

Acute epiglottitis: a retrospective review of 47 patients in Kuwait

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Abstract

Objectives Acute epiglottitis is a potentially life threatening condition which can lead to fatal airway obstruction in previously healthy individuals. The present study was undertaken to assess the clinical features, management and patient outcomes of epiglottitis in Kuwait over an eight year period.

Design Case series.

Setting Al Sabah Hospital, Kuwait.

Methods All patients admitted to the ENT department of Al Sabah hospital between January 2000 and January 2008 with the diagnosis of acute epiglottitis were included in this retrospective study. The diagnosis of acute epiglottitis was established by visualization of inflamed epiglottis either on indirect laryngoscopy or flexible fiberoptic/direct laryngoscopy.

Results 47 cases were identified, 5 children and 42 adults. There were 32 males and 15 females, in the age range of 5 to 66 years. Peak incidence was in the third decade. 31 patients had co-morbid conditions, 18 patients (38.2%) had diabetes, 8 patients (17%) had hypertension and 3 patients (6.3%) had dental caries. Majority of the patients (89.3%) presented with sore throat as their chief complaint. All patients were febrile on presentation. The classical "thumb sign" on lateral neck radiograph was seen in 32 patients (68%). Blood cultures were collected from 22 patients

(46.8%), all were negative. Ceftriaxone was the commonest empirical antibiotic prescribed. 7 patients required airway intervention (5 with endotracheal intubation and 2 with tracheostomy). There were no deaths in our study.

Conclusion In Kuwait, acute epiglottitis is commoner in adults than in children. It is imperative to secure the airway and to start the patients on broad spectrum antibiotics and steroids as early as possible. In general, the prognosis is good with antimicrobial therapy, close monitoring and selective airway intervention, in the form of intubation / tracheostomy, for patients with stridor or shortness of breath.

Keywords Acute epiglottitis · Complications · Airway · Tracheostomy · H influenzae

Introduction

Acute epiglottitis is an uncommon and a relatively rare disease that may become serious or even life-threatening because of sudden airway obstruction; hence it must be diagnosed and treated quickly and precisely [1]. The first published description in English of this condition dates back to 1799 when George Washington is believed to have died from acute epiglottitis during an epidemic of influenza [2], since then the clinical characteristics and epidemiology of the disease have been well documented in the western and temperate countries. However, there have been very few reports of this disease from the tropics [3]. Acute epiglottitis has now become a disease of adults, probably as a result of immunization of children against *Haemophilus influenzae* [4]. In children, acute epiglottitis can rapidly progress to airway obstruction, hypoxia and even death. Hence, securing the airway is of utmost importance. In adults although the symptoms and signs of the disease may be non-specific, most cases can be managed conservatively yet the potential for sudden airway obstruction still exists [5]. Early recognition of acute epiglottitis is therefore of

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utmost importance in minimizing morbidity and mortality. Unfortunately misdiagnosis occurs in 23–31% of the cases of adult acute epiglottitis [6].

This study reviews our experience with acute epiglottitis in a tropical Asian country, over an 8-year period from 2000 to 2008, regarding its clinical features, management and patient outcome.

Materials and methods

A retrospective chart review of 47 patients of acute epiglottitis admitted to the ENT department of Al Sabah Hospital, Kuwait, between January 2000 and January 2008 was performed. Al Sabah Hospital is a tertiary care multispecialty referral hospital in the State of Kuwait, which caters to approximately half of Kuwait population (approximately 2 million). Details of age, sex, clinical history, laboratory findings, clinical examination and radiological investigations were documented.

Symptoms like fever, sore throat, odynophagia, drooling of saliva, stridor, change of voice and shortness of breath were recorded. The onset and duration of symptoms was also recorded. Presence of any co-morbid conditions like diabetes mellitus, hypertension, etc. was also documented.

Acute epiglottitis was diagnosed according to the clinical symptoms, signs and by examination of the epiglottis or supraglottis either on indirect laryngoscopy or direct/flexible fiberoptic laryngoscopy. The diagnosis was established when edema and erythema of the epiglottis were visualized. Fever was identified as body temperature more than 37.5°C. Imaging procedure like lateral neck X-ray was done in all patients. However, advanced imaging procedures like CT was done only in selected cases in order to save valuable time for securing the airway.

Investigations done included CBC (total and differential white cell count) in all cases. Blood culture and throat swab were done in select cases.

Results

Age and sex distribution

Forty-seven patients were included in the study. There were 32 males and 15 females. Male:female ratio was 2.1:1. Age ranged from 5 to 66 years with a mean of 38 years. The peak incidence was in the third decade. There were 5 children in our study in the age range group of 5–7 years.

Clinical presentation

The chief complaints have been outlined in Table 1, 42 patients (all adults) complained of sore throat (89.3%).

