

# Acute epiglottitis: Trends, diagnosis and management

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## ABSTRACT

Acute epiglottitis is a life-threatening disorder with serious implications to the anesthesiologist because of the potential for laryngospasm and irrevocable loss of the airway. Acute epiglottitis can occur at any age. Early diagnosis with careful and rapid intervention of this serious condition is necessary in order to avoid life-threatening complications.

**Key words:** Acute epiglottitis, anesthesia, differential diagnosis, management, trends

## INTRODUCTION

Acute epiglottitis is a life-threatening disorder with serious implications to the anesthesiologist because of the potential for laryngospasm and irrevocable loss of the airway. There is inflammatory edema of the arytenoids, aryepiglottic folds and the epiglottis; therefore, supraglottitis may be used instead or preferred to the term acute epiglottitis.

## TRENDS AND CAUSES

Acute epiglottitis can occur at any age. The responsible organism used to be Hemophilus influenzae type B (Hib), but infection with group A b-hemolytic Streptococci has become more frequent after the widespread use of Hemophilus influenzae vaccination. There are differences in trends, occurrences and management of acute epiglottitis between children and adults. There is also more diversity in the cause of epiglottitis in adults.<sup>[1]</sup> The incidence of acute epiglottitis in adults ranges from 0.97 to 3.1 per 100,000, with a mortality of approximately 7.1%. The mean annual incidence of acute epiglottitis per 100,000 adults significantly increased from 0.88 (from 1986 to 1990) to 2.1 (from 1991 to 1995) and to 3.1 (from 1996 to 2000).<sup>[2,3]</sup> This rise seems to be unrelated to Hemophilus influenzae type b

infection, but related to miscellaneous pathogenic bacteria. The number of epiglottic abscesses increased concomitantly with a rise in the incidence of acute epiglottitis.<sup>[2]</sup> In adults, a more diverse microbiological etiology is found with often negative sputum cultures and negative blood cultures to Hib. Some cases of epiglottitis have been attributed to Candida spp. Noninfectious causes of epiglottitis may include trauma by foreign objects, inhalation and chemical burns, or are associated with systemic disease or reactions to chemotherapy. The presence of dysphagia, drooling and stridor subsequent to thermal or caustic injury should alert the treating physician to the possibility of injury to the supraglottic structures with resultant epiglottitis. Epiglottic injuries of this type should be suspected in patients with mental disorders or communication difficulties.<sup>[4]</sup> In young adults, acute epiglottitis has been described as being caused by inhalation of heated objects when smoking illicit drugs; the symptoms, signs, X-ray and laryngoscopic findings are similar to infectious epiglottitis.<sup>[3]</sup> These adults present many of the features seen in acute infectious epiglottitis, and should be handled with the same consideration for potential upper airway obstruction.

In an 8-year retrospective (1998–2006) review of epiglottitis admissions, Shah *et al.* found that epiglottitis continues to be a significant entity, with two uniquely vulnerable populations: infants (<1 year old) and the elderly (>85 years old). When examining the pediatric cohort of patients (patients <18 years of age), 34.4% were <1 year of age. This category of age <1 year seemed to have increased in frequency in representing 26.8% of pediatric patients in 1998 to 41.1% in 2006.<sup>[5]</sup> A case of epiglottitis with negative cultures has been reported in a neonate within hours of birth.<sup>[6]</sup>

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## DIAGNOSIS: SYMPTOMS AND SIGNS

The typical presentation in epiglottitis includes acute occurrence of high fever, severe sore throat and difficulty in swallowing with the sitting up and leaning forward position in order to enhance airflow. There is usually drooling because of difficulty and pain on swallowing. Acute epiglottitis usually leads to generalized toxemia. The most common differential diagnosis is croup and a foreign body in the airway. A late referral to an acute care setting with its serious consequences may result from difficulty in differentiation between acute epiglottitis and less urgent causes of a sore throat, shortness of breath and dysphagia. Antibiotic therapy is usually initiated without preceding bacterial culture, with the consequence of negative cultures at admission. Viral laryngotracheobronchitis, which results in swelling of the mucosa in the subglottic area of the larynx, is the most common etiology of croup. There is no seasonal predilection to epiglottitis, while croup is more prevalent during the wintertime. Croup has a more gradual onset than acute epiglottitis, and is commonly associated with low-grade fever. Although both acute epiglottitis and croup share the same symptoms of inspiratory stridor, suprasternal, intercostal and substernal retractions and hoarseness, differentiation in early illness is possible by additional observation of barking cough and absence of drooling and dysphagia in croup and by the additional observation of drooling and dysphagia with absence of coughing in epiglottitis. Additional reliable signs of epiglottitis are a preference to sit, dysphagia and refusal to swallow.<sup>[7]</sup> Other less-common differential diagnosis would include bacterial tracheitis, laryngeal foreign body and retropharyngeal abscess.

## RADIOLOGICAL AND LABORATORY FINDINGS

Anteroposterior radiographs of the neck are helpful in confirming the diagnosis and ruling out the possibility of a foreign body in the airway. In croup, the supraglottic structures and epiglottic shadow are normal, while there is blurring of the tracheal air shadow and symmetric narrowing of the subglottic air shadow, which creates the characteristic “church steeple” sign on anteroposterior films.

