

A Rare Presentation of Ludwig's Angina Following Dental Extraction: A Case Report

Padma Priya RM

¹Department of pharmacology, KMCH College of Pharmacy

*Corresponding Author:

Padma Priya RM

Department of Pharmacology, KMCH College of Pharmacy,

E-mail: rmpriya2108@gmail.com

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1. Abstract

Ludwig's Angina is a rare, rapidly advancing cellulitis of the submandibular, sublingual, and submental spaces, usually caused by odontogenic infections. Here, we report the case of a 48-year-old diabetic male who developed Ludwig's Angina after molar removal. Although he underwent incision and drainage at an outpatient centre initially, his condition deteriorated, resulting in respiratory distress and stridor. CT scan showed multiloculated collections extending to the parapharyngeal and pre-epiglottic spaces. He received an emergency tracheostomy and surgical drainage. Sensitivity of culture revealed *Staphylococcus aeruginosa*, and the antibiotic therapy was modified accordingly. The patient also had a depressive adjustment disorder caused by financial distress, treated with psychiatric management. With complete multidisciplinary treatment—airway stabilization, infection control, glycemic control, and mental health support—he improved significantly clinically and was discharged on oral antibiotics. This case stresses the significance of early identification, imaging, timely surgery, and integrated management to avoid morbidity and mortality in Ludwig's Angina.

2. Introduction

Ludwig's Angina is a rare but potentially fatal surgical emergency first described by the German physician Wilhelm Friedrich von Ludwig in 1836. It is characterized by a rapidly spreading cellulitis involving the submandibular, sublingual, and submental spaces of the neck and floor of the mouth. The condition typically presents with brawny, tense swelling in the submandibular region, leading to elevation and posterior displacement of the tongue, which can result in life-threatening airway obstruction.

Common clinical features include fever, chills, malaise, dysphagia, trismus, and respiratory distress. The infection is most

commonly odontogenic in origin—accounting for approximately 85% of cases—usually following dental procedures or untreated dental infections. Other causes may include peritonsillar or parapharyngeal abscesses, mandibular fractures, oral trauma or piercings, and submandibular sialadenitis. Systemic risk factors such as poorly controlled diabetes mellitus, malnutrition, alcoholism, and immunocompromised states significantly increase susceptibility and worsen outcomes.

Microbiologically, Ludwig's Angina typically follows a polymicrobial pattern, involving both Gram-positive and Gram-negative organisms. Diagnosis is largely clinical but may be supported by imaging to assess the extent of soft tissue involvement. Treatment necessitates early and aggressive intervention, including broad-spectrum antibiotics, airway management, surgical drainage when indicated, and supportive care.

Before the advent of antibiotics, Ludwig's Angina had a mortality rate exceeding 50%. However, with modern antimicrobial therapy, imaging modalities, and surgical techniques, current mortality rates have significantly decreased to approximately 8%. Despite its rarity, Ludwig's Angina remains a serious and time-sensitive condition. The purpose of this case report is to raise awareness of its clinical presentation, highlight the importance of early recognition and multidisciplinary management, and contribute to the growing body of literature aimed at improving outcomes in similar cases.

3. Case Presentation

A 48-year-old male with a history of dental extraction (right molar) a week ago, followed by right mandibular region swelling with pain underwent incision and drainage in the right mandibular region in an outside hospital (namakkal). After I&D the patient's day to time symptoms were worsened with a decrease in SPO2. Then the patient was referred here (KMCH hospital) for further treatment and management.

The patient has a past medication history of diabetes mellitus on irregular medication with HbA1C 7.9%. on examination, his Blood pressure was 120/80mmHg, cardiovascular sound S1S2+ was normal, and SPO2 96% at room airway.

Physical examination was significant for edematous, mouth opening resisted spacing of 2 fingers only with tongue protruding, enlarged, and stridor.

CT SCAN OF NECK Clinical profile: H/o tooth extraction 1 week before, c/o Submandibular region swelling with pain, h/o I and D in right SM region done outside, symptoms worsened, for further reevaluation. Serial sections are taken from the skull base to the aortic arch level.

Multiloculated hypodense trans-spatial collection is seen - predominantly in the floor of the mouth deep to mylohyoid muscle obliterating the sublingual space bilaterally. The largest loculation measures 2.9 x 4.7 x 1.6 cm (AP x Tr x CC). The loculations

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extend postero-superiorly to the parapharyngeal space on the right side. A posterior extension is seen to the pre-epiglottic space/root of the tongue. Extensive inflammation of the surrounding soft tissue was noted. Multiple tiny air pockets are seen within the collection. The nasopharynx, oropharynx, and hypopharynx are normal. The larynx is normal. Bilateral submandibular and parotid glands are normal. Multiple prominent enhancing lymph nodes are noted in levels 2 and 3, the largest measuring 8.1 mm in SAD. The thyroid gland is normal, and the aberrant origin of the right subclavian artery from the arch of the aorta and seen coursing behind the esophagus. The remaining neck vessels are normal. The Trachea and the visualized portion of the esophagus are normal. IMPRESSION: “Multiloculated hypodense trans-spatial collection predominantly in the floor of the mouth with extension to the right parapharyngeal and pre-epiglottic space as detailed - infected collection. “Multiple prominent enhancing lymph nodes in levels 2 and 3 - likely reactive.

