

# Adult Epiglottitis: A Case Series

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## ABSTRACT

**Introduction:** Emergency Departments are inundated by patients with respiratory illness during the winter months. Emergency physicians are required to quickly identify critically ill patients among the large volume of patients with mild upper respiratory illness. Among these life-threatening conditions is acute epiglottitis.

**Case Presentation:** We report a rare series of four adult patients who presented to our Emergency Department during a period of only one week in April 2015 and were ultimately diagnosed with acute epiglottitis. Three of the patients improved with conservative measures and were observed in the intensive care unit. One patient required an emergent tracheostomy.

**Discussion:** This series of patients is unique in that all four patients presented to a single Emergency Department within a few days of each other and, despite a myriad of presenting chief complaints, the patients were eventually found to have the same potentially life-threatening diagnosis.

These cases reinforce the variability of presenting symptoms and physical examination findings that can occur in patients with epiglottitis. They also highlight clinical findings and adjunctive testing that can help identify patients who would most benefit from intervention.

## INTRODUCTION

With the advent of immunizations against *Haemophilus influenzae* serotype b, epiglottitis in the pediatric population has declined rapidly in the past several decades.<sup>1,2</sup> As a result, most cases of epiglottitis now occur in adults.<sup>2</sup> The differential diagnosis for epiglottitis includes

benign conditions such as pharyngitis, laryngitis, viral syndrome, and influenza as well as severe conditions causing airway obstruction, including angioedema, anaphylaxis, foreign body aspiration, and caustic ingestion. Accurately identifying epiglottitis is critical because it may require immediate intervention. Treatment for epiglottitis is tailored to the degree of airway obstruction, with some patients improving with conservative measures and others requiring an emergent artificial airway.<sup>2</sup> Identifying risk factors for patients who will probably require airway intervention is of paramount importance.<sup>2</sup> The series of patients presented here is unique in that all four patients presented to a single Emergency Department (ED) during one week with different chief complaints but were found to have varying severity of the same life-threatening diagnosis.

## CASE PRESENTATIONS

### Case 1

A 54-year-old woman with a history of hypertension and hyperlipidemia presented to the ED with 3 days of myalgias, sore throat, and fevers. She reported increasing difficulty phonating and increasing shortness of breath during the course of the day. She denied drooling.

The patient was febrile (temperature, 38.4°C), and the rest of her vital signs revealed tachycardia with a heart rate of 101 beats/min, blood pressure of 155/75 mmHg, respiratory rate of 24 breaths/min, and oxygen saturation of 97% on room air. On examination, she was observed to be sitting upright for comfort and in mild distress. She had mild audible inspiratory stridor without wheezing. Her neck was supple, without trismus. Her posterior oropharynx was erythematous without exudate.

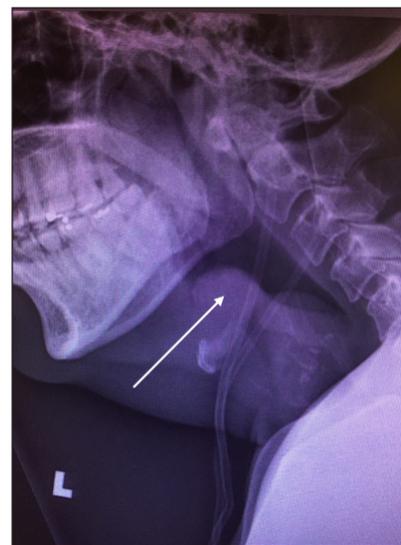


Figure 1. Lateral neck radiograph, with the white arrow indicating the inflamed epiglottis, or "thumbprint" sign.

On the basis of the severity of the above findings and concern for impending airway obstruction, the patient was given intravenous (IV) dexamethasone, racemic epinephrine, and IV ceftriaxone. Intubation equipment, including a flexible fiberoptic nasopharyngoscope, was placed at bedside. The Otolaryngology Department was consulted. A portable lateral soft-tissue neck radiograph was obtained, which showed an enlarged and edematous epiglottis, or "thumbprint" sign (Figure 1). The Anesthesiology Department was contacted and emergent intubation was planned. The patient was emergently transferred to the operating room for fiberoptic intubation with a backup plan for a surgical airway. During transfer, she became agitated and mildly hypoxic, requiring oxygen via facemask. In the operating room general anesthesia was induced with sevoflurane; the neck was prepared with povidone-iodine;

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and supraglottic intubation was attempted with video laryngoscopy and revealed an inflamed and erythematous epiglottis (Figure 2). Intubation was unsuccessful. Bag-valve-mask ventilation was also difficult because of airway edema. An emergent tracheostomy was performed by the otolaryngologist. Postoperatively, the patient was admitted to the intensive care unit (ICU) and discharged five days later without ventilatory needs. Nineteen days after surgery, her tracheostomy was decannulated without complication.

