

Self-inflicted Traumatic Acute Epiglottitis due to Use of Tongue Scraper in Adults: A Retrospective Descriptive Study

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ABSTRACT

Introduction: Acute Epiglottitis (AE) is an uncommon disease in healthy individuals but can be potentially life-threatening if left undiagnosed and untreated due to the risk of sudden airway obstruction.

Aim: To identify the various characteristics, like demographics, clinical manifestations, and modes of management, in a series of adult patients with self-inflicted traumatic AE.

Materials and Methods: This was a retrospective single-centre descriptive study conducted in the Department of Ear, Nose and Throat (ENT) in Al Azhar Medical College and Superspeciality Hospital in Thodupuzha, Idukki, Kerala, India and included all adult patients over the age of 18 years with self-inflicted traumatic AE due to the use of tongue scrapers from July 2022 to December 2023. The AE was diagnosed by flexible nasolaryngoscopy, which showed congested and oedematous epiglottis. Soft-tissue neck lateral view radiographs was used to confirm the diagnosis. Various demographic details-including

age, gender, history of trauma, clinical symptoms, and signs-were evaluated along with treatment modalities. For descriptive statistics, the categorical variables were presented as ratios and proportions, while numerical data were presented as means and standard deviations.

Results: A total of 16 patients were included, out of which five were males and 11 were females. All patients had a history of self-inflicted trauma while aggressively using metallic tongue scrapers. The mean age of presentation was 42.43 years. The most common symptom was sore throat (100%) and odynophagia (100%), followed by muffled voice (87.5%) and fever (75%). All patients were treated conservatively with broad-spectrum antibiotics and steroids. None of present patients had significant complications.

Conclusion: The AE is a life-threatening condition which has to be diagnosed at the earliest. The use of tongue scrapers should not be advocated to avoid the potential side effects.

Keywords: Broad-spectrum antibiotics, Endoscopy, Morbidity, Steroids, Trauma

INTRODUCTION

The AE is a life-threatening medical emergency with potential risk of sudden airway obstruction and death due to the extensive inflammation of supraglottic structures, such as the epiglottis, aryepiglottic folds, and arytenoids [1,2]. Although bacterial infection is the most common underlying aetiology, other factors like viral or fungal infections, chemical or thermal burns, inhalation of fumes, non-infectious conditions like trauma, associated comorbid systemic illnesses, and chemotherapy-also contribute to the causative factors. The common microorganisms of AE in adults are *Streptococcus pneumoniae*, *Staphylococcus aureus*, and *Klebsiella pneumoniae*. Risk factors include elderly age, male sex, pre-existing epiglottic cyst, obesity, and impaired immunity of the host [3]. In comparison with children, epiglottitis in adults is less severe, as the epiglottis is smaller and more rigid, causing less occlusion of the airway by inflammation [4].

The first published case of AE in the English literature dates back to 1799, wherein George Washington was believed to have died from AE during an epidemic of influenza [5]. The incidence of adult epiglottitis ranges between 1/100,000 and 4/100,000 [3,6]. The average age of presentation for the adult group is around 45 years. Among adults, males are more commonly affected, with a male-to-female ratio of 1.8:1 to 4:1 [7]. The 'tongue scraper' is an oral hygiene device used to scrape off the harmful bacteria, thereby managing halitosis, and is also used to remove excess plaques. Tongue scrapers are more usually made of plastic, resin, rubber, or metal. It reduces halitosis by decreasing volatile sulphur compounds concentration by 20% to 70% [8].

The present study is significant as there are no such previous studies in the past English literature mentioning self-inflicted trauma with tongue scrapers as a causative factor for adult epiglottitis. The present study strived to review all such cases of self-inflicted traumatic epiglottitis in adults and to assess the clinical features, including demographic characteristics, diagnostic methods, treatment, and outcomes.

MATERIALS AND METHODS

This was a retrospective single-centre descriptive study conducted in the Department of ENT in Al Azhar Medical College and Superspeciality Hospital in Thodupuzha, Idukki, Kerala, India involving 16 patients identified by ICD-10 codes (International Statistical Classification of Diseases and Related Health Problems) J05.1 (epiglottitis) [9] from July 2022 to December 2023. Institutional Ethical Committee clearance (AAMC/EC/2022-2023/11) was obtained.