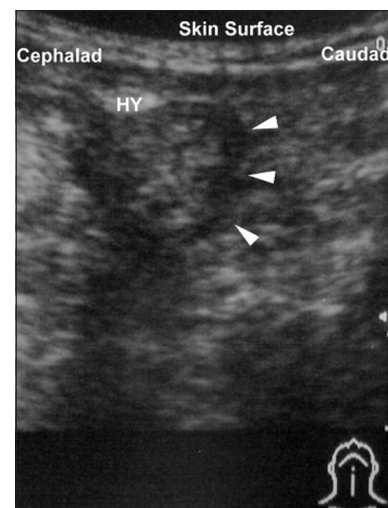
In acute epiglottitis, the radiological “thumb sign” [Figure 1] is indicative of severe inflammation of the epiglottis with potential for irrevocable loss of the airway. Difficulty in breathing and stridor are common signs of epiglottitis in children, but are less frequent in adults. The most common presenting symptom in adults is odynophagia (100%), followed by dysphagia (85%) and voice change (75%).<sup>[8]</sup> In adults, stridor is regarded as a warning sign for occlusion of the upper airway. Stridor, tachycardia, tachypnea, rapid

onset of symptoms and a “thumb-sign” present in 79% of the cases on lateral X-rays of the neck are significant predictors for imminent airway compromise with rapid clinical deterioration.<sup>[9]</sup>

Laboratory tests are usually not helpful in picking up the diagnosis. In the absence of a positive radiological finding, performing a flexible fiberoptic laryngoscopy in a controlled clinical setting for a reliable, timely diagnosis may be indicated. Because of the risk of inducing laryngeal spasm and/or total airway obstruction, examination of the pharynx and larynx should be attempted only in an area with adequate equipment and staff prepared to intervene should upper airway obstruction develop, ideally, in the operating room. Ultrasonography has been described as a way to investigate the epiglottis by visualization of the “alphabet P sign” in a longitudinal view through the thyrohyoid membrane [Figure 2].<sup>[10]</sup>



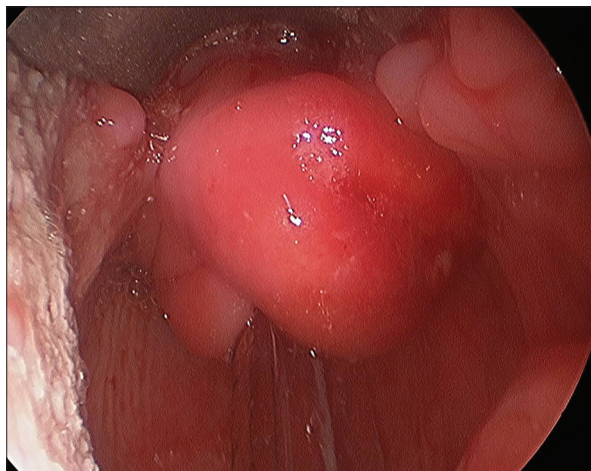
**Figure 1:** The radiological “thumb sign” in acute epiglottitis



**Figure 2:** “Alphabet P sign” formed by acoustic shadow of hyoid bone (HY), swollen epiglottis (pointed by white arrows). From Hung TY *et al.* *Am J Emerg Med.* 2011; 29:359.e1-3. Epub 2010 Aug 1

## ANESTHETIC MANAGEMENT AND COMPLICATIONS

Patients with signs of an advancing upper airway obstruction, consistent with an acute epiglottitis, should be treated as a medical and an airway emergency. In the presence of respiratory distress, diagnostic procedures and radiography are not indicated, and securing the airway should be prioritized. Tracheal intubation of a patient with epiglottitis must be regarded as a potentially difficult procedure [Figure 3]. It should be done in strict monitored conditions, i.e. in the operating room, while maintaining spontaneous ventilation. The readiness of a team capable of performing an immediate tracheotomy should be verified. The patient should be transferred to the operating room under the supervision of an experienced anesthesiologist and surgeon. The induction may be performed with the patient sitting upright. Forcing the child/patient into a supine position may precipitate acute airway obstruction. Anesthesia induction with achievement of a deep level of anesthesia and maintenance of spontaneous ventilation has been described as the method of choice. The amount of time necessary to produce deep anesthesia using an inhalation induction may be increased secondary to airway obstruction and may necessitate increasing gas concentration. Capnography with exhaled gas analysis is useful in determining anesthetic depth. Muscle relaxants are avoided and spontaneous ventilation should be maintained. In case of the diagnosis of epiglottitis, a fiberoptic nasal intubation or rigid bronchoscopy using an endotracheal tube with substantially reduced diameter is preferred. The patient should be transferred sedated to an intensive care unit (ICU) after securing the airway. Intravenous



**Figure 3:** Inflammatory edema of the arytenoids, aryepiglottic folds and the epiglottis. Tracheal intubation of a patient with epiglottitis must be regarded as a potentially difficult procedure

sedation should ideally allow spontaneous ventilation. Tracheal extubation should be preceded by a cuff leak test with a deflated cuff and, usually, a second look by direct laryngoscopy with deep sedation or general anesthesia. Complications of acute epiglottitis may include deep neck space infection, recurrent illness and vocal granuloma.<sup>[11]</sup> Dexamethasone treatment or budesonide aerosols could be used in an attempt to limit pharyngeal edema and thereby reduce the obstruction. The use of corticosteroids has been associated with shorter ICU and overall length of stay, with an average overall length of stay of 3.8 days in adults.<sup>[8]</sup>

## CONCLUSION

Acute epiglottitis is a serious condition necessitating careful and rapid intervention in order to avoid life-threatening complications.

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