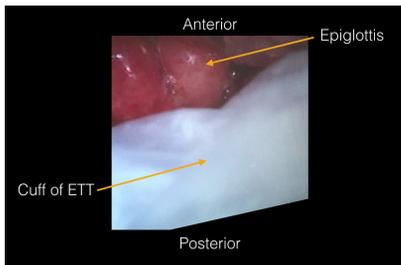


Figure 2. Image from a video laryngoscope of an inflamed epiglottis anterior to the cuff of the endotracheal tube (ETT).

**Case 2**

A 77-year-old woman with a history of diabetes, hypertension, hypothyroidism, and hyperlipidemia was brought to the ED by ambulance from a skilled nursing facility with a chief complaint of dehydration. She also reported increasing malaise during the course of the day because of decreased appetite and poor oral intake. She reported subjective fevers and “swollen glands” under her jaw.

She was noted to be afebrile, with a heart rate of 59 beats/min, blood pressure of 138/65 mmHg, respiratory rate of 20 breaths/min, and oxygen saturation of 95% on room air. On examination, firm and slightly tender masses were palpated in the submandibular and submental regions bilaterally, without significant erythema. The floor of her mouth was soft. Her posterior oropharynx was clear, and she did not exhibit any cervical lymphadenopathy.

During her stay in the ED, the patient became intermittently bradycardic, with a heart rate as low as 30 beats/min, and she was also noted to desaturate to 80% on room air when asleep. The possibility of a neck mass causing intermittent vagal bradycardia along with airway obstruction

was considered. Oxygen and methylprednisolone were administered. On the basis of physician preference, broad-spectrum antibiotics vancomycin and piperacillin-tazobactam were administered.

Because the patient was stable without evidence of impending airway obstruction, and a broad differential diagnosis was considered, including a neck mass or abscess, a computed tomography (CT) was planned. A noncontrast CT study was obtained owing to an elevation in her creatinine level. The CT demonstrated a soft-tissue mass adjacent to the left mandible in the left submandibular space that was causing tracheal deviation, an inflamed epiglottis, and supraglottic edema (Figure 3). The Otolaryngology Department was consulted for an emergent bedside fiberoptic nasopharyngoscopy, which demonstrated an enlarged epiglottis and edematous supraglottic space. The patient’s neck anatomy was marked and a cricothyrotomy kit was placed at bedside in preparation for a possible surgical airway. However, the patient continued to breathe comfortably while on nasal cannula with the head of the bed elevated. She was admitted to the ICU for ongoing dexamethasone, IV antibiotics, and airway observation. Repeat nasopharyngoscopy the following day demonstrated improvement in the supraglottic edema. On the third hospital day,

the epiglottis was no longer edematous. After further observation, the patient was discharged on hospital day seven without complication.

**Case 3**

A 51-year-old man presented to the ED reporting an “800-milligram pill of ibuprofen” stuck in his throat. The patient stated that he took the medication and felt it get stuck in his right posterior oropharynx. He had been unable to reach it with his finger or wash it down with water. On further questioning, he reported taking the ibuprofen for a sore throat that began acutely after lunch, resulting in difficulty swallowing. He also reported a change in his voice. He denied any other associated symptoms or any prior medical problems, and was not on any medications.

On examination, his temperature was 37.4°C with a heart rate of 116 beats/min, blood pressure of 133/78 mmHg, respiratory rate of 18 breaths/min, and oxygen saturation of 95% on room air. His examination demonstrated some mild erythema in the posterior oropharynx. His oropharynx was otherwise clear with no peritonsillar swelling, exudates, or foreign body visualized.