Inclusion criteria: All adult patients above the age of 18 years who had been admitted and treated with AE following the use of tongue scrapers.

Exclusion criteria: All other cases of adult epiglottitis were excluded.

Study Procedure

The diagnosis of AE was established by atleast two of the following: (a) direct visualisation of prominent inflamed, bulging, oedematous epiglottis on depressing the tongue (Sunrise Sign); (b) flexible nasolaryngoscopy showing grossly swollen, globular, oedematous, and congested epiglottis with whitish slough over the epiglottis and adjacent supraglottic structures, along with signs of excoriation over the epiglottis; and (c) soft-tissue neck (lateral view) radiographs to confirm the presence of the 'thumb sign.'

Body temperature, respiratory rate, oxygen saturation, and white blood cell count were analysed in all patients. Blood culture was done for all patients before the administration of systemic antibiotics. Due to anticipation of irritation and obstruction of airway, throat swab was not done in these cases. A subjective assessment was made to find the degree of laryngeal airway obstruction. Continuous respiratory monitoring was done in the intensive care unit for patients with respiratory distress along with conservative management with antibiotics, steroids and supportive care.

STATISTICAL ANALYSIS

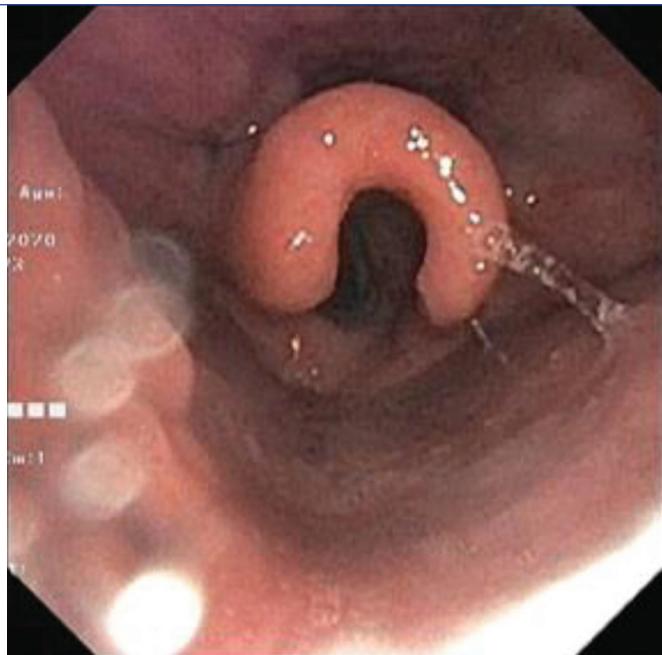
Authors used the Statistical Package for the Social Sciences (SPSS) version 20.0. For descriptive statistics, the categorical variables were presented as ratios and proportions, while numerical data were presented as mean and standard deviations.

RESULTS

A total of 16 patients were included in present study. The mean age of the presentation was 42.43 ± 6.93 years (range: 28-55 years). Among 16 patients, there were 11 females and five males, with a male-to-female ratio of 0.45:1. The most common symptoms were sore throat and odynophagia, which were seen in all patients (100%). 14 patients (87.5%) patients complained of muffled voice. Only 2 (12.5%) patients presented with stridor, which was mild and without significant drop in blood oxygen saturation [Table/Fig-1]. Flexible nasolaryngoscopy showed oedematous and erythematous epiglottis in all patients (100%) [Table/Fig-2].

Demographic characteristics	n (%)
Age (years)	
20-30	2 (1.25%)
31-40	5
41-50	5
51-60	4
Gender	
Males	5 (31.25)
Females	11 (68.75)
Co-morbidities	
Diabetes mellitus	4 (25)
Hypertension	3 (18.75)
Asthma	1 (6.25)
Ischaemic heart disease	1 (6.25)
Chronic renal failure	1 (6.25)
Cerebrovascular disease	1 (6.25)
Gastroesophageal Reflux Disease (GERD)	0
Clinical manifestations	
Sore throat	16 (100)
Dysphagia	6 (37.5)
Odynophagia	16 (100)
Drooling	0
Fever ($>37^\circ\text{C}$)	12 (75)
Cough	0
Dyspnoea	6 (37.5)
Stridor	2 (12.5)
Ear pain	6 (37.5)
Neck tenderness or swelling	0
Muffled voice	14 (87.5)
Oedematous and erythematous epiglottis	16 (100)
Swollen aryepiglottic folds and false cords	3 (18.75)
Erythematous vocal cords	2 (12.5)

[Table/Fig-1]: Demographic and clinical characteristics of the study population (N=16).



