

Case study: inflammatory processes in the neck, an imminent risk

Caso de estudio: procesos inflamatorios en cuello, un riesgo inminente

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Summary

Ludwig's angina is a serious and potentially fatal disease affecting the neck and floor of the mouth. It is characterized by a rapid progression and is associated with risk factors such as poor oral hygiene and immunosuppression. The disease is caused by a polymicrobial infection, and its treatment is based on adequate airway management, antibiotic therapy and surgical drainage. This report describes a case in which a patient developed Ludwig's angina from a primary dental infection. Unfortunately, the clinical picture was underestimated, and the disease progressed significantly. It is critical for healthcare professionals to be alert to the signs and symptoms of Ludwig's angina, especially in patients with risk factors. Timely and appropriate treatment can make a difference in the prognosis of this potentially fatal disease.

Resumen

La angina de Ludwig es una enfermedad grave y potencialmente mortal que afecta el cuello y el piso de la boca. Se caracteriza por una rápida evolución y está asociada a factores de riesgo que van desde la mala higiene oral hasta estados que generen inmunosupresión. La enfermedad es causada por una infección polimicrobiana y su tratamiento se basa en el manejo adecuado de la vía aérea, la terapia antibiótica y el drenaje quirúrgico. En este informe se describe un caso en el que un paciente desarrolla la angina de Ludwig a partir de una infección dental primaria. Desafortunadamente, el cuadro clínico fue subestimado y la enfermedad progresó de manera significativa. Es fundamental que los profesionales de la salud estén alerta a los signos y síntomas de la angina de Ludwig, especialmente en pacientes con factores de riesgo. El tratamiento oportuno y adecuado puede marcar la diferencia en el pronóstico de esta enfermedad potencialmente mortal.

Introduction

Ludwig's angina is a diffuse cellulitis of bacterial origin that affects the floor of the mouth and neck, and is potentially fatal without prompt management (1). The commonly affected spaces are the sublingual, submental and submandibular spaces; however, it is difficult to give an exact localization of the origin of the infection by clinical examination alone, due to the depth of the neck tissues (2). A proper diagnosis and localization by means of diagnostic imaging can determine timely management and avoid complications such as mediastinitis, necrotizing fasciitis of the neck and thorax, carotid artery rupture and jugular vein thrombosis (2, 3). Odontogenic infections in adults and respiratory tract infections in pediatric patients are common triggers. Ludwig's angina is characterized by rapid inflammatory progression to the floor of the mouth, with a risk of extension to the airway, and is associated with edema of the epiglottis, vocal cords and upper airway structures; it has a mortality rate of more than 50%. Mortality can be significantly reduced by timely antibiotic and surgical management (4).

Case

A 16-year-old male with a history of substance abuse and shrimp allergy. Admitted to the emergency room for a clinical picture of 15 days of evolution, consisting of persistent pain in the lower maxillary region associated with swelling, redness and local heat. He received outpatient antibiotic management with clindamycin and ciprofloxacin for suspected odontogenic infection.

Vital signs stable, no respiratory distress, adequate saturation, limitation of mouth opening due to pain, edema in the left submaxillary region, erythema and heat extending from zone II of the neck towards zone I, no areas of turgor or active secretion, no pain with neck mobilization, trachea centered, no alterations in vocal capacity and no alterations in cardiopulmonary auscultation.

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Paraclinical findings on admission, hemogram: leukocytes of 16,460 mm3 with a neutrophilic predominance of 70%; hemoglobin 15.3, and hematocrit of 46.1%; thrombocytosis of 683,000 mm3; elevated C-reactive protein, and no electrolyte or renal function alterations. Imaging studies included computed axial tomography (CT) of the neck with contrast medium (Figures 1 and 2).

Due to the social context, a high risk of infectious progression and possible airway compromise, it was decided to give multidisciplinary management in the pediatric intensive care unit.

Early antibiotic therapy was started with piperacillin tazobactam + metronidazole and clindamycin after taking cultures. Drainage, lavage, placement of drain and removal of tooth # 36, due to contamination, were performed.

