

Original Research Article

Clinical profile and management options in patients of Ludwig's angina: a 5 year prospective study

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ABSTRACT

Background: The objective of the study was to study the etiology, clinical presentation, bacteriology and management options in 38 cases of Ludwig's angina.

Methods: 38 patients of Ludwig's angina admitted in ENT Department of Saveetha Medical College, between March 2012 to April 2017, were included in the study. Various parameters like etiological agents, clinical features and management options were analysed.

Results: Ludwig's angina was found to be more prevalent between age group of 41 to 70 years with a mean age group of (60.3yrs). Males were found to be more commonly affected (71%) as compared to females (29%). Odontogenic infections still accounted for majority (81%) of causes with uncontrolled type 2 diabetes mellitus emerging as the main associated comorbidity. Patients mainly presented with symptoms like submental and submandibular swelling (100%), dysphagia (67%), odynophagia (55%), and stridor (42%). Almost all the patients required intravenous antibiotics, analgesics and steroids (100%) with (82%) requiring tooth extraction and (74%) requiring incision and drainage. Among the patients who presented with stridor (29%) underwent tracheostomy for airway management. The culture of the discharge obtained after incision and drainage found pseudomonas (71%), staphylococcus aureus (34%) and beta hemolytic streptococcus (42%) as common microbial agents.

Conclusions: Ludwig's angina is a serious and life threatening condition which can have fatal outcome if not treated aggressively, therefore a thorough understanding of the clinical presentation, common etiological factors, microbial agents and treatment methods is needed to manage these patients.

Keywords: Ludwig's angina, Odontogenic, Diabetes mellitus, Pseudomonas

INTRODUCTION

Ludwig's angina is a serious, potentially life threatening infection of the floor of mouth usually seen in adults with poor oral hygiene and concomitant dental infections.¹

With the increasing prevalence of comorbidities like diabetes mellitus the incidence of Ludwig's angina and other deep neck space infections is on the rise. While dental infections account for majority of cases, trauma and conditions like osteoradionecrosis following

radiotherapy account for the rest of the causes.² The microbiology in Ludwig's angina shows a mixture of gram positive, gram negative and anaerobic organisms, with *Pseudomonas*, *Staphylococcus aureus* and *Citrobacterfreundii* being the commonly isolated organisms.³ Management of Ludwig's angina needs an aggressive monitoring and management of the airway either by tracheostomy or awake fiberoptic intubation.⁴ Apart from securing the airway other treatment modalities like tooth extraction, incision and drainage

play a crucial role along with adequate intravenous antibiotics and anti-inflammatory drugs.⁵

METHODS

Study setting

Patients who were diagnosed and treated for Ludwig's angina in ENT Department of Saveetha medical college, Chennai.

Study design: A prospective study, descriptive analytical.

Study duration: 5 year (from March 2012 to April 2017)

Sample size

38 patients of Ludwig's angina diagnosed clinical and / or radiologically using Xray/CT/MRI.

Inclusion criteria

All the patients who were diagnosed clinically or radiologically as Ludwig's angina and treated for the same in ENT Department of Saveetha medical college, Chennai.

Exclusion criteria

Patients who did not give consent for the study.

Procedure

A total of 38 patients were included in the study based on the inclusion and exclusion criteria. Detail history was taken and examination of the patient was done. Data was collected on various parameters like age, sex, presenting complaints, associated comorbidity, etiology, organisms isolated and treatment methods. The patients were followed up after admission and relevant clinical history was recorded. All the patients were started with empirical intravenous antibiotics, steroids and analgesics. Patients who had stridor at presentation underwent conventional tracheostomy or fibreoptic intubation based on feasibility. The odontogenic source of infection was removed by tooth extraction with the help of dentist. Incision and drainage was done wherever needed and the fluid obtained was sent for culture and sensitivity. Depending on the organism isolated and sensitivity pattern antibiotics were added or changed later. All the patients were followed up till complete recovery and discharge. Details about surgical interventions done for the patient, were recorded and analysed. All the data available during the disease progression was recorded and analysed using suitable statistical analysis methods.