[Table/Fig-2]: Endoscopic picture showing inflamed and oedematous epiglottis.

The duration of symptoms prior to hospitalisation ranged between 24 hours to 72 hours, with a mean of 45 ± 17.25 hours. Out of 16 patients, 8 (50%) were admitted within 48 hours, 5 (31.25%) got admitted within 24 hours duration and rest three were admitted within 72 hours. Laboratory tests included initial White Blood Cell (WBC) count, which revealed leukocytosis (white blood cell count $>10,000/\text{mm}^3$) in all 16 patients [Table/Fig-3]. The final diagnosis of AE was established from their radiographic picture showing "thumb sign," which was in all our patients [Table/Fig-4].

Variables	n (%)
Duration of symptoms prior to hospitalisation	
24 hours	5 (31.25)
48 hours	8 (50)
72 hours	3 (18.75)
Initial WBC count (cells/mm³): n (%)	
5,000-9,999	0
10,000-14,999	11 (68.75)
15,000-19,999	5 (31.25)
$>20,000$	0
Blood culture	
Positive	0
Negative	16 (100)
Thumb sign	16 (100)
Treatment: Hospitalisation	
1-5 days	15 (93.75)
>5 days	1 (6.25)
Antibiotics	
NSAIDs or steroids (Inj. Dexa 8 mg i.v. 8 th hourly for 48 h)	12 (75)
ICU admission	
Continuous monitoring	4 (66.67)
Respiratory distress	2 (33.33)
Complications	
Intubation	0
Tracheostomy	0
Long term sequelae	0

[Table/Fig-3]: Patient characteristics with laboratory investigations and treatment modalities.

NSAIDs: Non steroidal anti-inflammatory drugs; ICU: Intensive care unit



Table/Fig-4: X-ray soft-tissue neck lateral view showing thumb sign (white arrow).

All our patients were treated conservatively and received intravenous antibiotics. Steroids, mainly dexamethasone, were administered to 12 patients (75%) intravenously in dose of 8 mg every eight hours for the first 48 hours and were tapered in response to clinical improvement and patient was discharged on oral Deflazacort, 12 mg 12th hours for three days, followed by 12 mg once daily for three days. None of our patients were intubated or received mechanical ventilation or underwent tracheostomy, or suffered any other significant complications.

DISCUSSION

Epiglottitis is a rare but life-threatening clinical entity which may have an infectious or non infectious cause, leading to fatal airway obstruction. Acute Epiglottitis (AE) is often associated with a number of co-morbid conditions, including hypertension, diabetes, asthma, ischemic heart disease, and immune suppression. The development of Haemophilus Influenzae type B (HiB) vaccine in the mid-1980s lead to a drastic decline in the incidence of epiglottitis in children [10]. In contrast to that, there has been a steady rise in the number of adult cases of AE. Consequently, it still remains a recognised cause of acute airway compromise in adults, with a mortality rate reported from 1-20% [10,11].

The AE in adults is often referred to as supraglottitis because inflammation is not confined to the epiglottis; it can also affect other structures like pharynx, uvula, base of the tongue, aryepiglottic folds, and false vocal cords. AE usually manifests in the form of sore throat, stridor, odynophagia, muffled (hot potato) voice, and high fever. It may be fatal secondary to sudden airway obstruction. As the mucosa of the epiglottic region is loose and vascular, it is more vulnerable to injury due to inflammation, irritation, trauma, and allergic responses [4]. This, in turn, rapidly causes oedema and vascular enlargement. There are four predictors for impending airway obstruction: drooling, history of diabetes mellitus, rapid onset of clinical symptoms, and abscess formation [12]. The most common duration from onset of symptoms to visiting the physician is two to three days.