The patient’s symptoms did not improve with drinking warm soda. The Otolaryngology Department was consulted for

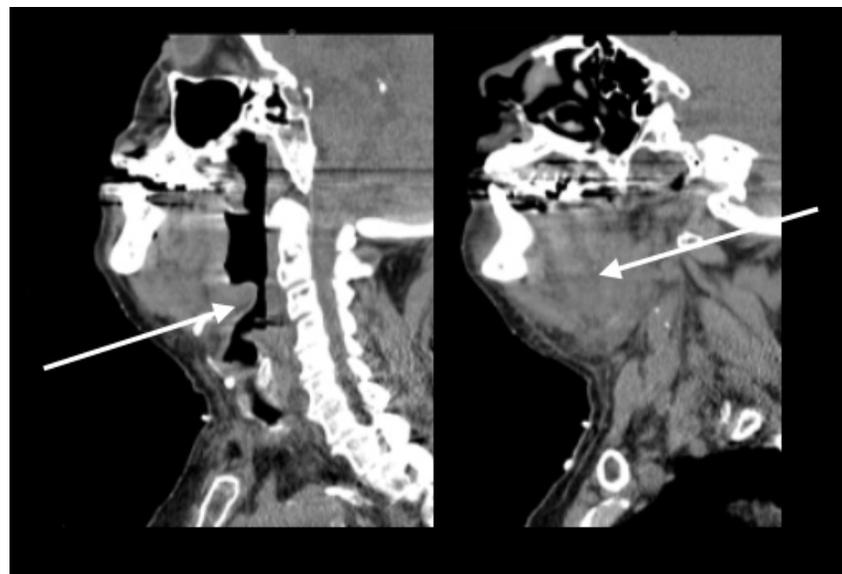


Figure 3. Saggital-view computed tomography images of the neck. The white arrow on the left image indicates an inflamed epiglottis. The white arrow on the right image indicates supraglottic edema.

bedside fiberoptic nasopharyngoscopy for foreign body visualization. While he was awaiting consultation, the patient's laboratory results revealed a leukocytosis to 24 K/ $\mu$ L (normal range, 3.5-12.5 K/ $\mu$ L). Because the patient was stable without signs of impending airway obstruction, a soft-tissue neck CT was obtained to evaluate for an infectious process not obvious on visual examination. The CT demonstrated a right palatine tonsillar abscess extending inferiorly into the lateral supraglottic larynx measuring 0.7  $\times$  1.5  $\times$  2.5 cm, with moderate surrounding inflammatory changes and mild airway narrowing. Owing to signs of airway narrowing, dexamethasone was administered. Direct visualization by the otolaryngologist showed supraglottitis with right epiglottis and arytenoid involvement. The patient was admitted to the ICU for further observation and IV antibiotics. The epiglottic edema improved by the following day and the patient was discharged home on hospital day 4 without complication.

#### Case 4

A 76-year-old man with a history of stage IV chronic lymphocytic leukemia with chronic leukopenia and thrombocytopenia, reactive airway disease, gastroesophageal reflux disease, and hyperlipidemia presented to the ED with a sore throat. He was undergoing chemotherapy at the time. His sore throat had progressively worsened during the previous 2 days, and he also reported a muffled voice, subjective fevers, and difficulty swallowing. On examination, the patient's temperature was 37.1°C, with a heart rate of 115 beats/min, blood pressure of 152/94 mmHg, respiratory rate of 18 breaths/min, and oxygen saturation of 96% on room air. He was noted to have a muffled voice and swelling of his right anterior neck with minimal erythema and tenderness to palpation. Examination also revealed an erythematous left tonsil with few overlying white lesions.

Bedside flexible fiberoptic nasopharyngoscopy performed by emergency physicians demonstrated moderate epiglottitis with bilateral aryepiglottic fold and arytenoid supraglottitis. The patient's laboratory work was notable for a white blood cell count of 3.0 K/ $\mu$ L (normal

range, 3.5-12.5 K/ $\mu$ L). On the basis of physician preference, IV dexamethasone and piperacillin-tazobactam were administered. The patient was admitted to the ICU for airway monitoring and repeat evaluation by the Otolaryngology Department. With continued clinical improvement, he was discharged on hospital day 3 without complication.

#### DISCUSSION

Epiglottitis is an acute inflammatory condition involving the epiglottis and other supraglottic structures that, in severe cases, can lead to airway obstruction. Patient populations at particular risk for epiglottitis include middle-aged white men, those with smoking history, and those with comorbid medical conditions such as diabetes.<sup>1,3,4</sup> Retrospective reviews have also revealed that infants younger than age 1 year and the elderly older than age 85 years are particularly vulnerable to this disease.<sup>4</sup> However, a large number of patients have no contributing risk factors.<sup>2-4</sup> Stridor and respiratory distress are considered strong predictors for airway intervention.<sup>2</sup> However, more subtle signs and symptoms, such as subjective shortness of breath, tachycardia, tachypnea, and rapid symptom onset (less than 24 hours), have also been shown to be predictors for airway intervention.<sup>2</sup>

