Management of acute epiglottitis in adults

Introduction

Acute epiglottitis is a medical emergency caused by oedema and inflammation of the epiglottis and supraglottic structures. It can be a rapidly progressive condition leading to life-threatening airway obstruction. Acute epiglottitis has traditionally been recognized as a paediatric disease but the incidence is rising in adults. Although still uncommon it is vital that junior doctors are well versed with the assessment of acute epiglottitis and simple management steps which are needed to treat this condition appropriately.

Aetiology

Adult epiglottitis has an incidence of between 1 and 4 per 100 000 per annum (Ames et al, 2000). Mortality rates vary widely from just under 1% to as high as 20% in some reviews (Carey, 1996). The incidence of epiglottitis in children has dropped significantly following the introduction of *Haemophilus influenzae* type B vaccination (Isakson and Hugosson, 2010). The incidence of acute epiglottitis in adults initially decreased on introduction of this vaccine but has now risen to pre-vaccine levels. It is not known why this has happened. In the majority of adult cases no causative organism is recognized.

Presentation

The adult with acute epiglottitis looks toxic on initial inspection. There is usually a short history of rapidly worsening symptoms of fever, sore throat, dysphagia (difficulty in swallowing) and odynophagia (pain with swallowing). Speech is usually muffled.

Progressive inflammation of the upper aero-digestive tract leads to drooling of saliva and stridor. The patient may adopt a posture of sitting upright with the neck flexed and head extended (previously described as the 'sniffing the morning air' position) to improve the airway.

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Assessment and management

Acute epiglottitis is a potentially life-threatening medical emergency and rapid assessment must be combined with early measures to secure the airway. In contrast to children it is safe to examine the oral cavity and throat in adults with suspected acute epiglottitis. The epiglottis cannot be seen on examination of the oral cavity. Examination of the oropharynx is therefore usually normal in acute epiglottitis, but is important to exclude other diagnoses, e.g. severe tonsillitis, peritonsillar abscess (quinsy) and infection of the floor of the mouth (Ludwig's angina). Examination of the neck will identify any significant lymphadenopathy or abscess formation.

One of the key things to note with acute epiglottitis in adults is that the degree of soreness of the throat and other symptoms are usually out of proportion to an often normal-looking throat. This should trigger immediate clinical suspicion of possible epiglottitis and a request for an ear, nose and throat surgery opinion.

The diagnosis is made on the basis of the clinical presentation described and confirmed by direct endoscopic examination of the upper airway (*Figure 1*). This is carried out by flexible fibreoptic nasendoscopic examination by an ear, nose and throat specialist.

Figure 1. Endoscopic view of intubated patient with oedematous epiglottis (E: epiglottis, T: endotracheal tube).

The most important step in the management of acute epiglottitis is the primary assessment of the airway. This will establish whether the management will be solely medical or whether an early airway intervention is required (*Figure 2*).

Medical treatment

This involves the use of oxygen therapy, intravenous or intramuscular steroids, nebulized adrenaline and intravenous antibiotics. Heliox (helium and oxygen mixtures) has been used in cases of severe upper airway obstruction, particularly croup, but there are no trials examining its use in acute epiglottitis. Heliox provides better oxygenation as the lighter gaseous mixture flows more easily through a tight airway, so it seems prudent to use Heliox if it is available in the emergency department.

Nebulized adrenaline can be safely administered at a dose of 0.5 mg/kg of a 1:1000 dilution and generally 3–5 ml of 1:1000 adrenaline is recommended (Zhang and Sanguebsche, 2006). It causes vasoconstriction in the mucosa and reduces inflammation and oedema. As soon as the adrenergic effect wears off, mucosal hyperaemia and soft tissue oedema can follow (a rebound effect), which can worsen airway obstruction. Nebulized adrenaline can provide temporary relief of upper airway obstruction but a definitive airway management plan is urgently needed.

Blood cultures should be taken before giving intravenous antibiotics. Third generation cephalosporins give empirical cover for the more common pathogens, e.g. *H. influenzae*, group A *Streptococcus pneumoniae* and staphylococcal infections. The use of corticosteroids is associated with shorter intensive care and overall length of hospital stay (Guardiani et al, 2010).

Airway intervention: when?