Table 1 Chief complaint of patients of acute epiglottitis

Symptoms	No. of patients	Percentage
Sore throat	42	89.3
Fever	47	100
Muffled speech	31	65.9
Drooling	14	29.7
Stridor	7	14.8
Shortness of breath	7	14.8
Recent URTI	47	100

Children did not initially present with sore throat. They presented primarily with drooling, which was also present in 9 adults (21.4%). All patients (100%) had fever on presentation. The highest temperature recorded was 40°C, which was seen in 6 patients (14.2%). Forty patients (85.1%) complained of odynophagia; all 5 children had odynophagia. Thirty-one patients (65.9%) had varying degrees of muffled speech. Inspiratory stridor was noted in two adults (4.2%). However, varying degrees of respiratory distress with shortness of breath was noted in all the children. All patients gave history of upper respiratory tract infection prior to presentation.

Rapid onset of symptoms was characteristic. The mean duration of symptoms prior to their presentation was around 40 hours. All children in our series had received some treatment from general practitioners/pediatricians prior to presentation to our hospital. Out of the adults only 12 had taken some treatment in the form of broad-spectrum antibiotics while the rest had not taken any treatment prior to presentation. Clinically, an edematous and erythematous epiglottis was noted in all patients. Airway compromise was noted in 7 patients (5 children, 2 adults). Two adult patients had to be tracheostomized and subsequently were weaned off 7–9 days later. Children were managed with endotracheal intubation and conservative treatment.

Eighteen (38.2%) of the patients were diabetic, 8 (17%) had hypertension, and 3 patients (6.3%) had dental caries. All but one patient with diabetes were insulin-dependent. An increase in the daily requirement of insulin was required during the acute phase of infection. Also, their average hospital stay was longer (5 days, compared to the 3 days otherwise). However, they developed no further complications.

Investigations

A lateral neck radiograph was performed in all 47 patients (100%). The classical “thumb sign” (Fig. 1), representing acute epiglottitis was seen in 32 patients (68%). However, there was no significant relationship between the thumb



Fig. 1 Lateral neck radiograph showing the "thumb sign"

sign and airway compromise. CBC was performed in all the patients, which revealed leucocytosis in all (100%) in the range of 12.1–18.3. There was no significant relationship between leucocytosis and airway obstruction. Indirect laryngoscopy and flexible endoscopy were performed in 39 patients (82.9%) with no obvious airway obstruction. The children, initially, were not subjected to such invasive procedures as it was felt that any manipulation during visualization of larynx would aggravate their airway obstruction. The same was the reason for not examining the larynx, initially, of the adult patients with stridor.

Swabs were taken from the epiglottis in 15 patients (31.9%) for aerobic and anaerobic culture and antibiotic sensitivity tests. Results revealed alpha hemolytic *Streptococcus* in 21.2%, methicillin sensitive *Staphylococcus aureus* in (12.7%) 6 patients and no growth in 2 patients (4.2%). Blood culture was ordered in 22 patients (46.8%), however all blood cultures were reported as negative.

Treatment and clinical course

All patients received intravenous antibiotics (100%). The antibiotic prescribed was intravenous ceftriaxone 1 g administered twice daily. Steroids were administered intravenously to all patients (100%), either dexamethasone or hydrocortisone. This had an overall effect on the degree of airway obstruction reducing it in about 19 patients. All 5 children had to be intubated and admitted to the ICU, for conservative treatment. Two adults presented with stridor and shortness of breath and signs of respiratory distress. After a lateral neck radiograph confirmed the diagnosis of acute epiglottitis, they were tracheostomized. They were weaned off between the 7th and 9th day. They stayed in the hospital for 9 and 11 days, respectively. There were no deaths in our study.

On follow up, vallecular cyst was noted in 3 patients.

One patient developed quinsy subsequently, 16 months after epiglottitis had subsided.

The mean duration of stay in the hospital was 3 days. This was slightly more in diabetics (5 days) and in children (1 week). The patients with tracheostomy stayed for 9–11 days.

Discussion

Acute epiglottitis is a relatively rare disease, with a potentially life-threatening course which requires urgent management of the airway, possibly tracheostomy at times. The epidemiology of acute epiglottitis has been well studied in temperate countries. However, a review of literature reveals that not much has been documented from tropical countries [3]. Kuwait is a tropical Asian country lying at the head of the Arabian Gulf. It is a desert country with summer temperatures varying between 40 and 50°C and winter temperatures between 7 and 12°C. To the best of our knowledge no study has been conducted on acute epiglottitis in Kuwait and ours is perhaps the first large case series in Kuwait.

Forty-seven patients, 42 adults and 5 children, were evaluated retrospectively over an 8-year period from January 2000 to January 2008. Our study showed a male predominance with M: F ratio of 2.1:1. The peak incidence of the disease has traditionally been identified as occurring in young children. However, in recent years, the incidence in childhood has declined, whereas there is an increased recognition of adults with this condition [6, 7]. Wurtele estimated the incidence of acute epiglottitis in Quebec, Canada as 60 per million for children and 10 per million in adults [8] based on the analysis of 712 pediatric and 257 adult cases. On reviewing other reports from Europe and North America, he found the pediatric to adult ratio as 3:1. Frantz et al. reported a decline of pediatric acute epiglottitis from 1980 to 1990 with no change in the adult acute epiglottitis [9, 10]. Mayo-Smith noted an increase in adult acute epiglottitis [11, 12]. Chan et al. have reported 32 adult patients in their series from Singapore over an 8-year period [3]. Nakamura et al. reported 80 adult patients in a 4-year period from Japan [13]. Deeb et al. reviewed a series of 80 cases of acute epiglottitis in adults [14]. Stanley et al. reported another series of 42 adult cases of acute epiglottitis from Singapore, with no pediatric cases [15]. In the recent years, there has been a marked decline in the number of pediatric cases, to the point that the disease is now rarely seen among children. The most likely explanation for this decline is the introduction of a series of ever more efficacious vaccines against *H influenzae* type B [12]. We had only 5 children (10.6%) in our series, which is in line with the above quoted studies showing a reducing trend of acute epiglottitis in pediatric age group. All 5 children

