



## Acute epiglottitis caused by *Haemophilus influenzae* type b: a case report

Jia-Horng Jiang<sup>1,3</sup>, Nan-Chang Chiu<sup>1</sup>, Yu-Ying Lin<sup>1</sup>, Kuo-Sheng Lee<sup>2</sup>, Hung-Chang Lee<sup>1</sup>,  
Fu-Yuan Huang<sup>1</sup>

Departments of <sup>1</sup>Pediatrics and <sup>2</sup>Otolaryngology, Mackay Memorial Hospital; and <sup>3</sup>Department of Pediatrics, National Taipei College of Nursing Hospital, Taipei, Taiwan, ROC

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Acute epiglottitis is an inflammatory, edematous disease of the epiglottis and adjacent structures, usually caused by *Haemophilus influenzae* type b. It is a life-threatening condition, occurring mainly in childhood. There have never been any reports of this condition in Taiwan. We report a case of 4-year-old boy who presented with characteristics of systemic illness combined with respiratory distress on arrival at the emergency room. His mouth was open and his neck was hyperextended. The diagnosis of epiglottitis was established on the basis of physical examination, lateral neck x-ray, and the finding of an enlarged, swollen, erythematous epiglottis on flexible fiberoptic laryngoscopy. Urine latex agglutination test for *H. influenzae* type b was positive and a blood culture grew *H. influenzae* type b. He was treated with cefotaxime and did not require intubation.

**Key words:** Acute epiglottitis, *Haemophilus influenzae* type b

Epiglottitis is rare in Taiwan [1]. It is a potentially life-threatening bacterial infection in children that is almost exclusively caused by *Haemophilus influenzae* type b (Hib). *H. influenzae* type b epiglottitis occurs mostly in children between 18 months and 5 years old, with a peak incidence in the 3rd year of life [2-6]. This differs from other invasive Hib disease, such as meningitis, in which the peak incidence is found between 7 and 12 months of age [4]. Acute epiglottitis affects boys more often than girls [3-4]. It is much more common in western countries [1,7-9]. However, there was no previous reports of Hib epiglottitis in Hong Kong [7] or Taiwan [1]. Here we report such a case in a Taiwanese boy.

### Case Report

A 4-year-old boy was brought to the emergency room of Mackay Memorial Hospital with respiratory distress and stertorous breathing. He had an abrupt onset of high fever. The child preferred to maintain a sitting position, leaning forward with the mouth open. The neck was hyperextended. He had inspiratory stridor. Acute epiglottitis was suspected. Lateral neck x-ray showed haziness of the supraglottis and thickening of the epiglottis ("thumb sign") (Fig. 1). An otolaryngologist

was consulted. A markedly enlarged ball-like "cherry-red" epiglottis was seen with a flexible fiberoptic laryngoscope (Fig. 2). The patient was transferred to the pediatric intensive care unit for further management. After blood culture was done, cefotaxime was administered. On the 2nd hospital day, the blood culture yielded ampicillin-resistant Hib, which was susceptible to cefotaxime and ceftriaxone. The urine latex agglutination test for Hib was positive. On the 4th day, follow-up laryngoscopy revealed that the edema of the epiglottis was rapidly resolving (Fig. 3). There was no evidence of disseminated Hib disease. Parenteral



**Fig. 1.** Lateral soft tissue radiograph demonstrating the classical "thumb sign" (arrow) of the swollen epiglottis.

Corresponding author: Dr. Nan-Chang Chiu, Department of Pediatrics, Mackay Memorial Hospital, 92, Chung-Shan North Road, Section 2, Taipei, Taiwan, 104, ROC. E-mail: ncc88@ms2.mmh.org.tw



**Fig. 2.** Laryngoscopy showing profound edema of the epiglottis, aryepiglottic folds, and false vocal cords.

antibiotic was administered for 7 days after admission. The patient did not require intubation to maintain his airway and was discharged without any sequela after complete antibiotic therapy.