Deciding whether or not an airway intervention is needed in an adult with acute epiglottitis should follow clinical assess-

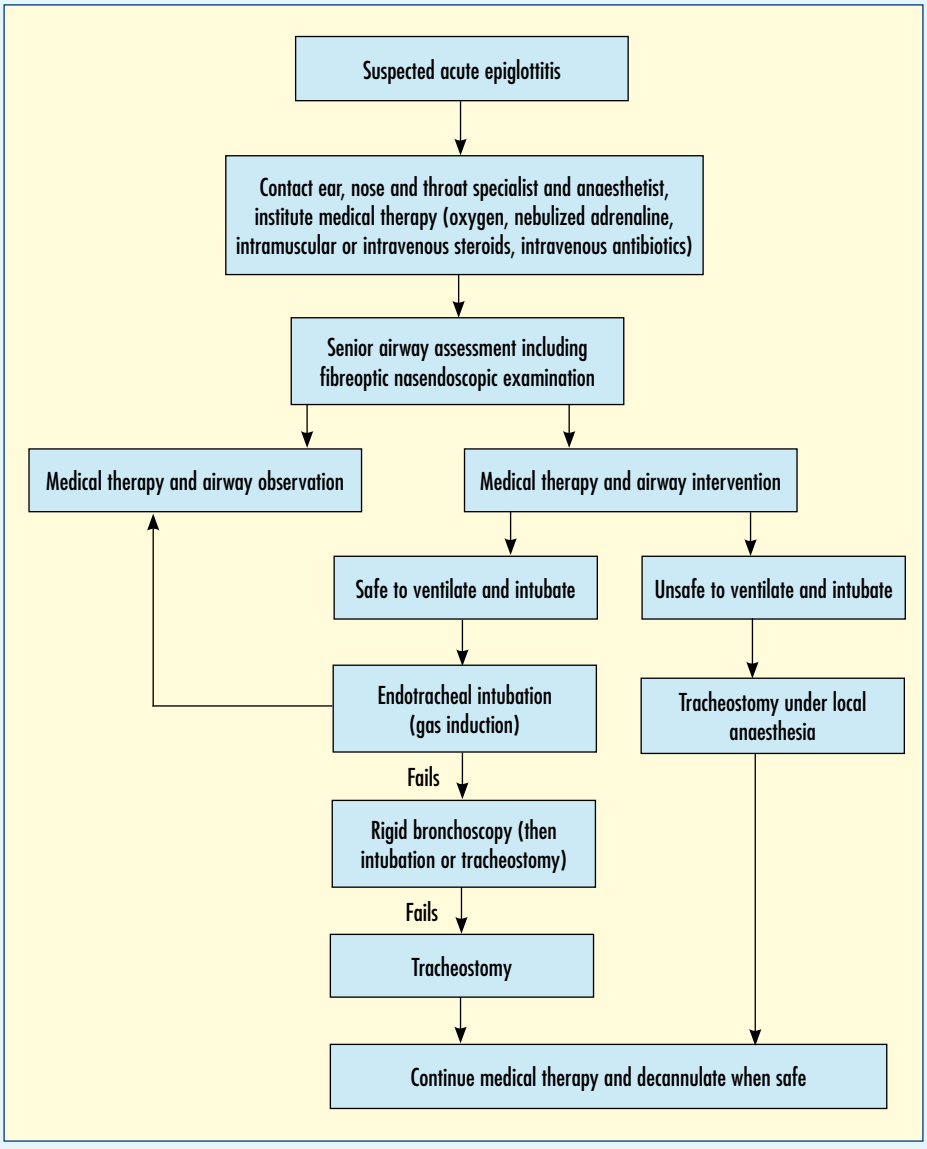

Figure 2. Algorithm for assessment and management of suspected acute epiglottitis.

ment by an ear, nose and throat specialist and anaesthetist. Evidence for establishing predictive factors for the need for airway intervention has largely arisen from retrospective reviews. Combination of features such as stridor, drooling, acute onset or rapid progression, hoarseness, respiratory distress, dyspnoea, chest wall retractions and upright position have been identified as predictors of the need for airway intervention.

Classification systems have also been identified in an attempt to make the decision-making process easier. Unfortunately, there is only low level evidence for the efficacy of these classifications and they have not been widely adopted by airway specialists. One significant problem is that they do not include the benefit of endoscopic examination which may identify a potential loss of airway in a patient who is compensating well and who may rapidly deteriorate.

A key point is that it is better to make any airway intervention in a controlled fashion with a compliant patient than in a pressured scenario of rapidly impending total airway obstruction. If there is any doubt by either an anaesthetist or ear, nose and throat surgeon based on clinical examination and endoscopic findings that medical therapy and airway observation may not be successful then an airway intervention is indicated.

Airway intervention: which?

The prime aim is to establish a secure airway in the quickest and safest way possible. As acute epiglottitis is an acute inflammatory condition that usually settles within 72 hours with the appropriate medical treatment, the least invasive airway intervention is preferable. Endotracheal intubation in theatre is preferred to tracheostomy if it is safe to do so. Important factors to consider are the degree of oedema and anatomical distortion of the epiglottis and larynx as seen on nasendoscopy, the severity of the patient's presentation and the experience of the airway specialists (ear, nose and throat surgeon and anaesthetist) who are present.

