

CLINICAL VIGNETTE

Adult Epiglottitis Identified Through Plain-Film Radiography

Christopher Katsura, M.D., Soni Chawla, M.D., Sam Melamed, and Mark Richman, M.D., MPH

Introduction

Due to widespread vaccination against *Haemophilus influenzae* type b (Hib), epiglottitis is rarely encountered in the United States. To differentiate between myriad causes of sore throat, high-clinical suspicion and a soft tissue lateral neck x-ray were critical in diagnosing adult epiglottitis.

A 34-year-old Guatemalan female complained of two days of severe sore throat and odynophagia preventing her from swallowing solids or liquids. Her voice had become raspy. Past medical history was significant only for an open resection of a sub-glottic hemangioma in Guatemala eight years prior. She had mediastinal and recurrent sub-glottic hemangioma and was followed by Otolaryngology and Cardio-Thoracic Surgery. She denied fevers or shortness of breath.

Vital signs were unremarkable. The patient was in no distress. There was no stridor, trismus, or cervical lymphadenopathy. Her voice was hoarse and oropharynx clear, without tonsillar enlargement or exudate. Her neck was severely tender to palpation superior and lateral to the thyroid cartilage. Without physical examination findings explaining severe symptoms, and coming from a country where she unlikely received Hib vaccination, a soft-tissue lateral neck film was obtained, revealing an enlarged, rounded 2.5 cm epiglottitis causing airway narrowing (Figures 1 and 2). Flexible fiberoptic laryngoscopy confirmed epiglottitis with patent airway, averting emergent intubation.

She was made NPO and admitted to the Intensive Care Unit (with a cricothyroidotomy kit nearby) and treated with broad-spectrum parenteral antibiotics, steroids, intravenous fluids, and nebulized racemic epinephrine.

By hospital day 2, the patient's condition had improved. She was able to swallow her own secretions with minimal pain and speak comfortably with mild pain. On hospital day 3, the patient was able to tolerate oral fluids and speak comfortably with no pain. She was started on a clear-liquid diet, which was advanced as tolerated. Steroids and breathing treatments were discontinued, and antibiotics were switched to amoxicillin/clavulanate 875 mg oral twice daily to complete a 14 day course. After two days in the ICU, she was transferred to the medicine floor and observed for one additional day. She was discharged on hospital day 4 in stable condition, asymptomatic, on oral amoxicillin/clavulanate.

Discussion

In December 1799, George Washington contracted, and rapidly died from, bacterial epiglottitis. The epiglottis, a flexible, cartilaginous structure at the back of the tongue, prevents food from entering the trachea during swallowing. Epiglottitis is inflammation of the epiglottis, vallecula, arytenoids, and aryepiglottic folds, which can lead to airway obstruction and death.¹ Epiglottitis has historically been most commonly associated with bacterial infection by *Haemophilus influenzae* type b (Hib). Up to 60% of pediatric epiglottitis cases had positive *H. influenzae* cultures.² Bacteria enter through the nasopharynx and may remain there for months. *H. influenzae* type b primarily infects infants and children under the age of five years and very rarely occurs in adolescents and adults. In the 1980s, around 20,000 annual cases of *H. influenzae*-associated diseases were reported in the United States, almost all among children younger than ten years.³ Epiglottitis is rare today because of pediatric immunization with the *H. influenzae type b (Hib) vaccine*, available in the United States since 1985. Since the Hib vaccine significantly lowered the number of epiglottitis cases due to *H. influenzae*, *Streptococci* (specifically, *Group A streptococci (S. pyogenes)*) have become a leading cause of the disease among children⁴ and adults.⁵ Other causes of acute epiglottitis, such as fungal pathogens or viruses, usually occur in patients with immune deficiencies.¹

Presentation

Our patient's presentation was typical for adult patients: unremarkable vital signs, tenderness of the anterior neck, and less ill-appearing. Most patients with epiglottitis have been symptomatic for three to four days at the time of presentation. The prevalence of particular symptoms differs between children and adults: adults are substantially more likely to have sore throat and difficulty swallowing, whereas children are more likely to have difficulty breathing, stridor, and fever (1.0°C higher average temperature than adults).² Given the low prevalence of dyspnea and fever, their absence does not exclude adult acute epiglottitis. Children are less likely to have cervical adenopathy and tenderness of the anterior neck. Less-frequent early indicators of epiglottitis include muffled voice, otalgia, and tachycardia.¹

Patients who complain of dyspnea as an onset symptom may experience potentially lethal future airway obstruction. Adult epiglottitis caused by *H. influenzae* (compared with other causes) is particularly prone to airway obstruction (up to 26% of cases) and presents with shorter duration of symptoms,

higher occurrence of respiratory distress and drooling, and a lower occurrence of sore throat and odynophagia.^{Error! Bookmark not defined.} Patients with impending respiratory failure may assume a “tripod” position, sitting or standing leaning forward, supporting the upper body with hands on the knees or another surface.

Diagnosis and Management

Direct laryngoscopy is the “gold-standard” for diagnosing epiglottitis, since the epiglottitis can be visualized directly and epiglottitis does not usually lead to anterior neck complications that would make laryngoscopy difficult.⁶ For patients who cannot receive either a direct or indirect laryngoscopy (equipment unavailable or those at risk of acute airway obstruction), a lateral, soft-tissue x-ray of the neck may reveal the “thumb print” sign, indicating an edematous epiglottis. However, x-ray is less sensitive and has a high false negative rate (12% – 20%).^{1,6} A high clinical suspicion should prompt more aggressive diagnostic maneuvers.

Patients with suspected or confirmed epiglottitis should not be agitated, such as by phlebotomy or placement of an intravenous line. The patient should be allowed to remain in whatever position they are comfortable until airway competence is assured or secured.