RESULTS

38 patients of Ludwig's angina examined and treated in the ENT department of Saveetha medical college,

Chennai during the period of March 2012 to April 2017 were included in the study. The age of the patients ranged from 10 to 70 years with maximum number of patients (29) between ages 40 to 70 years. The mean age was found to be 60.3 years. A total number of 14 patients (37%) were seen in the age group of 40 to 50 years (Figure 1).

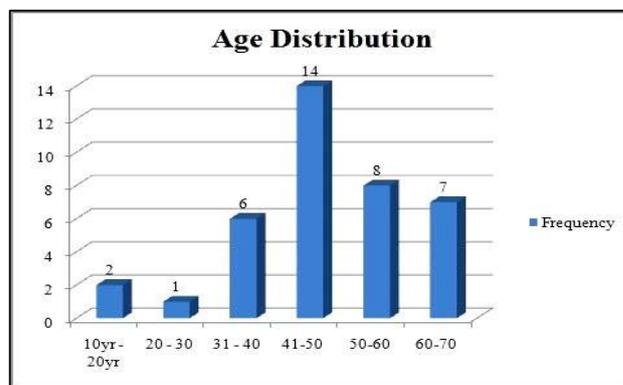


Figure 1: Graph showing frequency of Age distribution (n=38).

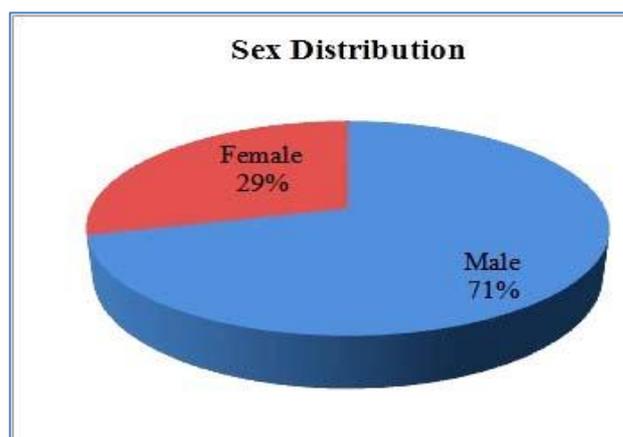


Figure 2: Pie chart showing sex distribution (n=38).

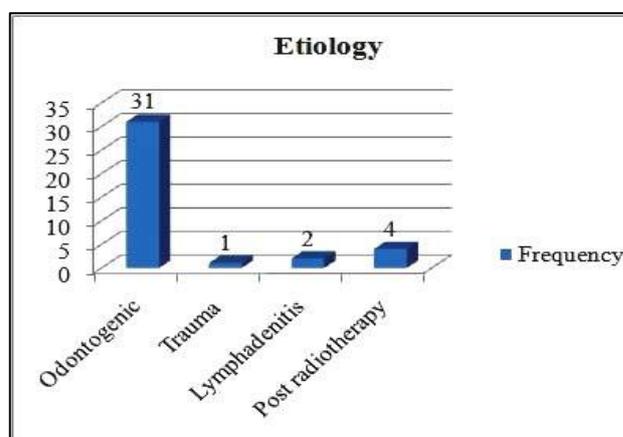


Figure 3: Graph showing frequency distribution of etiological factors (n=38).

Among the 38 patients 27 patients (71%) were male and 11 patients (29%) were females with female to male ratio being (0.40) (Figure 2).

Out of the etiological factors odontogenic cause was found to be most common, and was seen in 31 patients (81%) (Figure 3).

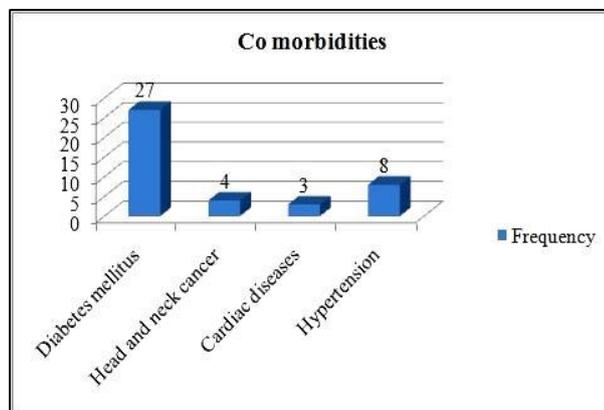


Figure 4: Graph showing frequency of associated co morbidities (n=38).