The three key decisions to be made by both the anaesthetist and ear, nose and throat surgeon are:

Awake *vs* asleep airway intervention

Keeping the patient awake maintains his/her airway tone and ventilation, and is the safest option if there is doubt about the ability to secure the airway, maintain ventilation or intubate the trachea following induction of anaesthesia. Airway intervention in the awake patient is usually via a tracheostomy since awake fibreoptic intubation is contraindicated in patients with severe obstruction (see below). Induction of anaesthesia is considered if safe to do so without compromising the patient's critical airway.

Non-invasive *vs* invasive airway intervention

Tracheostomy may be performed in the awake patient (see above). Otherwise, tracheal intubation is performed in the anaesthetized patient when it is considered safe, and is highly likely to be successful at maintaining ventilation and achieving tracheal intubation. If the latter fails, then an emergency tracheostomy in the asleep patient becomes mandatory.

Self breathing *vs* paralysed patient

In the awake patient, spontaneous ventilation is maintained. In anaesthetized patients, spontaneous ventilation may also be preserved by using gas induction. Preserving spontaneous ventilation in asleep patients is considered safer than paralysing the patient but tracheal intubation is more difficult. Paralysing the patient to facilitate tracheal intubation is associat-

ed with a risk of losing airway tone and losing the ability to ventilate (either by the patient him-/herself since he/she is paralysed, or by the anaesthetist using a face mask).

Planning acute airway management

A stepped approach to planning acute airway management, consisting of a plan A, followed by plans B and C, is helpful in managing the difficult airway. This incorporates strategies to manage the airway if the preceding 'plan' fails either as a result of deterioration of the airway or failed anaesthetic technique. Possible scenarios are:

Unsafe to maintain ventilation and intubate patient

In this scenario the airway specialists have decided that the risk of losing the airway in attempting intubation is too high. Therefore, plan A should be an 'awake approach' with the patient self breathing (spontaneous ventilation). This is essentially a surgical tracheostomy under local anaesthetic.

Safe to ventilate and intubate trachea

In this scenario, the airway specialists have decided that there is a high probability that an endotracheal intubation may be successful. This is based on a number of factors including the endoscopic appearance of the epiglottis and laryngeal inlet and the experience of the anaesthetist in dealing with difficult airways. In all cases the ear, nose and throat surgeon should be available in theatre and have the appropriate instruments ready to secure the airway with either a ventilating bronchoscope or via an emergency tracheostomy.

An 'asleep' technique is preferred for acute epiglottitis and has historically been via gas (rather than intravenous anaesthesia) as it tends to preserve spontaneous ventilation.

Awake fibreoptic intubation is contraindicated in acute, severe upper airway obstruction for several reasons. Patients need to be cooperative and calm which is often not the case. Use of sedatives, opioids and topical anaesthesia should be avoided because of the risk of precipitating complete obstruction in the acute epiglottitis patient.

'Asleep' intubation is attempted and fails

This is where the concept of plan B and plan C is helpful. If plan A (intubation) fails then plan B should follow immediately, i.e. either an 'asleep' emergency tracheostomy or rigid bronchoscopy. The latter has several advantages. It splints open the airway and allows ventilation (via standard anaesthetic machine breathing systems or jet ventilation). In addition, it allows an asleep tracheostomy to be performed under more controlled conditions (as opposed to struggling to keep the patient anaesthetized and spontaneously breathing via a face mask). If the plan B rigid bronchoscopy fails, then plan C follows by performing an 'asleep' emergency tracheostomy.

Continuing management

Medical management for the underlying infection starts as soon as the airway is secured. Microbiological swabs of the epiglottis should be taken. In the intubated and ventilated patient daily flexible fibreoptic endoscopic examination can be used to assess improvement in the airway and to decide when extubation is safe.

If there is a failure to improve despite appropriate antibiotic therapy, there should be a low threshold for considering the presence of underlying abscess formation, e.g. parapharyngeal abscess. In this scenario, prompt imaging, e.g. computed tomography or magnetic resonance imaging of the neck, is indicated.

Conclusions

Acute epiglottitis in adults is a life-threatening medical emergency and requires rapid assessment and early involvement of airway specialists. A key sign for early diagnosis is that the degree of soreness of the throat in such patients, as well as other symptoms, is usually out of proportion to an often normal-looking throat. This should trigger clinical suspicion of a possible epiglottitis and a request for an urgent ear, nose and throat opinion. As a junior doctor it is important to recognize the condition, to contact the ear, nose and throat specialist and anaesthetist to assess the need for any airway interventions and to institute early medical therapy. **BJHM**

Conflict of interest: none.

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KEY POINTS

- Acute epiglottitis in adults is a medical emergency.
- Beware severe sore throat in a patient with a normal oropharyngeal examination.
- Fibreoptic nasendoscopy is generally safe to perform in adults by ear, nose and throat specialists.
- Seek help from senior anaesthetists and ear, nose and throat specialists to establish whether immediate airway intervention is needed.
- Institute oxygen or Heliox, nebulized adrenaline, intravenous steroids and antibiotics early.