After the CT scan, the patient was planned for I&D followed by tracheostomy. After surgery, the patient suffered from bloody, strained vomiting, and tracheostomy blood-strained secretions were noticed.

The doctor advised a culture sensitivity test, and the report showed a positive result for *Staphylococcus aeruginosa*. The patient started with antibiotic management. There was no soakage of dressing, the tracheostoma was healthy, and no more pus cells were seen.

Meanwhile, the patient looked stressed. After psychiatry's opinion, it was found that he developed adjustment disorder-depressive reaction due to financial stress.

On the other hand, the patient improved symptomatically- better, stable, and no fever spikes. He was successfully extubated and transitioned to oral antibiotics; he was discharged with the continued antibiotic course for one week.

Lab investigation	Normal range	Day 01	Day 05
TWBC	4000-11300Cells/cu.mm	15400	9600
DC	L: 20-40%	13	19
	P: 45-75%	84	78
PLATELET	150000-450000cells/uL	96000	119000
HbA1C	Less than 5%	7.9%	-

Table 1: Lab value

Drug/Regimen	schedule
cefoperazone sodium & salbactam-8mg	IV/BD
metronidazole-500mg	IV/TID

Table 2: Antibiotics given

4. Discussion

Ludwig's angina is a fulminant, life-threatening cellulitis of the submandibular, sublingual, and submental compartments of the neck. It most frequently occurs secondary to dental infection, most

often of the second and third mandibular molars. This is because of their anatomical closeness to these fascial spaces. Its fulminant course is facilitated by the polymicrobial infection that often includes aerobic and anaerobic organisms like *Streptococcus*, *Staphylococcus*, and *Bacteroides* species.

Ludwig's angina generally starts as a periodontal or dental infection and develops into cellulitis without lymphadenopathy. The infection disseminates in the plane of the fascia's and results in edema of the soft tissue of the neck and floor of the mouth. This edema may shift the tongue upwards and backwards and result in airway obstruction, dysphagia, odynophagia, trismus, and stridor, which were all present in this patient.

This is a case of a 48-year-old man who had progressive swelling in the right mandibular area after molar extraction — the most frequent precipitating factor in Ludwig's angina. Even after incision and drainage (I&D) at an outlying facility, his condition deteriorated, which is a pointer towards the likelihood of incomplete drainage, ongoing infection, or extension in deeper planes, as subsequently verified by CT imaging.

Contrast-enhanced CT scan is still the standard in assessing the severity of soft tissue involvement in deep neck infections. Here, the CT showed a multiloculated hypodense collection from the floor of the mouth into the parapharyngeal and pre-epiglottic spaces with obliteration of the sublingual space and inflammatory changes in the surrounding tissues—features in keeping with advanced Ludwig's angina.

Moreover, evidence of small air spaces is in line with secondary necrosis or gas-producing bacteria and hence incriminates the polymicrobial necrotizing infection.

Prompt intubation airway administration is the crux of managing Ludwig's angina. Under this circumstance owing to a compromised airway (present in the form of stridor, enlarged tongue, and decreased opening in mouth), an appropriate tracheostomy was undertaken to safeguard the airway.

Surgical drainage was indicated because of the severity and loculated extension of the infection. Bloody strained secretions developed postoperatively in the patient, and suspicion for irritation of the surgical site or injury to small vessels prompted close observation.

Empirical broad-spectrum antibiotics are started early and further modified according to sensitivity on culture. The culture result of *Staphylococcus aeruginosa* in this patient directed antibiotic treatment, and improvement was gradually seen in symptoms.

The case also highlights the necessity of treating comorbid illness—this patient had diabetes mellitus, an established risk factor for complicated infections and nonhealing. His HbA1c level of 7.9% indicates poor control of blood glucose, which most likely played a role in progressing the infection as well as resistance to initial therapy.

A frequently neglected but vital aspect of care is mental health. This patient manifested evidence of psychological distress and was diagnosed with an adjustment disorder with a depressive reaction, most likely brought about by economic stress and the severity of his illness. Prompt psychiatric care guarantees improved coping and overall outcomes.

With proper surgical management, airway care directed antibiotic therapy, and supportive treatment, the patient clinically improved,

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experienced no subsequent fever spikes, and was successfully weaned to oral antibiotics. He was discharged in stable condition.

5. Conclusion

Ludwig's Angina is still a potentially life-threatening illness, especially in immunocompromised individuals such as those with poorly controlled diabetes. This case highlights the need for early diagnosis, aggressive medical and surgical intervention, and multidisciplinary treatment—including psychiatric assessment—to provide good outcomes. Prompt imaging and airway management are essential pillars in the treatment of deep neck space infections. Patient education regarding dental hygiene and control of chronic disease is critical in avoiding such complications. Recovery of the patient and eventual discharge following extubating and stabilization of symptoms represent a successful, team-oriented outcome in treating a complicated, potentially life-threatening infection.

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