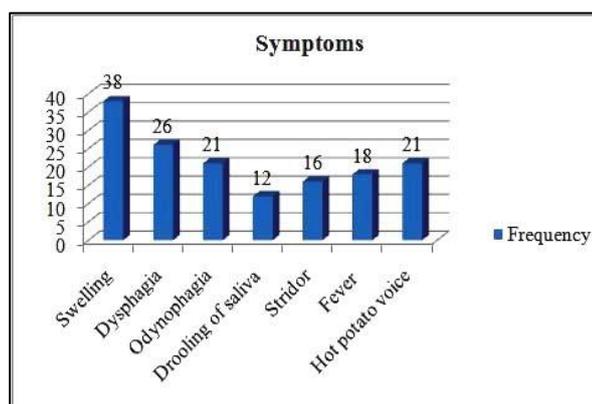


Figure 5: Graph showing frequency of symptoms (n=38)

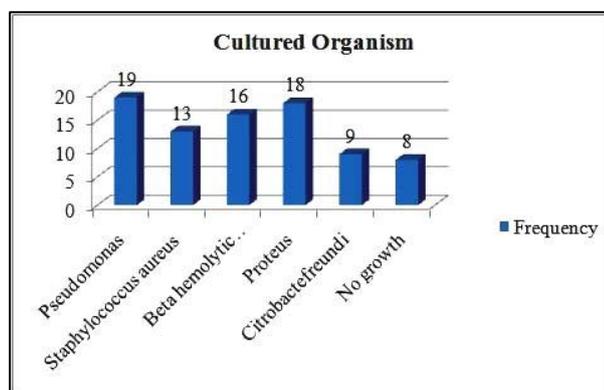


Figure 6: Graph showing frequency distribution of various cultured organisms (n=38).

Among the 38 patients 27 patients (71%) were found to have uncontrolled type 2 diabetes mellitus at the time of presentation, and thus can be said as the most common predisposing factor nowadays (Figure 4).

Swelling in the submental and submandibular region was seen in all the 38 patients (100%), followed by dysphagia (67%), odynophagia (55%), stridor (42%), hot potato voice (55%), and drooling of saliva (32%) (Figure 5).

The results of the bacterial culture were positive in 20 patients (53%). Pseudomonas was isolated in 19 cultures (95%), followed by beta hemolytic streptococcus in 16 cultures (80%), Proteus in 18 cultures (90%), and Staphylococcus aureus in 13 cultures (65%) (Figure 6).

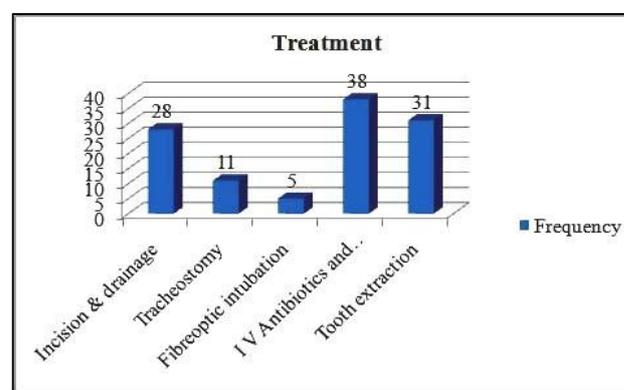


Figure 7: Graph showing frequency of different treatments given (n=38).

All the 38 patients (100%) were given appropriate intravenous antibiotics and analgesic for control of infection. Out of them 28 patients (74%) required incision and drainage in the neck for decompression of swelling, and 31 patients (82%) needed tooth extraction by dentist. 16 patients had stridor at the time of presentation out of which in 5 patients (13%) only fiberoptic intubation was feasible while rest 11 patients (29%) required a tracheostomy for airway management (Figure 7).

DISCUSSION

Ludwig's angina was first described by a German physician *Wilhelm Friedrich von Ludwig* in 1836 as a rapidly progressive life threatening cellulitis involving the submandibular, sublingual and submental spaces.⁶ This disease needs an aggressive management and careful monitoring of associated comorbidities like diabetes mellitus.