The decision of how to diagnose patients suspected of having epiglottitis begins with the patient’s clinical status. Those with impending respiratory failure require immediate airway attention with advanced airway equipment (including a cricothyrotomy kit and/or needle-jet insufflation (also known as percutaneous transtracheal jet ventilation)) and back-up expertise (e.g., Otolaryngology and/or Anesthesiology) as available. The edematous epiglottitis may be visualized at that time. Stable patients may undergo direct or indirect laryngoscopy, or a lateral, soft tissue neck x-ray.^{Error! Bookmark not defined.}

After assuring airway stability, patients may undergo phlebotomy (complete blood count, blood cultures, chemistry panel, and others, as needed) and receive intravenous fluids (patients may be dehydrated from poor oral intake due to odynophagia). If the patient is intubated, purulence around the epiglottis should be cultured, as well.

Adult patients are often managed more conservatively than pediatric patients. Of 216 adult cases of acute epiglottitis, Nonoyama et al⁷ found most cases received conservative treatment; only 18.1% required airway management. Intravenous antibiotics should be administered promptly following acquisition of culture material to cover *H. influenza*, *Streptococcus pyogenes*, and *Streptococcus pneumoniae*. Common antibiotics effective against the causative organisms of epiglottitis include ceftriaxone, ampicillin/sulbactam, cefuroxime, and cefotaxime. For patients with severe penicillin and cephalosporin allergies, clindamycin or chloramphenicol are options.^{Error! Bookmark not defined.}

Racemic epinephrine, sedation, and beta-agonists have not been proven to be helpful in epiglottitis. Supplemental humidified oxygen may be administered, if doing so does not

agitate the patient. Corticosteroids remain controversial.^{Error! Bookmark not defined.}

Patients, intubated or not, should be admitted to the intensive care unit (ICU) as those who are not intubated require close observation and serial evaluation of airway competency.

Although our patient did not have a history of being immunized against *H. influenza* type b, it is more likely she contracted epiglottitis from a different pathogen, based on epidemiology^{Error! Bookmark not defined.} and absence of some *H. influenzae*-associated symptoms, such as drooling, acute airway compromise, or respiratory distress.^{Error! Bookmark not defined.} Since our patient resided in the United States, it is unlikely she would become infected with *H. influenzae*, as virtually all *H. influenzae*-related diseases have been eradicated.^{Error! Bookmark not defined.} A much more likely pathogen is *Group A Streptococci*, which has become a prominent cause of epiglottitis in adults.

Conclusion

Adult epiglottitis is potentially life-threatening but easy to overlook, as patients (such as ours) often have unremarkable vital signs and may not appear critically ill. A high index of suspicion is necessary to make the diagnosis. Adults often present with the common complaint of sore throat and difficulty swallowing. Absence of common pediatric symptoms (difficulty breathing, stridor, fever) does not exclude adult epiglottitis. As with our patient, elements of the history and physical examination that might prompt a more thorough evaluation of the adult patient with “sore throat” include:

- Confirmed or suspected lack of Hib vaccination;
- Severe symptoms;
- Symptoms not explained by physical examination (e.g., hypopharyngeal odynophagia with a normal visualized oropharynx); and
- Anterior neck tenderness.

For patients who cannot receive laryngoscopy, a lateral, soft-tissue x-ray of the neck may reveal the “thumb print” sign. However, x-ray has up to 20% false negative rate; high clinical suspicion should prompt more aggressive diagnostic maneuvers.

After airway stabilization is assured, patients should undergo phlebotomy, receive intravenous fluid and antibiotics, and be admitted to the ICU with specialty consultation (Otolaryngology, Anesthesiology, Infectious Disease).

Figures

Figure 1: Antero-posterior neck film

Arrows outline the mediastinal hemangioma



Figure 2: Soft-tissue lateral neck plain film

* indicates enlarged epiglottis

Arrow demonstrates sub-glottic hemangioma

indicates calcification in known hemangioma



REFERENCES

1. **Gompf G.** Epiglottitis. *Medscape*. Available at <http://emedicine.medscape.com/article/763612-overview>. Accessed August 8, 2014.
2. **Mayo-Smith MF, Spinale JW, Donskey CJ, Yukawa M, Li RH, Schiffman FJ.** Acute epiglottitis. An 18-year experience in Rhode Island. *Chest*. 1995 Dec;108(6):1640-7. PubMed PMID: 7497775.
3. **Centers for Disease Control and Prevention.** Haemophilus influenzae type b. *Pink Book Pamphlet*. Atlanta: CDC; 2012: 87-9.
4. **Faden H.** The dramatic change in the epidemiology of pediatric epiglottitis. *Pediatr Emerg Care*. 2006 Jun;22(6):443-4. PubMed PMID: 16801849.
5. **Briem B, Thorvardsson O, Petersen H.** Acute epiglottitis in Iceland 1983-2005. *Auris Nasus Larynx*. 2009 Feb;36(1):46-52. doi: 10.1016/j.anl.2008.03.012. Epub 2008 May 23. PubMed PMID: 18502071.
6. **Solomon P, Weisbrod M, Irish JC, Gullane PJ.** Adult epiglottitis: the Toronto Hospital experience. *J Otolaryngol*. 1998 Dec;27(6):332-6. PubMed PMID: 9857318.
7. **Nonoyama H, Arimoto M, Inagawa S, Uchida I, Tanigawa T, Ogawa T, Ueda H.** [A clinical study of acute epiglottitis in adults]. *Nihon Jibiinkoka Gakkai Kaiho*. 2014 Mar;117(3):191-5. Japanese. PubMed PMID: 24783452.

Submitted September 28, 2015