

Ludwig's angina. Case presentation

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Abstract

Ludwig's angina is an infectious disease that mainly affects the floor of the mouth. It is frequently produced by abscesses of the second and third molars; It has an insidious beginning, so it should be considered, since if the diagnosis is delayed it can have fatal consequences. The case of a 26-year-old male patient diagnosed with Ludwig's angina is presented. He receives medical treatment and surgical drainage of the abscess, with a good uneventful outcome. Appropriate medical and surgical intervention was essential for the successful outcome of this patient, especially to prevent airway obstruction and other serious complications.

Keywords

Ludwig angina; soft tissues; lymph nodes; mediastinitis

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■ INTRODUCTION

Ludwig's angina is a septic and usually severe process of the soft tissue of the floor of the mouth. It progresses rapidly from the floor of the mouth to the neck, generating inflammation, suppuration, and necrosis of the compromised soft parts. It is the infectious cause that mostly affects the airway, due to its rapid, silent and life-threatening course due to progressive airway occlusion. It is located in the submaxillary space, affecting the sublingual, submental and soft tissue areas of the floor of the mouth. (1,2)

Ludwig's angina has its origin in odontogenic infectious foci and, within them, the abscesses of the 2nd and 3rd molars constitute its main cause in their roots. It extends below the crest of the mylohyoid muscle and from there, spread the infection to other spaces, causing 70% to 90% of cases. There are other etiological factors such as sialadenitis of the submaxillary glands, mandibular open fracture, lacerations of oral soft tissues, wounds in the floor of the mouth and secondary oral infections. (1,2)

The most frequently isolated germs are Gram-positive anaerobes such as *Peptostreptococci*, Gram-negative anaerobes such as *Prevotella*, -* *Porphyrromona* and

Fusarium, as well as Gram-positive (*Streptococcus pyogenes*, *Staphylococcus aureus*), and Gram-negative aerobes. This polymicrobial nature of odontogenic infections favors the occurrence of bacterial symbiosis and synergy phenomena. The production of endotoxins such as collagenase (*staphylococci*), hyaluronidases (*streptococci*) and protease and their subsequent combination promote the rapid progression of the infection. (3)

It is a rare disease, with low incidence, but life-threatening. There is no significant gender predisposition; 1/3 of cases are associated to other systemic illnesses (i.e., HIV, diabetes mellitus, renal failure), and poor dentition and dental hygiene are independent risk factors. (4)

Its diagnosis is especially based on clinical criteria; it must be done in a timely manner, to start the most appropriate treatment and prevent the appearance of complications, which can be fatal. Ludwig's angina is a medical and surgical emergency. Among the possible complications of Ludwig's angina, the most relevant are edema of the glottis, necrotizing fasciitis and descending necrotizing mediastinitis, which has the highest mortality rate. A late diagnosis can often favor the development of early complications, especially fatal, involving the airway. (5)

■ CASE PRESENTATION

A 26-year-old man, weighing 70 kg and 165 cm in height, presented with complaints of mouth and neck pain and

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difficulty swallowing for 24 hours; He also reported progressive swelling in the neck and inability to open the mouth for the last 6 hours. A traffic accident with fracture of third molar had been occurred 3 days ago. There was no history of difficulty in breathing at rest. He did not get anything by mouth for more than 6 hours.

On physical examination, he had mild respiratory distress, body temperature of 38.8°C, pulse rate of 106 beats per minute, blood pressure of 140/90 mmHg and a respiratory rate of 25 breaths per minute.

On airway examination, mouth-opening was restricted, with an interincisor gap of 1 cm. There was a diffuse tender neck swelling, particularly in the submandibular space. Neck extension was painful and limited. Both the nares

Emergency actions were taken:

- Intravenous access was obtained and a Hartman infusion started.
- Clindamycin 600mg IV every 6h.
- Ceftriaxone 2g IV every 12h, started 30 minutes before the surgical procedure.
- Blood tests were ordered.
- Supplementary oxygen by nasal catheter.
- Diclofenac 75mg IV every 12 h.

SURGICAL TECHNIQUE AND FINDINGS

After explaining the need for an emergency incision and drainage, informed consent was taken.

