

Acute epiglottitis in the adult: is intubation mandatory?

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Acute epiglottitis (AE) in the adult results in inflammation of the supraglottic structures and carries the potential for complete airway obstruction. There is disagreement in the medical literature as to the appropriate management of the airway in the adult with AE. Some authors advocate intubation in all patients while others propose more selective intervention, intubating the trachea only in those patients presenting with airway compromise. We reviewed our institutional experience with 21 patients over the last seven years admitted with a proven diagnosis of AE. Six patients presented with respiratory distress, three in severe distress with symptoms and signs of upper airway obstruction. The three patients in severe distress were taken to the operating room, in two the tracheas were intubated and one underwent tracheostomy after failed intubation. All other patients were monitored but their tracheas were not intubated. The majority of the patients were monitored for 24 hr in the ICU before transfer to wards. No patient initially monitored required tracheal intubation for progression of disease. There were no deaths. Recommendations for the care of the airway in the adult with AE based on our experience and a review of approximately 1000 cases reported in the last ten years are presented. It is our opinion that adults presenting without respiratory symptoms may be safely monitored in an intensive care setting given that provision is made for tracheal intubation or tracheostomy should respiratory distress become evident.

L'épiglottite aiguë de l'adulte (AE) est le résultat d'une inflammation des structures supraglottiques et présente un risque potentiel d'obstruction complète des voies aériennes. On note un désaccord dans la littérature médicale concernant la conduite optimale à tenir concernant les voies aériennes chez l'adulte atteint d'épiglottite aiguë. Certains auteurs conseillent

l'intubation chez tous les patients alors que d'autres proposent une intervention plus sélective où l'intubation serait indiquée seulement si les voies aériennes sont compromises. On a revu notre expérience dans notre institution avec 21 patients admis durant les sept dernières années avec un diagnostic confirmé d'épiglottite aiguë. Six patients ont été admis en détresse respiratoire, trois en détresse respiratoire sévère avec des signes et symptômes d'obstruction des voies aériennes hautes. Les trois patients ayant une détresse respiratoire sévère furent amenés en salle d'opération où deux ont été intubés et un a subi une trachéostomie après échec de l'intubation. Tous les autres patients furent surveillés mais leur trachée n'a pas été intubée. La majorité des patients furent surveillés pour 24 heures aux soins intensifs ayant le transfert aux étages. Aucun patient initialement surveillé n'a requis l'intubation trachéale pour une aggravation de sa maladie. Il n'y a eu aucun décès. Les recommandations pour la conduite et le soin des voies aériennes chez l'adulte atteint d'épiglottite aiguë en se basant sur notre expérience et une revue d'environ 1000 cas rapportés dans les dix dernières années sont présentées. Selon nous, les adultes n'ayant pas de symptôme respiratoire peuvent être surveillés avec sécurité aux soins intensifs tout en ayant à notre disposition la possibilité d'intubation ou de trachéotomie si la détresse respiratoire devient évidente.

Acute epiglottitis (AE) in the adult is a serious infection of the supraglottic structures which carries the potential for lethal, total airway obstruction. Following correct diagnosis and implementation of antibiotic therapy, a rapid clinical resolution is common. There is controversy whether it is necessary to intubate the tracheas of all adults with a diagnosis of AE although there is no dispute that this is appropriate management in all children with AE.¹ The proponents of intubation argue that sudden and lethal airway obstruction can occur and the airway should be secured.²⁻⁴ The contrary position is that the airway in most adults with AE is not jeopardized, that tracheal intubation is not usually required and that sudden complete obstruction, without preceding symptoms or signs of respiratory distress, is not common.⁵⁻⁷

We reviewed and describe our experience with 21 patients with AE, over a seven-year period, and suggest a protocol for the airway management of the adult patient with AE.

Key words

COMPLICATIONS: epiglottitis;
EQUIPMENT: tracheostomy;
INTUBATION: tracheal.