Age

In our study most of the patients were between 40 to 70 years, with nearly 76% of the patients above the age of 40 years and 24% of patients below the age of 40 years.

The mean age group was 60.3 years. So the prevalence of the disease was more in the elderly population above the age of 40 years. Various studies done by Chen et al, Wang et al, Huang et al, showed that the disease is more commonly seen in adults with a mean age group within 40 to 50 years.⁷⁻⁹

Sex

The sex distribution showed a more male dominance with female to male ratio being 0.40. This is comparable to the studies done by Chen et al (0.37), Wang et al (0.49), Huang et al (0.69) which also had a male dominance.⁷⁻⁹

Etiology

The most common cause was found to be odontogenic infections (81%), which is consistent with the studies done by Huang et al (42%), Parhiscar and Har-El (43%), Marioni et al (38.8%), Eftekharian et al (49%) and Saifeldeen et al (42%).⁹⁻¹³ The lower second and third molar was most common source of infection in our study. 11% of the patients were found to have osteoradionecrosis of the mandible after a course of radiotherapy for oral cancer. 5% of the patient reported Ludwig's angina following suppurative inflammation of the cervical lymph nodes.

Comorbidities

Diabetes mellitus was reported as the most common co morbidity with 27 patients (71%) suffering from the disease at the time of admission. Diabetes mellitus was also the common associated comorbidity in case of study done by Saifeldeen et al.¹³ The presence of diabetes had a significant correlation with the management of the disease. The patients who had more severe uncontrolled diabetes at the time of admission presented with more severe symptoms of Ludwig's angina and needed a control of the blood sugar levels to achieve a complete cure. The duration of hospital stay and morbidity was more as compared to the non-diabetic Ludwig's angina patient. The response to conservative medications was poor in such patients and they frequently needed surgical interventions. Therefore patients of Ludwig's angina with uncontrolled diabetes need to be managed aggressively along with monitoring of blood glucose levels so as to avoid fatal outcomes.

Symptoms

In our study all the patients (100%) presented with submandibular and submental swelling, while 67% had dysphagia, 55% had odynophagia, 42% had stridor, and 55% had hot potato voice at the time of presentation. This is consistent with recent studies which show neck swelling odynophagia, dysphagia, hot potato voice and stridor as the common presenting symptoms.

Microbial flora

The culture obtained from incision and drainage did not show any microbial growth in 40% of cases. The rest 60% of cases revealed a mixed microbial flora consisting of gram positive, gram negative and anaerobic organisms. *Pseudomonas* was found in maximum cases (95%) along with beta hemolytic *Streptococcus* (80%), *Proteus* (90%) and *S. aureus* in 65% of cases. Similar studies done by Co et al and Ovassapian et al revealed a mixed microbial flora made up of beta hemolytic *Streptococcus*, *Proteus* and *Staphylococcus* as the common organisms.^{14,15}

Management

All the patients received intravenous antibiotics, analgesics and steroids. Around 82% of patients needed a tooth extraction by the dentist, while 74% needed incision and drainage for surgical decompression of the neck swelling. 42% of patients had stridor at the time of presentation among which 29% had severe laryngeal and tongue base edema making fiberoptic intubation difficult and thus had to undergo a temporary conventional tracheostomy for immediate airway management. In rest 13%, awake fiberoptic endotracheal intubation was done to secure the compromised airway. Barakate et al studies advocated the use of mainly intravenous antibiotics, steroid and analgesics for curing patients of deep neck space infections.¹⁶ But with the rise in incidence of co morbidities like diabetes mellitus, surgical intervention measures help in faster and complete cure of the patients.¹⁷

CONCLUSION

Ludwig's angina is an acute, rapidly progressing, life threatening infection which needs aggressive IV antibiotics therapy and steroids along with surgical intervention measures like tooth extraction, tracheostomy or fiberoptic intubation and incision drainage at the site. A thorough clinical understanding of the etiological factors, clinical features and management methods help in rapid diagnosis and management so that the morbidity of the patient can be reduced.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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