### Discussion

The annual incidence of invasive Hib disease among Taiwan children less than 5 years of age is 1.9 per 100 000 [1]. In other regions previously reported rates are 2.7 per 100 000 per year in Hong Kong [7], 33 to 55 per 100 000 per year in Europe [8,10], and 67 to 129 per 100 000 per year in the United States [11,12]. About 70% of all invasive Hib infections in Taiwan are meningitis, a proportion similar to western countries [9,12]. Epiglottitis accounts for 23% of invasive Hib disease in Europe [8,9] and 8% in US [11]. However, this condition has not been previously reported in



**Fig. 3.** Laryngoscopy showing rapid resolution of the edema after treatment.

Taiwan [1] or Hong Kong [7]. The incidence of invasive Hib diseases, particularly acute epiglottitis, is thus comparatively low in Taiwan.

Infection of the epiglottis probably arises from direct invasion by Hib with subsequent bacteremia, unlike other invasive Hib diseases that develop as a consequence of bacteremia [3,5]. The incidence of acute Hib epiglottitis associated with other disseminated infection is extremely low [5,13]. In epiglottitis, inflammation with marked edema usually involves the epiglottis, the aryepiglottic folds, ventricular bands, and arytenoids. As the edema increases, the epiglottis curls posteriorly and inferiorly. Inspiration draws the inflamed epiglottis into the laryngeal inlet, while expiration is unopposed [3]. This makes the patient prefer the sitting position with mouth open to keep the airway patent.

Acute epiglottitis is a dramatic, potentially lethal condition characterized by a fulminant course of high fever, sore throat, dyspnea, and rapidly progressive respiratory obstruction. The patient has no barking cough, as in croup. Stridor, drooling, dysphagia, muffled voice, and history of upper respiratory tract infection may be present. The patient usually prefers sitting up with the arms back, the trunk leaning forward, the neck hyperextended, and the chin pushed forward [3,5]. The diagnosis is generally based on both historical and clinical findings. Although some patients with epiglottitis have undergone direct inspection of the oropharynx without adverse effects [14,15], examination with a tongue depressor in the emergency room may precipitate complete airway obstruction and is not recommended [16,17]. Lateral neck film will reveal a swollen epiglottis ("thumb sign"). However, in severe cases, treatment should not be delayed to obtain radiographs, nor should there be attempts to restrain the patient, perform venipuncture, or do further examinations. The child with suspected epiglottitis should be taken to the operating room without delay, where experienced anesthesiologic, otolaryngologic, and medical staff can immediately establish the diagnosis and secure an airway with nasotracheal intubation and laryngoscopy. Although there are reports of successful treatment without an artificial airway [2, 5,18], elective tracheostomy or, preferably, intubation in all children immediately after diagnosis is highly recommended [3]. In this case, we did not perform nasotracheal intubation in the emergency room. Fortunately, the patient recovered completely without sequelae, but there was room for improvement in our management of this condition. Securing the airway in suspected patients is the gold standard.

Blood culture or culture of the surface of the epiglottitis can identify the organism. *H. influenzae* type b also can be demonstrated by antigenemia or antigenuria [3]. The urine latex agglutination test for Hib is 100% sensitive and about 95% specific [19,20].

Treatment of epiglottitis is directed at airway maintenance, antimicrobial therapy after cultures are obtained, and intensive care. Most Hib in Taiwan is resistant to ampicillin [21,22], therefore, third-generation cephalosporins (cefotaxime or ceftriaxone) are a reasonable choice. Steroids are not indicated. Transnasal fiberoptic laryngoscopy is the most reliable and most commonly used technique to evaluate resolution of edema.

*H. influenzae* type b vaccine is now available in Taiwan. The polysaccharide-protein conjugated vaccine provides significant immune protection against disease and reduces the Hib respiratory mucosa carriage rate [23]. With the introduction of Hib vaccine in the US, the annual incidence of epiglottitis in children declined from 3.74 cases per 100 000 in 1980 to 0.63 cases per 100 000 in 1990 [6]. European studies also showed a decline in the incidence of acute epiglottitis after introduction of the Hib vaccine [4]. It is probable that Hib epiglottitis will soon become a rare childhood disease in the West. However, other pathogens, such as *Streptococcus* species may also cause epiglottitis [24]. In Taiwan, acute epiglottitis will probably continue to be very rare. However, awareness of the signs and symptoms of this life-threatening and rapidly progressive disease to facilitate prompt diagnosis and adequate treatment is needed.

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