On supine position, under general anesthesia, hyperextension of the neck obtained by dorsal thoracic pillow, an incision at submental region is performed,

proceed to open submental, submandibular and sublingual spaces obtaining frank fowl smelling purulent material approximately 150 cc. Samples for Gram and culture were taken, and debridement and drainage was done. Exhaustive lavage with hydrogen peroxide 1.5% (500 ml in total) followed by irrigation with one liter of NSS. One inch Penrose drain was set in place, and fixed with nylon 3/0; wound was left

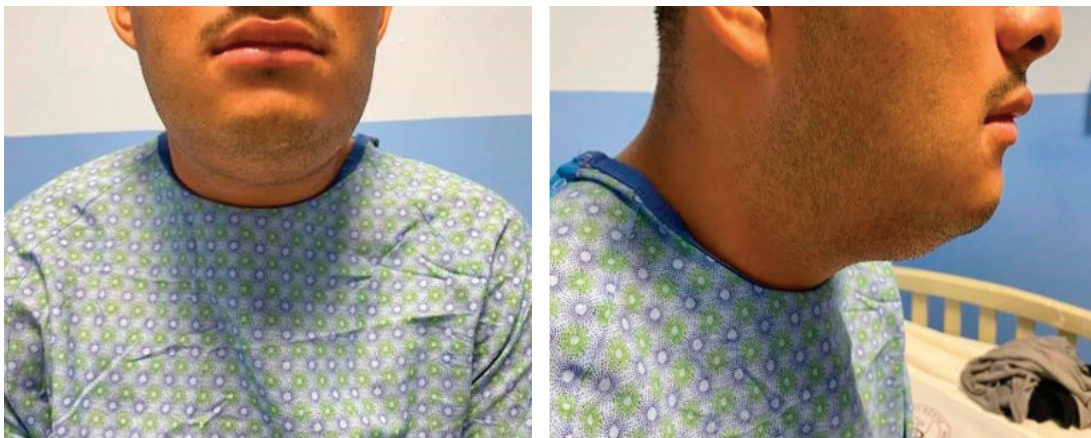


Figure 1. External aspect of the submandibular swelling. A- Frontal view. B- Lateral view.

were patent and the trachea was palpable in the lower part of neck. (Figure 1)

Clinical diagnosis of Ludwig's angina was later confirmed by a neck CT scan.

NECK CT SCAN CONCLUSIONS (FIGURE 2)

1. Collection (abscess) in oropharynx and hypopharynx with extension towards to retropharyngeal space.
2. Large diffuse emphysematous cellulitis involvement of the floor of the mouth, affecting the submandibular, sublingual, and parapharyngeal space bilaterally.
3. Small collection in the left submandibular gland.
4. Bilateral cervical adenopathies.

BLOOD TEST RESULTS ON ADMISSION

CBC (Hb 12.3g/dl, Hto 43 %, WBC 22 x10⁹/l)
 PT: 14s, PTT: 34s, Procalcitonin 2,5ng/ml,
 BUN: 26mg/dl, Creatinine 1.3mg/dl

The patient was scheduled for emergency hospitalization and drainage of the abscess.

open. (Figure 3)

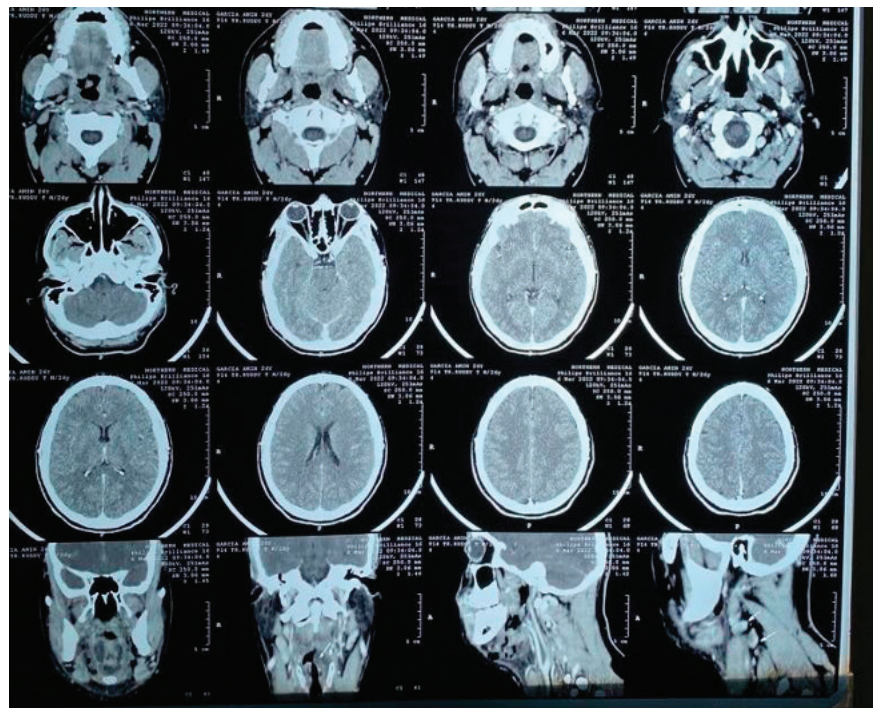


Figure 2. CT scan images



Figure 3. Cervical incision and pus drainage

Patient stayed in hospital for 96 hours, with intravenous antibiotics, IV fluids, pain medications, and daily wound dressings. Supplementary oxygen was removed 6 hours after surgical procedure. A control blood test was done 24 h after surgical procedure. The white blood cell count on post-op day one was $17 \times 10^9/l$ (down slightly from $22 \times 10^9/L$ the prior day) and dropped significantly to $11.9 \times 10^9/L$ on post-op day two, which suggested a good response to the treatment. *Peptostreptococci* was isolated in culture.