The differential diagnosis of AE includes infectious conditions such as mononucleosis, diphtheria, pertussis, croup, tonsillitis, Ludwig's angina, with retropharyngeal, peripharyngeal, and peritonsillar abscesses, tracheobronchitis and other non-infectious conditions like allergic reactions, angioneurotic oedema, foreign body aspiration, reflex laryngospasm, laryngeal trauma, tumours, hydrocarbon aspiration, systemic lupus erythematosus, and inhalation of toxic fumes or superheated steam [13,14].

Diagnosis of AE is mainly clinical, based on physical examination and endoscopic findings. Soft-tissue neck lateral view radiographs

are used commonly to demonstrate the oedematous epiglottis—the “thumb sign.” Early diagnosis of AE is crucial as it leads to life-threatening airway obstruction and hence it is challenging for the physician when an otolaryngologist is not available.

Medical management of epiglottitis in adults includes systemic antibiotics, NSAIDs, steroids, and nebulised adrenaline, with close surveillance of respiratory function [15]. The most common complications are epiglottic abscess and systemic bacteraemia. AE can also lead to retropharyngeal abscess, cervical necrotising fasciitis, negative pressure pulmonary oedema, sepsis, and sudden airway obstruction, leading to respiratory arrest [4,16].

Among all studies, present study is unique in that authors had included only cases of self-inflicted traumatic adult epiglottitis following the use of tongue scrapers. The use of tongue scrapers assumes cultural relevance, especially in the state of Kerala, where tongue scraping is encouraged from childhood, as it is commonly believed to improve the articulation of certain words [17]. Epiglottitis related to foreign body ingestion among children has been reported in literature during attempts at retrieval using blind finger sweep [18,19]. Several studies showed that adult epiglottitis occur predominantly in males [3,19]. Contrary to this trend, the present study demonstrated a strong female preponderance. As in other studies, the most common clinical manifestation was sore throat and odynophagia, followed by fever [7,12].

The final diagnosis was confirmed by flexible nasolaryngoscopy, which showed the presence of oedematous and erythematous epiglottis in all cases. In present study, the WBC count was performed and showed leukocytosis in all cases. Moreover, blood cultures were taken from all 16 patients and yielded negative results, which are consistent with the results of the study by Berger G et al., [11]. The medical management of AE usually involves the use of intravenous antibiotics, hydration with normal saline, and steroids. Third-generation cephalosporins are usually recommended for the treatment of adult epiglottitis [20].

Administration of corticosteroids acts by reducing the oedema and inflammation of the epiglottis and supraglottis and thereby preventing airway obstruction. In case of respiratory difficulties such as stridor and oxygen desaturation, immediate airway intervention is required [15]. According to Friedman's classification of respiratory distress, endotracheal intubation is planned, and close monitoring of patients are implemented [21]. If endotracheal tube intubation fails, then tracheostomy is performed and airway is maintained. However, none of our cases required intubation, tracheostomy, or mechanical ventilation. All 16 patients were treated conservatively with antibiotics and anti-inflammatory agents.

Limitation(s)

The small sample size could be explained by the low prevalence rate of adult epiglottitis in the general population. Moreover, present study is a single-centre retrospective study, and as a result, the conclusions of present study cannot be generalised. Therefore, a multicentric study with a larger sample size would be needed to assess the various characteristics of self-inflicted traumatic epiglottitis.

CONCLUSION(S)

Healthcare professionals must possess a profound understanding of the fundamental clinical presentation, key diagnostic assessments, and treatment protocols for patients afflicted with AE, particularly those encountered in the emergency department. In an adult presenting with symptoms and signs of AE, a history of tongue scrapers should be probed. In this subset of patients, chances of serious complications are lower than in typical infective cases of AE, and usually respond well to medical management. Collaboration between anaesthesiologists and otolaryngologists is imperative to ensure optimal outcomes and facilitate seamless management of the patient's airway and enhance the likelihood of a successful

patient outcome. The use of tongue scrapers should not be advocated, and awareness should be created among the general population regarding side effects of its usage, like damage to tongue with unpleasant taste or sensation, disruption of oral micro biome and epiglottitis.