Table 2 Friedman classification of acute respiratory distress

Stage I	Stage II	Stage III	Stage IV
No respiratory complaints	Subjective respiratory complaints	Moderate respiratory distress	Severe respiratory distress
Respiratory rate <20/min	Respiratory rate >20/min	Stridor, retractions, perioral cyanosis	Severe stridor, retractions, cyanosis, delirium, loss of consciousness, hypoxia
		PCO ₂ >45 mmHg -arterial carbon dioxide pressure	
		Respiratory rate >30/min	Respiratory arrest

showed some degree of airway obstruction. However, tracheostomy was not required in either of them. They were intubated, sedated and nursed in the ICU since in children, airway obstruction is a common sequelae and securing the airway is crucial. Amongst the adults only 2 patients had stridor and shortness of breath which required tracheostomy. Various studies have indicated a range of 7–50% of stridor in adults with acute epiglottitis. Kass et al. after analyzing their data in adult acute epiglottitis concluded that stridor is a strong predictor of airway obstruction [16]. Factors indicating the need of tracheostomy in our series included symptoms of stridor with shortness of breath and signs of respiratory distress.

A well performed lateral neck radiograph can be used as a diagnostic tool for acute epiglottitis and several qualitative radiological features are helpful in making the diagnosis. The “thumb sign” (Fig. 1) is one of the classic radiological findings in acute epiglottitis. It is actually a rounded mass shadow of the normal leaf-like epiglottic tissue. Another radiological feature of acute epiglottitis is the “vallecula sign” which is the result of partial or complete obliteration of a well-defined air pocket bounding the base of tongue and the epiglottis [7]. In our series, the “thumb sign” was present in 32 patients (68%) whereas the “vallecula sign” was not seen in any of our patients. However, we found no relation between the radiological finding of thumb sign and stridor or airway obstruction in our series.

The appropriate management of acute epiglottitis is manifold. Intravenous antibiotics must be started at the earliest without awaiting the results of a culture as any delay can result in airway obstruction. A broad-spectrum antibiotic covering both gram-positive and gram-negative bacteria is recommended. In our study ceftriaxone, in the dose of 1 g bid, was the preferred antibiotic. In patients with allergy to cephalosporin, clindamycin was used. Nakamura et al. suggested the use of piperacillin or ticarcillin as the first choice [13]. In most of the adult and pediatric cases, the disease can be managed by conservative treatment without the need for tracheostomy. However, this is controversial. Some authors have advocated the use of artificial airway in all cases whereas others adopt a more conservative approach, recommending medical therapy and close patient monitoring and reserving airway intubation only for select patients with respiratory distress, according to

Friedman’s classification of respiratory distress (Table 2) [7, 17]. Crosby et al. observed that adults presenting without respiratory symptoms may be safely monitored provided provision is made for tracheal intubation or tracheostomy should respiratory distress become evident [17]. Chan et al. recommended artificial airway in Friedman Stage III to IV [3]. However, according to Ossoff et al. tracheostomy is indicated in progressive disease [18]. In our study, we only intubated the children as they were showing signs of respiratory distress. Except for the two tracheostomized adults, all were managed conservatively.

Steroids were used in all our patients in the belief that they help in reducing the inflammation and the resultant edema of the intralaryngeal tissues, thereby improving the airway. Various studies have advocated use of steroids in the range of 24–95% [19, 20]. All patients were not subjected to local swabs for bacteriological examination as it was felt that it would aggravate the potentially life-threatening situation. Also, in the 3 days or so, that it takes the reports of culture and sensitivity to be available, the critical period of therapy would already have elapsed. In our study alpha hemolytic streptococci and methicillin sensitive *S. aureus* were isolated from adult patients. *H. influenzae* was not isolated in any of the cases in our series. This is in concurrence with Mayo-Smith et al. who suggested that only the pediatric acute epiglottitis is caused by *H. influenzae* [11, 12]. Also, our study supports their hypothesis that there are two forms of the disease. The first caused by *H. influenzae*, more common in children, has rapidly progressive symptoms and a high risk of airway closure. The second form is unrelated to *H. influenzae*. It is much more common in adults, particularly in the 20–40 years old age range, has a slower onset with more symptoms of oropharyngeal inflammation, has less localization to the epiglottis, and has less risk of airway occlusion [12].

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