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Methods

The charts of all patients with the diagnosis of AE admitted to our institution between January, 1983 and December, 1989, were retrieved and analyzed. The clinical diagnosis was confirmed in all patients by indirect (mirror) or direct (fiberoptic nasolaryngoscope or laryngoscope) examination. The following data were recorded from the chart: age, sex, nature and duration of prodromal illness, contact with a physician in the 24 hr before presentation, symptoms at the time of presentation, specifically sore throat, dysphagia or odynophagia, voice change and descriptor used, signs and symptoms of respiratory distress including tachypnoea, stridor, cyanosis, orthopnoea, dyspnoea, impending or actual respiratory arrest, and temperature. The lateral cervical *x*-rays were retrieved and measurements of the epiglottitis and the aryepiglottic folds were made and compared with previously established values for adult epiglottitis.⁸ The results of the oropharyngeal tongue blade examination and the indirect (mirror) or direct (nasolaryngoscope, laryngoscope) were recorded. The details of patient management (observation, intubation or tracheostomy) and the recorded indications for the mode of management were noted as were the complications related to the mode chosen.

Results

Patient assessment

PRESENTING SYMPTOMS

Twenty-one patients were admitted to our institution during the period of the review with the diagnosis of AE supported by both clinical findings and *x*-ray. Sixteen (76%) of the patients were male, five female and the average age was 36.7 yr (range 16–68 yr). Six patients (29%) had a prodromal upper respiratory tract infection, lasting from one to seven days before the onset of the presenting symptoms. The presenting symptoms are shown in Table I. Sore throat was the only uniform symptom, being present in all patients, was severe in most and represented the major presenting complaint in 16 patients (76%). Difficulty with swallowing was a common presenting complaint, present in 20 patients (95%). A voice change was remarked upon by 12 patients (57%), with hoarse (eight patients) and muffled (four patients) being the descriptors used to describe the change. Sixteen patients (76%) had an elevated temperature. Mild respiratory distress was noted in three patients (14%) at the time of presentation; in two patients orthopnoea was the main complaint and in one dyspnoea. Severe respiratory distress was present in three patients at the time of presentation and was characterized by tachypnoea greater than 30 breaths per minute (three patients), stridor (two

TABLE I Presenting symptoms

Symptom	Number of patients (%)
Sore throat	21 (100)
Odynophagia	17 (76)
Dysphagia	3 (14)
Voice change	12 (57)
Temperature $\geq 37.9^\circ$ C	16 (76)
Respiratory distress	6 (29)

patients), and cyanosis (one patient). Airway obstruction was either impending (two patients) or present (one patient) at the time of presentation. The symptoms had persisted from three hours to five days with most (19 patients) reporting symptoms of two days or less. Six patients (29%) had seen a physician in the 24 hr before presentation (missed diagnosis).

Airway examination

Oropharyngeal examination with a tongue blade revealed mild to moderate pharyngitis in 17 patients, exudative pharyngitis in one, was normal in one and was not carried out in two patients. One of these patients was a referral from a peripheral hospital with a diagnosis of AE, the second patient was in extremis at the time of presentation. Epiglottitis (18 patients) or supraglottitis (two patients) was observed in all (20) patients examined with either a mirror or nasolaryngoscope. Three patients were examined in the operating room under direct vision with an oral laryngoscope, after induction of general anaesthesia, including the patient in extremis.

Patient management

Eighteen patients (86%) were observed, without tracheal intubation, 13 in the intensive care unit, one in the emergency room and four on patient wards. The patients observed on the wards were admitted between 1983 and 1985. The duration of the ICU observation period was 24 hr for 11 patients and 72 hr for two. Patients observed included two who had complained of orthopnoea on admission and one who was dyspnoeic. This latter patient was pancytopenic following chemotherapy for lymphoma and there was some reluctance to intervene surgically on her airway. Intervention for airway support because of a deterioration in status was not necessary in any patient who was initially observed. Rather, the two patients who had been orthopnoeic quickly became symptom-free after initiation of antibiotic therapy. The patient who presented with dyspnoea remained symptomatic for 36 hr before subjective clinical improvement was noted.

The three patients who had severe respiratory distress (dyspnoea, tachypnoea >30 bpm, stridor or cyanosis) at the time of presentation to hospital were taken to the

operating room and, with an otolaryngologist in attendance, inhalational (two patients) or modified inhalational induction (one patient) of general anaesthesia was carried out and tracheal intubation was attempted. One trachea was then intubated easily, in one patient the airway was described as "difficult" although the intubation was uneventful, and in one patient a failed intubation led to an emergency tracheostomy. These latter two patients were found to have pulmonary oedema after intubation, were treated with furosemide and positive pressure ventilation with positive end-expiratory pressure and the oedema resolved. The patient with the "difficult" airway was returned to the operating room on the third day because of persistent fever and bilateral peritonsillar and epiglottic abscesses were drained. A prompt resolution of the patient's toxic state followed and his trachea was extubated the following day.

