

Paediatric Acute Epiglottitis Re-Visited

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ABSTRACT

Introduction: Paediatric acute epiglottitis is rare in Asia. The National University Hospital in Singapore has seen only two cases of paediatric acute epiglottitis in the last 10 years. The topic is re-visited here to remind physicians of its acutely dramatic progression.

Clinical picture: Both boys presented with a viral prodrome which progressed within hours to life-threatening upper airway obstruction. Examination revealed an inflamed epiglottitis.

Treatment: They were successfully intubated and treated with intravenous antibiotics.

Outcome: Both recovered uneventfully.

Conclusion: Paediatric acute epiglottitis has declined markedly in the West with widespread vaccination against *HiB*. In contrast, the incidence of invasive *HiB* disease in Asia has always been low despite limited vaccination. Clinicians must remain vigilant of the possibility of acute epiglottitis in a child with "flu".

Keywords: stridor, upper airway obstruction, Croup, *Haemophilus influenzae B*, vaccination

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INTRODUCTION

Acute epiglottitis is an uncommon but life-threatening condition which has been well described in western textbooks. Since the introduction of vaccination against *Haemophilus influenzae B (HiB)*⁽¹⁾ for the prevention of meningitis in the Western world, there has been an incidental decrease in the paediatric to adult incidence ratio of acute epiglottitis. In Asia, paediatric acute epiglottitis is a relatively rare disease even though the *HiB* vaccine is not extensively used⁽²⁾.

Over a 10-year period from 1992-2001, only two cases of paediatric acute epiglottitis were seen in the National University Hospital, a tertiary hospital with full paediatric facilities in Singapore. Because of its rarity, many medical professionals may not have

encountered a case in recent years. Therefore the authors feel that the topic should be re-visited to remind physicians to be vigilant against it. The two case reports are as follows.

Case 1

Master S, a three-year-old Indian boy, presented in May 1995 with symptoms suggestive of a viral upper respiratory tract infection for a few days. On admission, he had a fever of 40°C. This was followed by a rapid onset of noisy breathing associated with drooling of saliva. On examination, there was marked inspiratory stridor with tachypnoea and sternal retractions. He was alert and not cyanotic. A lateral neck radiograph showed a swollen epiglottitis.

He was brought directly to the operating room where examination under anaesthesia was performed. There was acute inflammation with marked swelling of the epiglottitis. Intubation was achieved easily orally without hypoxia. Intravenous ceftriaxone 75mg/kg/day and IV dexamethasone 0.1 mg/kg six-hourly were started after blood cultures were taken. Flexible nasopharyngoscopy was performed daily to monitor his progress and recovery. The epiglottic oedema and inflammation subsided and he was successfully extubated on Day 5.

The blood culture grew *Haemophilus influenzae B*. It was sensitive to ceftriaxone. He was continued on antibiotics for a total of two weeks. Close paediatric contacts were given Rifampicin prophylaxis. Master S was well on follow-up and was given *HiB* booster vaccination six weeks after discharge.

Case 2

Master C was a healthy two-year-old Chinese boy who presented in February 2001 with a two-day history of sore throat and refusal to feed, progressing to noisy breathing and drooling. This was associated with a fever of 38 degrees Celsius. There was no history of immunisation against *Haemophilus influenzae B*. On examination, he was pink with an oxygen saturation of 97% on room air. There was marked inspiratory and expiratory stridor.

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Examination under anaesthesia was performed. The epiglottis was found to be inflamed and swollen (Fig. 1). He was intubated with a 3.5 mm endotracheal tube. Intravenous ceftriaxone was started. The epiglottic swelling resolved gradually and he was extubated on the 4th day of admission. Antibiotic therapy was continued for a total of 10 days.

Blood cultures grew *Haemophilus influenzae B*, which was sensitive to ceftriaxone. He was discharged well on Day 6.

DISCUSSION

Acute epiglottitis is a well known paediatric disease in the West. In a review of the incidence of acute epiglottitis in North America and Europe from 1946 to 1983, the estimated paediatric to adult ratio was 3:1⁽³⁾. Since the introduction of the *HiB* vaccine in 1985 in certain Western countries, the incidence of paediatric epiglottitis has decreased markedly⁽⁴⁾. In Northern California, Frantz et al reported a drop in the paediatric to adult ratio from 2.6 in 1980 to 0.4 in 1990⁽¹⁾. This was attributed to the introduction of *HiB* vaccination in 1985. In a Swedish study, a substantial decrease in the incidence of acute epiglottitis was found after a large scale vaccination against *HiB* was introduced in 1992-3⁽⁵⁾. In children below five years of age, the annual incidence decreased from 20.9 in 1987 to 0.9 in 1996. Moreover, there was a corresponding decreased incidence in its older paediatric age groups as well as in adults. This was attributed to an indirect effect that when young children are vaccinated, the oropharyngeal carriage of this bacteria decreases and thus the possibility of encountering the bacteria in the society is decreased for all ages. In Sheffield England, Midwinter et al documented a similar decline in the number of cases of acute epiglottitis after the introduction of *HiB* vaccine. Interestingly, the pathogens isolated from acute epiglottitis in children who had received the vaccine, were all *Streptococcus*^(4,6).