The postoperative follow-up of the drainage of the infectious focus showed improvement of the initial symptoms, cardiovascular stability and control of the systemic inflammatory response. The culture report showed E. coli, so clindamycin treatment was suspended. Other antibiotics were continued until the results of the antibiogram, which showed no resistance patterns, so the antimicrobial management was redirected to ampicillin sulbactam. Finally, outpatient management was decided for 15 days with oral ciprofloxacin + clindamycin.

Discussion

Ludwig's angina is a necrotizing cellulitis type complication of the floor of the mouth, with a high risk of involvement of the upper airway. Odontogenic infections are responsible for most cases, but it can also be caused by sialoadenitis, sialolithiasis of the submandibular glands, peritonsillar abscess, mandibular fracture, mandibular osteomyelitis, penetrating trauma to the floor of the mouth and tongue perforation. There are multiple risk factors among which poor oral hygiene, diabetes, malnutrition, obesity and alcoholism stand out (5 ,6). The etiology is polymicrobial and includes gram-positive, gram-negative and anaerobic bacteria. Involvement by *Streptococcus viridans*, *Staphylococcus aureus*, *Neisseria* species, *Haemophilu*s species, *Bacteroides* species, non-A streptococci and *Streptococcus pyogenes*, among others, has been described (6).

Classically, it presents with trismus, dysphagia, odynophagia, submandibular inflammatory changes, voice attenuation, tongue elevation and retraction (7). It can extend to the sublingual and submandibular spaces and cause airway compression and dissemination to the mediastinum via the parapharynx and/or retropharynx. Therefore, timely identification by means of diagnostic imaging, such as CT with neck contrast medium, which, although less sensitive than magnetic resonance imaging (MRI), is more timely in the emergency setting, taking into account that airway obstruction is the main cause of mortality, is peremptory. The next steps include infection control with broad-spectrum intravenous antibiotics, surgical drainage, use of intravenous corticosteroids and nebulized adrenaline (5, 7, 8).

In this case, it is a male adolescent patient with no known medical history, but with risk factors given by poor oral hygiene, psychoactive substance use and low socioeconomic status (9). The clinical picture was initially considered as a skin infection, but the findings of the neck CT studies were crucial to characterize the odontogenic origin of the infectious focus, evaluate the extension, rule out airway involvement and plan the surgical intervention (10).



Figure 1. CT of the neck with contrast medium in soft tissue window. a) In the axial plane: low density lesion, well defined contours, located in the left masticatory space, without enhancement in its periphery, which generates dorsal displacement of the content of the parapharyngeal and carotid spaces and right lateral displacement of the mucosal-pharyngeal space. b) In the coronal plane: extension of a low density multiseptate lesion with linear enhancement of its walls and septa, in the left masticatory space to the submandibular (bilateral) and right sublingual spaces, configuring a multiseptate abscess in early phase with a phlegmonous component in its cephalic and deep portion. c) In the sagittal plane: lesion in the submandibular space, without laryngeal, oropharyngeal or hypopharyngeal involvement.

