

# Clinical Profile and Outcome of Ludwig's Angina in Tertiary Care Hospital in Tamil Nadu

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## Abstract

**Background:** Ludwig's angina is a lethal infectious cellulitis of the submandibular space, which always makes a difficult situation for treating surgeons.

**Objectives:** The objective of this study was to study about the presentation, management, and clinical outcome of Ludwig's angina.

**Materials and Methods:** A study made in the Department of ENT - Head and Neck Surgery, Tirunelveli Medical College, Tirunelveli, for a period of 1 year from July 2016 to July 2017, a total of 41 patients - 33 males and 8 females were included in the study.

**Results:** Majority of the patients were having a dental infection before the episode - 85%. *Pseudomonas aeruginosa* is the most common among the isolated pathogens. Six patients presented with stridor and needed tracheostomy. With early incision and drainage, proper antibiotics and supportive measures, 37 patients survived without any morbidities. Despite all of our greatest efforts, four patients expired. Although comorbidities such as diabetes and chronic kidney disease are seen in few, majority were not having any other systemic illness.

**Conclusion:** Prompt diagnosis and surgical drainage with broad-spectrum antibiotics and if needed tracheostomy often give much better results in the treatment of Ludwig's angina. An early intervention of dental infection in early stages may be helpful in avoiding progression into Ludwig's angina.

**Key words:** Ludwig's angina, Deep neck space infection, Tracheostomy, Odontogenic infection

## INTRODUCTION

Ludwig's angina is named after a German physician, Wilhelm Friedrich von Ludwig, who first described it in 1836. It is an overwhelming generalized septic cellulitis of connective tissues of the neck affecting the submandibular and other deep neck spaces, which usually follows a dental infection and systemic comorbidities like diabetes mellitus (DM) associated in majority. The condition carries a risk of rapid progression and severe airway compromise and sudden fatality. The purpose of our study was to evaluate

the mode of presentation, risk factors and causes, its prompt management, and outcome.

## MATERIALS AND METHODS

A total of 41 patients presented to our department with features suggestive of Ludwig's angina from July 2016 to July 2017 were followed up. All basic investigations, pus culture and sensitivity, and USG/CT neck were done. Incision and drainage was done and tracheostomy for those who were in severe respiratory distress, and broad-spectrum antibiotics given for all. Data were collected and evaluated.

## RESULTS

41 patients with clinical features consistent with Ludwig's Angina were included in the study. There were 33 males

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(80%) and 8 females (20%). Age ranges from 5 years to 76 years. The most common age group involved was found to be the 5<sup>th</sup> decade. Majority are from villages. The clinical presentations seen were neck swelling, fever, dysphagia, and trismus [Table 1]. Although all were having features of airway compromise, very few were came with severe stridor and tracheostomy was done [Tables 1 and 2]. All were found to be dehydrated.

Odontogenic infection was found to be the most common etiological factor associated in 35 patients (85%) [Table 3]. Among the associated comorbidities, diabetes was seen as the most common, which is seen in 11 patients (28%) [Table 4]. None of them were screened to be positive for HIV/AIDS. Incision and drainage was done in 34 patients (83%), and remaining were treated with conservative means [Table 2]. Six were needed tracheostomy (15%). Pus culture and sensitivity sent for all. In a majority (19 patients), no pathogens could be identified. Among isolated pathogens, *Pseudomonas aeruginosa* was seen in 6 patients (15%) [Table 5]. In one case, methicillin-resistant *Staphylococcus aureus* was identified. One patient had a second attack of Ludwig's angina.

A total of 4 deaths (9.7%), one at the time of presentation itself with severe airway compromise and multiorgan failure due to sepsis; three patients were during the hospital stay including one child. The cause was seemed to be multiorgan failure along with sepsis.

Almost all presented after 3–4 days of onset of the symptoms. Average hospital stay is about 8–28 days, majority discharged after 26–28 days.

## DISCUSSION

Ludwig's angina is a potentially life-threatening diffuse cellulitis involving the submandibular region and extending to other deep neck spaces bilaterally leading to progressive airway obstruction and mortality very rapidly. With the advent of broad-spectrum antibiotics and prompt airway management, the mortality rate is significantly reduced now. Our study shows that males are affected more than females and highly prevalent in rural and poor socioeconomic status. The most common age group involved in the 5<sup>th</sup> decade, and odontogenic infections, especially that of lower 2<sup>nd</sup> and 3<sup>rd</sup> molar roots, are most common.<sup>[1]</sup> This is in common with similar studies which show that the 2<sup>nd</sup>/3<sup>rd</sup> molar roots extend below the mylohyoid line.

The common symptoms of presentation in our study are similar to studies elsewhere. Many studies shown

**Table 1: Distribution of presenting symptoms**

Symptoms	Number of patients
Neck swelling	41
Trismus	41
Fever	41
Dysphagia	41
Pus discharge	28
Facial swelling	7
Stridor	6
Altered sensorium	7

**Table 2: Modality of treatment**

Treatment given	Number
Incision and drainage with high-dose antibiotics	34
Tracheostomy done	5
Antibiotics and supportive measures only	6

**Table 3: Source of infection**

Etiology	Number of patients
Dental infections	35
Superficial neck infection/minimal trauma	6

**Table 4: Associated comorbidities**

Associated comorbidities	Number of patients
DM	7
DM with CKD	4
Cal/Post RT-Post chemo	3
Psychiatric/MR/Low IQ	2
PLHA/HBsAg	0
None	25

DM: Diabetes mellitus, CKD: Chronic kidney disease

**Table 5: Spectrum of microbial isolates**

Organism isolated	n
<i>Pseudomonas aeruginosa</i>	6
<i>Streptococcus viridans</i>	3
<i>Staphylococcus aureus</i>	3
MRSA	1
<i>Klebsiella spp.</i>	3
<i>Proteus vulgaris</i>	2
<i>Escherichia coli</i>	2
<i>Bacteroides fragilis</i>	2
None	19

MRSA: Methicillin-resistant *Staphylococcus aureus*

that the association of systemic illness to dental infections, and hence, Ludwig's Angina, in our study and in literature, there is no significant association was found out between DM and Ludwig's angina, even though the single most identified comorbidity is DM. Majority are having no other systemic illness. It has been concluded that if the patient is having any of such comorbidities, the management should be more aggressive since the chance of developing fatal

outcomes is common. Furthermore, in our study, we found that at the time of presentation, if the patient is having severe airway compromise and elevated RFTs, the outcome is poor.

The microbiological results of our study did not isolate any pathogen in majority, though among the identified pathogens, *Pseudomonas* is most common. Streptococcus viridans was found to be most common in similar studies. The treatment consists of airway maintenance, surgical drainage,<sup>[2]</sup> and broad-spectrum antibiotics. Tracheostomy is the gold standard in full-fledged airway compromise.<sup>[3]</sup> In our study, the need of tracheostomy was very insignificant and we have managed majority with surgical drainage and antibiotic support. Research has shown that Ludwig's angina has a mortality rate of 8–10% and most often due to hypoxia rather than sepsis.<sup>[4]</sup> In our study, mortality is 9.7%, and death due to severe airway compromise was found in only one patient, rest of all developed septicemia and multiorgan failure.

## CONCLUSION

Despite the severity of the condition, prompt diagnosis and early surgical intervention with high-dose antibiotics will reduce the fatal outcome significantly. Any age group can be affected and no particular underlying systemic illness is needed. Patient who presenting with features of severe airway compromise the outcome is very poor. Early intervention on dental infections will almost completely prevent the occurrence of the condition.

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