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REFERENCES

- [1] Kimura Y, Jo T, Inoue N, Suzukawa M, Tanaka G, Kage H, et al. Association between systemic corticosteroid use and mortality in patients with epiglottitis. *Laryngoscope*. 2023;133(2):344-49.
- [2] Ramlatchan SR, Kramer N, Ganti L. Back to basics: A case of adult epiglottitis. *Cureus*. 2018;10(10):e3475.
- [3] Bizaki AJ, Numminen J, Vasama JP, Laranne J, Rautiainen M. Acute supraglottitis in adults in Finland: Review and analysis of 308 cases. *Laryngoscope*. 2011;121(10):2107-13.
- [4] Swain SK, Shahjahan N, Debta P, Das S, Padhy R. Acute epiglottitis in elderly age group: Our experiences at a tertiary care teaching hospital in Eastern India. *Indian J Health Sci Biomed Res*. 2021;14:119-23.
- [5] Cohen B. The death of George Washington (1732-99) and the history of cynanche. *J Med Biogr*. 2005;13(4):225-31.
- [6] Pineau PM, Gautier J, Pineau A, Emam N, Laccourreye L, Boucher S. Intubation decision criteria in adult epiglottitis. *Eur Ann Otorhinolaryngol Head Neck Dis*. 2021;138(5):329-32.
- [7] Swain SK, Nahak B, Debta P. Clinical characteristics and treatment of acute epiglottitis: A retrospective study of 28 cases. *J Acute Dis*. 2020;9(3):109-13.
- [8] Seemann R, Kison A, Bishang M, Zimmer S. Effectiveness of mechanical tongue cleaning on oral levels of volatile sulfur compounds. *J Am Dent Assoc*. 2001;132(9):1263-67.
- [9] Available from: <https://www.icd10data.com/ICD10CM/Codes/J00-J99/J00-J06/J05-.>
- [10] McVernon J, Slack MP, Ramsay ME. Changes in the epidemiology of epiglottitis following introduction of *Haemophilus influenzae* type b (Hib) conjugate vaccines in England: A comparison of two data sources. *Epidemiol Infect*. 2006;134:570-72.
- [11] Berger G, Landau T, Berger S, Finkelstein Y, Bernheim J, Ophir D. The rising incidence of adult acute epiglottitis and epiglottic abscess. *Am J Otolaryngol*. 2003;24(6):374-83.
- [12] Sarkar S, Roychoudhury A, Roychoudhuri BK. Acute epiglottitis in adults- a recent review in an Indian hospital. *Indian J Otolaryngol Head Neck Surg*. 2009;61:197-99.
- [13] Al-Qudah M, Shetty S, Alqadah M. Acute adult supraglottitis: Current management and treatment. *South Med J*. 2010;103(8):800-804.
- [14] Cruz MG, Almazan NA. Adult acute epiglottitis: An eight-year experience in a Philippine Tertiary Government Hospital. *Philipp J Otolaryngol Head Neck Surg*. 2016;31:20-23.
- [15] Lustig LR, Schindler JS. Ear, nose, & throat disorders. In: Papadakis MA, McPhee SJ, Rabow MW, editors. *Current Medical Diagnosis & Treatment*. New York, NY: McGraw-Hill; 2018.
- [16] Tanaka S, Kikuchi S, Ohata A, Tsutsumi T, Ohki M. A clinical study of 285 cases of acute epiglottitis. *Nippon Jibin Koka Gakkai Kaiho*. 2015;118(11):1301-08.
- [17] Marshalla P. Horns, whistles, bite blocks, and straws: A review of tools/objects used in articulation therapy by van Riper and other traditional therapists. *Int J Orofacial Myology*. 2011;37(1):69-96. Available from: <https://doi.org/10.5210/ijom.2011.37.1.6>.
- [18] Kavanagh KR, Batti JS. Traumatic epiglottitis after foreign body ingestion. *Int J Pediatr Otorhinolaryngol*. 2008;72(6):901-03.
- [19] Yen K, Flanary V, Estel C, Farber N, Hennes H. Traumatic epiglottitis. *Pediatr Emerg Care*. 2003;19(1):27-28.
- [20] Briem B, Thorvardsson O, Petersen H. Acute epiglottitis in Iceland 1983-2005. *Auris Nasus Larynx*. 2009;36:46-52.
- [21] Ng HL, Sin LM, Li MF, Que TL, Anandaciva S. Acute epiglottitis in adults: A retrospective review of 106 patients in Hongkong. *Emerg Med J*. 2008;25:253-55.

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