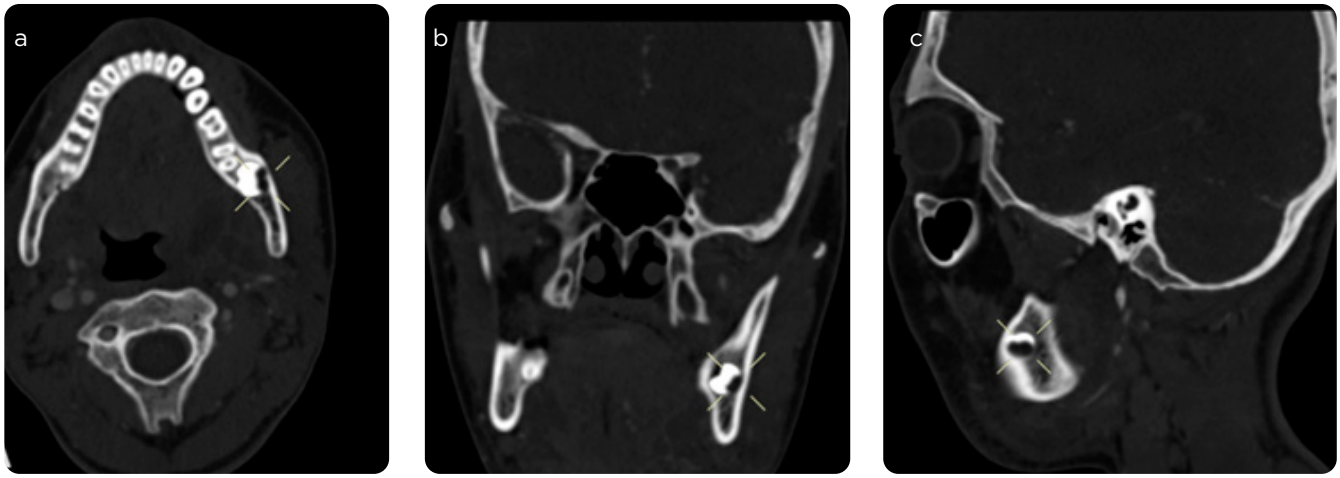


Figure 2. CT of the neck bone window. The cursor indicates the odontogenic focus origin of the infection.

Conclusion

Ludwig's angina is a rare, rapidly progressive and potentially life-threatening type of bacterial cellulitis due to airway compromise that emergency physicians should consider. Timely diagnostic suspicion through evaluation of risk factors, mainly associated with oral hygiene and immune compromising states, is paramount in the diagnostic exercise. Imaging studies are essential, since they allow characterizing the infectious focus, its extension and planning the surgical approach in emergency situations. Timely multidisciplinary management by radiology, anesthesiology, otolaryngology and maxillofacial surgery is crucial to provide the best possible outcome and ensure patient safety. In addition, a comprehensive approach is recommended, including measures to improve oral hygiene and strengthen the immune system, such as regular dental care and a healthy diet.

References

1. Hansen BW, Ryndin S, Mullen KM. Infections of deep neck spaces. Semin Ultrasound CT MRI. 2020;41(1):74-84.
2. Esposito S, De Guido C, Pappalardo M, Laudisio S, Meccariello G, Capoferri G, et al. Retropharyngeal, parapharyngeal and peritonsillar abscesses. Children. 2022;9(5):618.
3. Bridwell R, Gottlieb M, Koyfman A, Long B. Diagnosis and management of Ludwig's angina: An evidence-based review. Am J Emerg Med. 2021;41:1-5.
4. Saifeldeen K. Ludwig's angina. Emerg Med J. 2004;21(2):242-3.
5. Gunawan F, Ferriastuti W. Ludwig's angina: An alarming radiology challenge. Radiol Case Rep. 2022;17(9):3103-6.
6. Romero J, Elkattaway S, Romero A, Latif A, Al-Fiky E, Al-Nasseri A, et al. Ludwig's angina. Eur J Case Rep Intern Med. 2022;10.
7. An J, Madeo J, Singhal M. Ludwig angina. En: Stat Pearls [internet]. Treasure Island (FL): Stat Pearls Publishing; 2023 [citado: 2023 nov. 14]. Disponible en: http://www.ncbi.nlm.nih.gov/books/NBK482354/
8. Tami A, Othman S, Sudhakar A, McKinnon BJ. Ludwig's angina and steroid use: A narrative review. Am J Otolaryngol. 2020;41(3):102411.
9. Jain A, Singh I, Meher R, Raj A, Rajpurohit P, Prasad P. Deep neck space abscesses in children below 5 years of age and their complications. Int J Pediatr Otorhinolaryngol. 2018;109:40-3.
10. Oczkowski S, Alshamsi F, Belley-Cote E, Centofanti JE, Hylander Møller M, Nunnaly ME, et al. Surviving Sepsis Campaign Guidelines 2021: highlights for the practicing clinician. Pol Arch Intern Med [Internet]. 6 de julio de 2022 [citado: 2023 nov. 14]. Disponible en: https://www.mp.pl/paim/issue/article/16290

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