



Ludwig's Angina – Case Study

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ABSTRACT

Ludwig's angina is extremely dangerous as it causes edema, distortion, and airway obstruction and can appear as a result of airway problems. The first phase of the management of patients with this disease is observation and intravenous antibiotics. Protecting the airway with surgical drainage will be the management of advanced diseases. In addition to this infection; pain, trismus, airway swelling, and tongue displacement lead to weak airways. Therefore, airway management is a major concern in these situations [1]. Although "normal" airway management for patients with deep neck disease is a tracheostomy with local anesthesia, in extreme cases the infection is difficult or sometimes not possible due to the required tracheostomy position or due to external neck distortion. [2]

Keywords: Ludwig's angina, compromised airway, Tracheostomy.

1. CASE PRESENTATION

A 61-year-old man with type II Diabetes Mellitus came to the Emergency Department with complaints of a three-day fever, chills and swelling of the left side face which gradually involved right side face and neck. Severe pain, odynophagia and dyspnea were also reported. Physical examination of the patient revealed that the patient had severe illness and facial edema visible on the surface of the parotid region, submandibular region with left parotid tenderness along with respiratory distress. His vital signs were; oral temperature - 102 ° F, heart rate - 158 Beats per minute (BPM) and respiratory rate - 46 breaths / minute and Spo2 - 80-86% per 10 liters of oxygen. The patient was stabilized with ventilator support and antimicrobial medication. Examination of the oral cavity reveals multiple carious teeth, dry oral mucosae and edema of the floor of the mouth and anterior neck which was tender in nature. Neck radiographs showed evidence of gas in the soft tissues, inflammation of the soft tissue and degree of airway obstruction, as confirmed by a CT scan. After stabilization, Incision and drainage of the submandibular abscess was performed the next day. The patient went on a respiratory arrest and was rehabilitated. Considering long-term airway support percutaneous tracheostomy performed under local anesthesia, protected airway and general anesthesia were provided followed by Separate stab incisions were made in relation to the submandibular space bilaterally and submental space. The sinus forceps were introduced to open up tissue spaces and the pus was removed. The wound was soaked in normal saline, and a separate tube drain was placed and secured to the skin with silk sutures. Intravenous administration of cefotaxime 1 g Bd, gentamycin 80 mg Bd, metrogyl 500 mg, Tid were given for 5 days with a tapering dose of decadran 8–4 mg Bd for first two postoperative days. Postoperative irrigation was performed through the drain, after 36-hours drain was removed along with the infected tooth. Tracheostomy tube care was provided during the postoperative period, the skin was strapped on the fifth day after tracheostomy tube was removed. The patient recovery was satisfactory. The next day the patient was comfortable, with a mean pulse rate of 68 BPM, a BP of 110/70 mmHg and an oxygen saturation of 97%. Swelling of the neck had been reduced.

2. INTRODUCTION

Ludwig's angina was created after German physician Wilhelm Friedrich von Ludwig first described the condition in 1836. It is the fastest and most common form of gangrenous cellulitis and edema of the soft tissues of the neck and floor of the mouth [3] with advanced inflammation of the soft tissues and elevation and posterior displacement of the tongue the most serious complication in Ludwig's angina is airway obstruction. [4] prior to the development of antibiotics Ludwig's angina mortality rate exceeded by 50%. As a result of antibiotic therapy, as well as advanced imaging and surgical techniques, the current mortality rate is about 8%. [5, 6]

Ludwig's angina should not be confused with angina pectoris. The word "angina", is derived from the Latin word "angere", meaning "to choke"; and the Greek word "ankhone", meaning "strangle". To put it in context, Ludwig's angina refers to a sense of choking and strangling, second to airway obstruction, which is the most serious of these conditions. [5]

Other name: Angina Ludovici

3. CAUSES

- Odontogenic Infections: The most common form of infection is from infected molars or pericoronitis, which is a disease of the gums surrounding the partially erupted lower (usually third) molars. [4]
- Peritonsillar or parapharyngeal abscess
- Mandibular Fracture
- Cut or pierce the inside of the mouth.
- Submandibular salivary stones.
- Oral ulcers
- Infections of oral malignancy
- Injuries to the floor of the mouth.
- Infection of connective tissues through tissue spaces. It directly includes involves the submandibular, submental, and sublingual spaces.
- This condition is not common in children.

4. PREDISPOSING FACTORS

- Dental caries.
- Recent dental treatments such as tooth extraction
- Systemic diseases - Diabetes Mellitus (DM)
- Malnutrition
- Alcoholism
- Compromised immune system - organ transplants and AIDS. [3]

5. PATHOPHYSIOLOGY

Ludwig's angina usually begins with an infection of the submandibular space from the second or third lower molar and spreads to sublingual space of the same side. From there it cross over to the opposite side of the sublingual space and then from there to the contralateral submandibular space. Through lymphatic circulation infection spreads to the submental space than it progress to the submandibular space. Infection from the sublingual space spreads posteriorly and reaches epiglottis which causes edema of the glottis and respiratory obstruction. [4]

6. SIGNS AND SYMPTOMS

- Oral pain and throat pain
- Trismus
- Hot potato voice
- Dysphagia to saliva
- Stridor suggest impending airway obstruction
- Fever, tachycardia
- Progression to septic shock
- Bull neck appearance
- Tripod position and respiratory distress
- Tongue appears displaced superiorly and anteriorly, and inability to protrude the tongue
- Tenderness over the throat and neck
- Submandibular “woody” induration, crepitus or tenderness

7. COMPLICATIONS

- Airway obstruction due to elevation and posterior displacement of the tongue and edema of the glottis
- Mediastinitis
- Septic shock

8. INVESTIGATIONS

8.1 Culture of fluid

The culture samples of pus from a patient with Ludwig's angina, microbiology were found to be polymicrobial and normal anaerobic. Other commonly found microbes are Viridans Streptococci, Staphylococcus aureus, Peptostreptococci, Prevotella melaninogenicus, Porphyromonas and Fusobacterium spp.