There were no deaths in the series. The duration of hospitalization averaged 4.7 days in the entire group, 4.3 days in the observed group and seven days in the intubated group. The patient with lymphoma had the longest hospital stay of 11 days.

Discussion

Acute epiglottitis, long recognized in children was, until recently, thought to be rare in adults. However, in three recent reports adults comprised 35–53% of the patients in the series.^{7,9,10} The incidence of AE in the adult population has been estimated at between 0.97–1.8 per 100,000 population.^{4,7,10} Mortality rates as high as 50% have been reported in the past but have decreased over the last 20 yr. Compiling the series reported since 1980 yields 904 patients with ten deaths, a mortality rate of 1.1%.^{4–7,9–21} Mortality is increased in those patients who present with respiratory distress and Khilanani, in a separate series of 118 adult AE patients presenting with respiratory distress, reported a mortality rate of 17.6%.²²

Most adults with epiglottitis present with sore throat. Respiratory distress is a less common feature of the disease in adults compared with paediatric AE, being documented in 25–69% of adults (weighted mean 31%).^{1,4,6,7,11,13,16,19,20} Sore throat was present in all of our patients whereas respiratory distress was limited to less than one-third. Oropharyngeal examination with a tongue blade and light appears to be well tolerated in adults with AE and does not induce respiratory distress, despite the commonly expressed concern that sudden airway obstruction may occur as a result of such examination.²³ Oropharyngeal examination was carried out in 19 of our patients, was apparently well-tolerated and was either normal (one patient) or revealed only mild to moderate pharyngitis in most (18 patients).

Visual examination of the epiglottitis is necessary to

TABLE II Acute epiglottitis: the Friedman classification

Stage I	Stage II	Stage III	Stage IV
No respiratory complaints	Subjective respiratory complaint	Moderate respiratory distress	Severe respiratory distress
Respiratory rate ≤ 20	Respiratory rate > 20	Stridor, retractions, perioral cyanosis	Stridor, retractions, cyanosis, delirium, decreased consciousness
		Respiratory rate > 30	Respiratory arrest

From: Friedman M, Toriumi DM, Grybauskas V, Applebaum EL. A plea for uniformity in the staging and management of acute epiglottitis. *Ear, Nose Throat J* 1988; 67: 873–80.

confirm or rule out the diagnosis of AE. Indirect (mirror) laryngoscopy has been used in the past and more recently the fiberoptic nasolaryngoscope has been employed. The examinations appear to be well tolerated and there is some evidence that the nasolaryngoscope results in less oropharyngeal discomfort than the mirror. The positive findings on visual examination reflect a generalized supraglottitis, rather than inflammation affecting the epiglottis alone.²

Airway management

The appropriate management of the airway in the adult patient with AE is controversial. Recent reports in the anaesthetic literature advocate tracheal intubation or tracheostomy in all adults with AE.^{2,3,23,24} Other authors recommend an artificial airway only in those patients presenting with respiratory distress.^{5–7,9,11,13–17,19,20} In these series reporting on 812 patients, the weighted average intubation rate was 21% and the mortality rate was 0.6%. Unfortunately, details of patient assessment, categorization of the degree of respiratory distress and criteria for intubation are not provided in most of these series. Authors advocating selective intubation argue that most adult patients do not present with respiratory distress and that acute deterioration and respiratory arrest in a monitored patient is rare. Instances of "sudden respiratory arrest" have occurred in patients who presented in respiratory distress and were admitted without close observation.^{3,18,24} Friedman has defined four stages of adult AE and maintains that, if carefully observed, patients move through the stages in sequence and that sudden respiratory arrest does not occur in patients with no previous evidence of airway compromise²¹ (Table II).

Pulmonary oedema following intubation has been reported in both adults and children with AE.^{23,25} Normal

TABLE III Acute epiglottitis: airway management

1 No respiratory complaints (Friedman Stage I)
(a) Monitoring in ICU
(b) Humidified oxygen
(c) Intravenous antibiotics
(d) Intubation/tracheostomy kit immediately available
2 Mild to moderate respiratory distress (Friedman Stage II, III)
(a) Transport to operating room
(b) Otolaryngologist standing by, setup for tracheostomy
(c) Attempt inhalational, modified inhalational induction
If airway obstructs options include:
(i) attempt intubation
(ii) establish surgical airway
(iii) needle cricothyrotomy, oxygenate, then perform intubation, retrograde intubation or tracheostomy
3 Severe respiratory distress, impending arrest (Friedman Stage IV)
(a) Immediate intubation, cricothyrotomy or tracheostomy in the emergency room

pulmonary artery pressures were measured in the adult report. Both adults with pulmonary oedema died and the suggestion was that the pulmonary capillary leak was a result of overwhelming sepsis, profound hypoxia or extreme negative intrathoracic pressure.²³ Two of our patients were found to be in pulmonary oedema after difficult intubations. The oedema resolved quickly and the subsequent clinical course of both patients suggested that negative intrathoracic pressure was the cause of the capillary leak.