A recent study from the Oxford Vaccine group in UK reported that with the decline in Hib disease as a result of widespread *HiB* vaccination, non-type b *Haemophilus influenzae (Hi)* would become a more important cause of *Hi* disease⁽⁷⁾. It was found that invasive *Hi* disease in a fully vaccinated child was more likely to be caused by a non-B strain than a type B strain. These children tended to be younger, less likely to have meningitis and epiglottitis, and more likely to have pneumonia and bacteraemia. In addition, full *HiB* vaccination does not preclude the occurrence of invasive *HiB* disease, and this possibility should be entertained in a vaccinated child if the clinical picture is suggestive^(7,8).

The epidemiology of paediatric acute epiglottitis in Asian countries has not been well studied. Most reports described epiglottitis in adults. In a Japanese series of 80 patients with acute epiglottitis diagnosed over a four-year period, the youngest patient was 16 years of age⁽²⁾. A Singapore series by Stanley et al, reported no paediatric cases in a series of 42 patients over a four-year period⁽⁹⁾. In another Singapore series, there was only one paediatric case in a series of 32 patients over a seven-year period⁽¹⁰⁾.

We reviewed cases of acute epiglottitis admitted to a university hospital in Singapore using the ICD-9 code 464.3 over a 10-year period from 1992 to 2001. Only two such cases were identified. Both patients were boys below five years of age and with a viral prodrome. Airway compromise progressed rapidly within a day and both required endotracheal intubation. *Haemophilus influenzae B* was isolated from blood cultures of both patients.

A related study conducted by YS Lee et al in the same hospital showed that the *HiB* disease burden in our community is significantly less than in many other countries⁽¹¹⁾. Despite the estimate that *HiB*-conjugate vaccine was used in less than 0.1% of the population during the period of study from 1990 to 1995, the annual attack rate of invasive *HiB* disease was found to be at most 3.3 per 100,000 children less than five years of age. This is much less than the annual incidence of 22-109 per 100,000 in children less than five years of age in the USA, UK and Australia⁽¹⁰⁻¹²⁾.

The reason for this remarkably low incidence is not entirely known. A Japanese study⁽²⁾ observed that although *HiB* vaccine is not routinely prescribed to children, paediatricians and otolaryngologists in Japan tend to prescribe antibiotics almost routinely to paediatric patients suffering from acute otitis media or acute upper respiratory infections. The authors postulated that this preventive administration of antibiotics may play a role in the low occurrence rate of invasive *Haemophilus influenzae B* disease in children. This postulation however is very anecdotal and no formal study has been made to support it. Furthermore, if this were true, then the type of antibiotic prescribed by the primary care physician would affect the incidence of invasive *HiB* disease. For example, penicillin has no action against *HiB* whereas amoxicillin would be more effective. Therefore, a practice where penicillin is prescribed routinely over amoxicillin may see a higher incidence of invasive *HiB* disease.

With this low incidence of invasive *HiB* disease and the relatively high cost of the *HiB*-conjugate vaccine, a universal *HiB* vaccination programme is currently not justified in Singapore. However,

physicians, especially general practitioners, need to be wary of the possibility of acute epiglottitis in a child presenting with signs and symptoms of a viral upper respiratory tract infection.

The classical presentation of children with acute epiglottitis is contrasted to that of the more benign condition of croup (laryngotracheobronchitis) in a review article by Stroud and Friedman⁽¹⁵⁾. Children with acute epiglottitis present with severe throat pain, fever, irritability and respiratory distress. The symptoms usually progress rapidly, usually within a matter of hours. Characteristically, the children appear toxic, assuming an upright sitting position with the chin up and mouth open, bracing themselves on their hands. This classic position is known as the tripod position. Patients often exhibit drooling and difficulty in handling their secretions because of severe odynophagia. Speech is limited because of pain, and the voice may sound muffled. Stridor is a late finding and signals near-complete airway obstruction. In contrast, patients with croup typically present with a several-day history of upper respiratory type symptoms, progressing to the characteristic barking cough, hoarseness and stridor. A low-grade fever is common. Infrequently, airway compromise occurs, as indicated by the presence of biphasic stridor, retractions, severe tachypnoea or oxygen desaturations. This insidious onset and clinical presentation of croup readily distinguishes it from acute epiglottitis.

Acute epiglottitis is rare in Singapore but is nonetheless a life-threatening disease. As is well-illustrated by these two case reports, airway compromise in acute epiglottitis can occur in a matter of hours. Any child with suspected acute epiglottitis

should be referred to a hospital with paediatric emergency facilities for immediate airway management. With timely and appropriate intervention, full recovery is expected.

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