8.2 CT neck and face

- Airway patency
- Extent of soft-tissue swelling
- Underlying dental disease
- Local skin thickening
- Increased attenuation of subcutaneous fat
- Muscle enlargement
- Loss of fat planes within the submandibular space
- Soft tissue emphysema
- Focal fluid collections (abscess)
- Rapidly progressive cellulitis of the floor of the mouth [8]

9. MANAGEMENT

Management for Ludwig's angina focuses on following aspects

- Adequate airway management
- Early and aggressive antibiotic therapy
- Incision and drainage for any who fail medical management or form localized abscesses
- Adequate nutrition
- Hydration support.

9.1 Airway maintenance

Indications for immediate artificial airway:

- a) Stridor
- b) Cyanosis
- c) Retractions
- d) Difficulty controlling secretions.
- e) Rapid progression of edema
- f) Comorbid health problems- DM

Airway maintenance can be difficult:

Endotracheal intubation:

- Supraglottic edema
- Nuchal rigidity
- Trismus

Nasal intubation:

- Patient should be awake
- Flexible endoscope
- Patient should be in an upright position

Last resort:

- Cricothyroidotomy
- Tracheostomy.

• Airway Management:

- Airway management is the major aspect of immediate care.
- All patients with Ludwig's angina should be admitted to the ICU as there an expected risk of rapid airway compromise,.
- Main cause of death is hypoxia or asphyxia, not severe sepsis.
- Fiber optic intubation can be helpful.
- If fiber optic intubation is not possible tracheostomy using local anesthesia is recommended. [9]
- In patients with deep-neck infections tracheostomy using local anesthesia has been recognized as the gold standard of airway management. However, cellulitis of the neck with involvement of the tracheostomy site makes the procedure difficult.
- A recent study on patients with Ludwig's angina have shown that tracheal intubation with a flexible bronchoscope using topical anesthesia have provided better airway management.

9.2 Antibiotic agent

- Early aggressive antibiotic therapy:
- Initial antibiotic therapy is chosen to kill gram-positive organisms and oral cavity anaerobes.
- Empiric treatment with metronidazole 500mg IV every 12 hours and Benzylpenicillin 1.2g IV every 6 hours is recommended before culture and sensitivity results are available.
- For patients with non-immediate hypersensitivity to penicillin: Cephazolin 1g IV every 8 hour. Some experts recommend the addition of gentamicin.
- For patients with immediate hypersensitivity to penicillin: clindamycin 450 mg IV every 8 hours OR lincomycin 600 mg IV every 8 hours.

Use of Steroids

- IV dexamethasone (e.g., Dalalone, Decadron, Dexasone), given for 48 hours. It can decrease edema and cellulitis and thus help to maintain the integrity of the airway and improve penetration of antibiotics.
- Dexamethasone 10-20 mg IV, Then 4-6 mg Q6 for 8 doses.
- "Used every time when airway compromise suspected"

9.3 Surgical intervention:

Source control

- Needle aspiration
- Surgical decompression of the sublingual, submental and submandibular spaces if: airway compromise, focal collections, necrotizing infection, poor response to antibiotics.

Incision and drainage

- Treatment includes initial surgical removal of the source of infection (i.e., carious dentition) via extraction, aggressive, and vigorous incision and drainage procedures with appropriate placement of drains, along with intense and prolonged antibiotic therapy and maintenance of a patent airway.

- Indication for Surgical drainage
- Fluctuance or crepitus,
- Radiologic evidence of accumulation of fluid or air in soft tissues.
- A significant indication is the lack of clinical improvement within 24 hours of starting antibiotic therapy.

Supportive care and monitoring

Close airway observation on a specialized airway unit if definitive airway deemed unnecessary

9.4 Nutritional support

Adequate nutrition and hydration support are important in determining outcomes for any patient following surgery. For Ludwig's angina, pain and swelling in the neck region often causes dysphagia, which is why it reduces food and fluids. As a result, patients suffer from weight loss due to loss of fat, muscle and skin initially, followed by bone and internal organs in the later stages. In the meanwhile, at the cellular level, the cells will be less able to maintain homeostasis in the presence of stressors such as infection and surgery. Patients should therefore be well-nourished and hydrated to promote wound healing and to prevent infection. [10]

9.5 Post-operative care

When the patient's airway is proved to be patent, allowing adequate breathing then extubation (i.e., is the removal of endotracheal tube to liberate the patient from mechanical ventilation) to be done. Indications for extubation are decrease in swelling and patient's ability of breathing sufficiently around an uncuffed endotracheal tube with the lumen blocked. [10]

Close monitoring is essential during a hospital stay. The following steps to be taken to ensure patient recovery.

- Performing cultures and sensitivity tests to determine if any changes have been made to patient's antibiotic regimen.
- To monitor the patient's body temperature, a rise indicates more infection.
- Report on white blood cell count, a significant decrease suggestive of effective and adequate drainage
- Repeat the CT scans to confirm patient's restored health status or if infection is getting worse, to evaluate the extend of infection in nearby anatomical areas. [9]

10. CONCLUSION

Ludwig's angina, which means spasmodic suffocative pain if left untreated. Ludwig's angina always resolves without complications, but the condition can be fatal. Prompt diagnosis, proper airway management, effective intravenous antibiotic therapy, and close ICU monitoring promote positive outcomes for many patients.

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