Recommendations for management

Any adult presenting with painful dysphagia should be considered to have epiglottitis until proven otherwise. The diagnosis must be confirmed or ruled out on the basis of visual examination of the supraglottic structures. A protocol for the airway management of the adult with AE is provided in Table III. It is our opinion that an adult with a diagnosis of AE experiencing no signs or symptoms of respiratory distress (Friedman Stage I) can be safely monitored in an intensive care unit. Humidified oxygen should be provided and antibiotic therapy commenced after appropriate cultures are obtained.^{2,11} Equipment for emergency intubation and tracheostomy should be at the patient's bedside and experienced personnel available. Should the patient develop new signs or symptoms of respiratory distress an artificial airway should be established. There is no role for racemic epinephrine or helium-oxygen mixtures in these patients. Patients who initially present with respiratory distress or develop signs or symptoms of airway compromise after hospital admission (Friedman Stage II–III) should undergo intubation or tracheostomy. Complete airway obstruction occurs in

TABLE IV Acute epiglottitis: Criteria for Extubation

1 Normal temperature, resolution of systemic toxicity
2 Normal chest x-ray
3 Patient able to breathe around occluded endotracheal or tracheostomy tube with cuff deflated
4 Visual examination of supraglottic structures indicates decreased oedema and inflammation

18.3% of these patients, may develop rapidly and results in a mortality rate of 17.6%.²² The trachea should be intubated under controlled conditions in the operating room with an otolaryngologist standing by and a setup for a surgical airway available. There were three patients in our series who fitted Friedman Stage II, but their tracheas were not intubated and they did well. Nevertheless, given the considerable reported incidence of complete airway obstruction and mortality in these patients,²² it would appear prudent to secure the airway with tracheal intubation or tracheostomy. Patients presenting in impending or actual respiratory arrest (Friedman Stage IV) should undergo immediate tracheal intubation, cricothyrotomy or tracheostomy in the emergency room.

For tracheal intubation, an inhalational induction has been recommended and a slow and difficult induction should be anticipated. Airway obstruction may worsen or become complete either with excitement or as the patient becomes anaesthetized. Should this occur, a number of options exist including an immediate attempt at orotracheal intubation, establishment of a surgical airway or temporizing the situation with a needle cricothyrotomy and then performing orotracheal intubation, retrograde intubation or establishing a surgical airway.

In adults, the toxic state quickly defervesces with antibiotic therapy. Continued fever suggests abscess development and mandates careful examination with incision and drainage if present. Nonintubated patients should be reassessed at 24 hr and if the clinical picture is resolved and the swelling is reduced on visual examination, they may be discharged to the ward. Criteria for extubation are summarized in Table IV. Barring complications extubation will be performed in most patients within 2–3 days.

We have reported our experience with 21 adults with AE. Respiratory distress was present in 29% and was severe in 15%. All patients presenting with severe respiratory distress had artificial airways established. The remainder of the patients were monitored and over the last five years all monitoring took place in an ICU. There is disagreement between recent management recommendations appearing in the anaesthetic and the otolaryngology literature. The anaesthetic literature supports mandatory intubation of all adults with acute AE while the otolaryn-

gology literature recommends more selective intervention in those patients with respiratory distress. It would appear that only about one-quarter of adult patients require tracheal intubation, and those patients requiring airway support can be differentiated from the others on the basis of respiratory symptoms. It is both prudent and safe to monitor adults with AE but without signs or symptoms of airway compromise in an ICU setting until there is evidence of resolution of the airway inflammation. Because the literature appears to document an increased incidence of airway obstruction in AE patients with respiratory symptoms and it is not possible to predict which patients with respiratory symptoms will progress to complete airway obstruction, it is recommended that adults with AE presenting with respiratory symptoms undergo tracheal intubation or tracheostomy.

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