Oral antibiotics and general meds were recommended at discharge. The patient was reevaluated four days after, with a favorable clinical evolution.

■ DISCUSSION

This condition was described around 1836 by the German Wilhelm Friedrich von Ludwig, personal physician to King Frederick I of Wurttemberg and the royal family, who was so precise in describing the disease that even today it is said that no one has described it so perfectly. However, the bacterial cause of the disease was unknown, therefore, Ludwig never related it to an infection, much less odontogenic. (6,7)

Ludwig's angina is a rapidly progressive, potentially fulminant cellulitis involving the sublingual, sub-mental, and submandibular spaces. It typically originates from an infected or recently extracted tooth, most commonly the lower second and third molars. (7)

The sub-mandibular space is involved by penetration of the thin inner cortex of the mandible by periapical dental abscesses. Spread to the sub-lingual space is around the posterior margin of mylohyoid muscle. It has, however been reported as a result of mandibular fracture, submandibular sialadenitis, peritonsillar abscess, epiglottitis, and oral malignancies. It can rapidly progress to brawny bilateral induration of the upper neck with pain, trismus, and tongue elevation. Fever and dysphagia are common. The most serious complication of Ludwig's angina is asphyxia caused by expanding edema of soft

tissues of the neck. (8)

A male between 20 and 60 years presenting with fever, mouth and anterior neck pain, associated to swelling, is the typical clinical presentation, generally of dental origin or due to a facial trauma like in our case. (9)

A recent retrospective study of 6072 ICU patients in China, found that only 33 patients were admitted with Ludwig's angina. Out of them, 29 were included in the study, among which 96.5%

required mechanical ventilation, all of them required surgical debridement, and 10% of them died. (10) The patient presented did not need mechanical ventilation even though the extensive involvement of the neck and the urgent surgical debridement performed to drain the abscess and reduce the swelling.

The management of Ludwig's angina is based on the principles of airway protection and treatment of the infection. A CT scan is helpful in assessing the retropharyngeal extension of the abscess and may also help to decide when an artificial airway is required. An early recognition and treatment of Ludwig's angina is extremely important. (11)

A retrospective study of emergency department visits in the United States between 2006 and 2014 showed that among 5855 patients with Ludwig's angina, 47% required surgical debridement and combination of antibiotics. (12) Also, in some patients repeated debridement was needed due to incomplete resolution of swelling, difficult patients with severe infection and extensive involvement of the neck spaces. (13) Our case had a satisfactory evolution with a single debridement and antibiotic therapy, consistent with published studies.

Respiratory failure due to airway obstruction is the most serious complication that may happen. However, the spread of the infection to the mediastinum, carotid sheath, skull base, and meninges, worsen the prognosis, reaching a mortality rate of 20% to 50%. Ludwig's angina was formerly invariably fatal but now, with adequate surgical and antibiotic treatment, has a much-reduced rate of mortality. (14)

■ CONCLUSIONS

The present case describe a typical case of Ludwig's angina. This is a life threatening condition, which requires early intervention along with an interdisciplinary team when multiple systems are involved. Adequate medical and surgical intervention were essential for successfully management of this patient, especially to prevent airway

obstruction and other major complications.

Angina de Ludwig. Presentación de caso.

Resumen

La angina de Ludwig es una enfermedad de causa infecciosa que afecta fundamentalmente al suelo de la boca. Se produce esencialmente por abscesos del segundo y tercer molar; tiene un comienzo insidioso, por lo que se debe pensar en ella, ya que de retrasarse el diagnóstico puede tener consecuencias fatales. Se presenta el caso de un paciente masculino de 26 años de edad al cual se le diagnostica una angina de Ludwig. Recibe tratamiento médico y drenaje quirúrgico del absceso, con una buena recuperación sin complicaciones. La adecuada intervención médico-quirúrgica fue fundamental para el manejo exitoso de este paciente, especialmente para prevenir la obstrucción de la vía aérea y otras complicaciones graves.

Palabras clave

Angina de Ludwig, tejidos blandos, diagnóstico, tratamiento

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