In the US, the incidence of adult epiglottitis is increasing in those aged 45 to 64 years and in those older than age 85 years.<sup>4</sup> Some authors estimate that diagnosis of acute epiglottitis is approximately 0.6 to 3 cases per 100,000 adult patients each year with a national mortality rate of 0.89%.<sup>4,5</sup> Mean length of stay in the hospital is 4 days.<sup>4</sup> Presentation of epiglottitis to the ED is variable. Patients often present with sore throat, odynophagia, and voice change.<sup>2,6</sup> Diagnosis is clinical but is confirmed by nasopharyngoscopy with direct visualization of an inflamed epiglottis and/or supraglottic tissues.<sup>7</sup> In a stable patient, the emergency physician may decide to perform nasopharyngoscopy as in case 4 above. However, a team approach in the operating room with the Anesthesiology and Otolaryngology Departments is preferred for epiglottitis visualization in patients with clinical concern for impending airway obstruction. Lateral

soft-tissue neck radiographs may show the classic "thumbprint" sign, but this imaging modality has poor sensitivity.<sup>7</sup> Bedside ultrasound and CT may also be considered as adjunctive testing.<sup>8</sup> Imaging modality should be chosen on the basis of clinical concern and consideration of alternative diagnoses. For example, CT imaging may be used in stable patients in whom conditions such as retropharyngeal abscesses are of concern. Diagnostic imaging should not delay airway intervention in patients with respiratory distress. Etiology is multifactorial and may include infectious and non-infectious entities.<sup>9</sup> Infectious etiologies are thought to be bacterial, viral, or fungal organisms.<sup>9</sup> Possible bacterial pathogens include *Streptococcus pyogenes*, *pneumonia*, *Staphylococcus aureus*, and *H influenzae*, among other respiratory flora.<sup>9-11</sup>

Treatment is centered on airway management. One retrospective review in 2010 revealed that 13.2% of patients diagnosed with epiglottitis required intubation whereas 3.6% needed tracheostomy.<sup>4</sup> Antibiotics are the mainstay of initial treatment with steroids considered potential adjuncts.<sup>4</sup> Antimicrobial therapy should be tailored to the most common etiologies and resistance patterns, with a third-generation cephalosporin often recommended as single therapy.<sup>9</sup> Vancomycin should be administered if methicillin-resistant *S. aureus* is considered.<sup>12</sup> Steroid use is controversial, but some studies have shown that steroids contribute to a shorter length of stay in the hospital and ICU.<sup>2</sup> Bronchodilators, such as racemic epinephrine, have not been shown to be effective in acute epiglottitis but may be considered in patients with impending airway obstruction while preparing for airway intervention.<sup>13</sup> Racemic epinephrine should not be used in children because it may cause agitation and promote laryngospasm.<sup>14</sup> Caution should also be used in elderly patients or in those for whom there is concern for myocardial ischemia or arrhythmia.<sup>15</sup> Supportive care along with airway observation in the ICU is sufficient for the management of most patients with epiglottitis.<sup>4</sup> However, careful planning for securing the airway is paramount because patient decompensation may require immediate life-saving intervention.<sup>2</sup> Airway management should involve preparation

for surgical airway with identification of landmarks and skin cleansing. The patient should be maintained in an upright position initially because placing the patient supine exacerbates airway obstruction.<sup>16</sup> Visualization of the vocal cords should be obtained in a controlled setting, using awake intubation to allow for spontaneous ventilation during intubation attempts.<sup>17</sup> Paralysis may worsen obstruction. Fiberoptic or videolaryngoscopy should be considered.<sup>2,16,17</sup> The physician must be quick to recognize futile attempts at supraglottic intubations and perform cricothyrotomy in an expedited fashion.<sup>2</sup>

These cases reveal the importance of timely diagnosis and intervention in epiglottitis to prevent severe morbidity and mortality. Epiglottitis is a true airway emergency.<sup>18</sup> Physicians must maintain a high clinical suspicion for this condition because presenting symptoms are variable, physical examination may be unreliable, and delayed diagnosis can have catastrophic consequences. ❖

#### Disclosure Statement

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## Inflammation

This operation of the body, termed inflammation, requires our greatest attention, for it is one of the most common and most extensive in its causes, and it becomes itself the cause of many local effects, both salutary and diseased.

— John Hunter, FRS, 1728-1793, Scottish surgeon