as a cause of life-threatening airway compromise (owing to *Haemophilus influenzae* Type B vaccination for the latter) and presents with cough, stridor and copious secretions. Unlike epiglottis, these patients (usually children) do not typically drool and can lie supine. Both diseases feature severe systemic toxicity. Croup, by contrast, rarely requires intubation; however, a persistently high Westley score (**Table 2**), despite medical treatment, may necessitate this. More common in adults are periodontal abscess and Ludwig's angina (severe, pustular cellulitis of the subglossal space). Both are complicated by trismus, which may be mechanical (due to pus and oedema) rather than pain-induced; anaesthesia and muscle relaxant may not improve airway malleability. Failure to protrude the tongue is highly suggestive of Ludwig's angina or other subglossal collection, e.g. haematoma.

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Table 2 Westley croup score: mild <2, moderate 3–5, severe 6–11, prearrest >12

Score	0	1	2	3	4	5
Breath sounds	Normal	Decreased	Markedly decreased			
Stridor	Not present	When agitated	At rest			
Cough	Not present	Hoarse cry	Bark			
Recession	Not present	Mild	Moderate	Severe		
Cyanosis	Not present				When agitated	At rest
Conscious level	Normal					Reduced

Acute, severe airway compromise is a common first presentation of ENT tumours. This is due in part to the absence of stridor before 50% occlusion and that these patients are usually smokers and may refute their diagnosis or attribute symptoms to chronic pulmonary disease. Gradual occlusion as the tumour grows tends to allow compensation unlike the acute compromise seen with infection; similar levels of respiratory distress from a tumour often represent a much more severe reduction in airway calibre. Stridor volume does not predict airway calibre and reducing noise may denote exhaustion or hypoxia-induced reduction in consciousness. Stridor at rest is common in these patients but postural exacerbation, particularly night-time choking, is worrying and should be noted. This suggests supine positioning for anaesthesia may also be problematic. Dysphagia and drooling are seen with supraglottic tumours. Similarly bleeding is often a feature, particularly with epiglottic tumours that are friable and can bleed profusely.

Investigations

There is rarely the time or need for any form of imaging in these scenarios. In the case of tumours, recent CT scans from clinic may provide useful information. Similarly, with these patients, an experienced ENT surgeon may be able to assess the airway at nasendoscopy in the cooperative adult patient. Inability to visualise the larynx usually predicts inability to visualise it laryngoscopically.

Anaesthetic management

Even in the most pressing emergency, some attempt must be made to assess the airway difficulty, systemic state of the patient and pertinent comorbidities to make appropriate plans. Wherever time allows, these patients should always be managed in conjunction with a senior anaesthetic colleague, assistant and, ideally, an ENT consultant.

Trauma airway

Reliable intravenous access is required and full monitoring should be applied whilst thorough preoxygenation is undertaken. The default mode of anaesthesia in these patients should be rapid sequence induction with a calculated dose of induction and relaxant agents. Cricoid pressure should be delegated to someone with experience of the technique; usually an operating department practitioner (ODP) can perform this and act as your airway assistant. Manual in-line stabilisation (MILS) of the cervical spine is required and you should decide if the C-spine collar is most safely removed before induction (co-operative patient) or immediately after induction (agitated patient). Blood, vomit and debris render fibreoptic intubation nearly impossible. Similarly, the need for rapid airway control and possibility of a full stomach preclude a gaseous induction. It is important to have rescue plans made, e.g. as seen in Difficult Airway Society (UK) guidelines.

Infection

Particularly in the paediatric population, minimal interference is key; distress

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increases respiratory effort, which may precipitate collapse and obstruction of a critical airway. Allow the patient to find their most comfortable position and apply pulse oximetry if possible. Escort to theatre and patiently achieve deep inhalational anaesthesia with the ENT surgeon scrubbed to provide surgical airway access if required. A similar approach would be suitable for airway foreign body; inhalational induction is followed by retrieval of the foreign body via rigid bronchoscope.

Tumour

If the larynx cannot be visualised at nasendoscopy, laryngoscopy is likely to be difficult. These patients are usually too distressed to tolerate awake fibreoptic intubation. Airway distortion, bleeding and obstruction of the narrow airway by the endoscope (cork-in-bottle) are also problems. Close liaison with the surgeon is vital and a low threshold for surgical tracheostomy under local anaesthesia should be adopted. Sedation in this instance is dangerous. Heliox has a role although consideration must be given to the low oxygen content of this mixture (21%).

Extubation

Guidance also exists for this phase of management which is frequently underestimated (again, see Difficult Airway Society (UK) for an example). Consideration should first be given to whether extubation is possible at that time; need for intravenous dexamethasone, no cuff leak, ongoing airway soiling. If extubation is undertaken, the patient must be fully awake and the surgical team should remain scrubbed in theatre until a spontaneous airway is well established.

Further reading

Cook TM, Woodall N, Frerk C. Major complications of airway management in the UK: results of the Fourth National Audit Project of the Royal College of Anaesthetists and the Difficult Airway Society. Part 1: anaesthesia. Br J Anaesth 2011; 106:617–631.

Maloney E, Meakin GH. Acute stridor in children. Br J Anaesth: Continuing Education in Anaesthesia, Critical Care & Pain 2007; 7:183–186.

Related topics of interest

- Airway assessment (p. 1)
- Airway – difficult and failed intubation (p. 4)
- Airway – the shared airway (p. 10)
- Awake intubation (p. 13)
- Emergency anaesthesia (p. 70)
- Human factors in patient safety (p. 86)
- Paediatric emergency airway (p. 194)

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