

## CASE REPORT

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# Ludwig's angina during pregnancy. Case report

## Angina de Ludwig durante el embarazo. Reporte de caso

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### ABSTRACT

Physiological, hormonal and immune changes caused by pregnancy may predispose to increased risk of infectious complications, especially in odontogenic infections. Ludwig's angina is a rapidly progressive infectious complication affecting the floor of the oral cavity, usually secondary to abscesses of mandibular second and third molars that subsequently spreads to the submandibular, sublingual and submental spaces. If not treated quickly and adequately it can have fatal consequences, such as upper airway obstruction and sepsis. Its occurrence during pregnancy is associated with an increased risk of severe perinatal morbidity, in most cases secondary to tissue hypoxia. Treatment consists of the administration of broad-spectrum antibiotics and, in some cases, surgical decompression of the affected areas. But it is necessary to consider the potential adverse fetal effects of management. It is essential to reinforce the importance of good oral health of the pregnant woman to avoid this complication. A case of Ludwig's angina during pregnancy is presented.

**Key words:** Ludwig's angina, Preventive dentistry, Pregnancy complications, odontogenic infection, Case management.

### RESUMEN

Los cambios fisiológicos, hormonales e inmunes causados por el embarazo pueden predisponer a mayor riesgo de complicaciones infecciosas, en especial en infecciones odontogénicas. La angina de Ludwig es una complicación infecciosa rápidamente progresiva que afecta al suelo de la cavidad bucal, generalmente secundaria a abscesos de segundos y terceros molares mandibulares que posteriormente se extiende a los espacios submandibular, sublingual y submentoniano. Si no es tratada rápida y adecuadamente puede tener consecuencias mortales, como obstrucción de las vías aéreas altas y sepsis. Su aparición durante el embarazo está asociada a mayor riesgo de morbilidad perinatal severa, en la mayoría de los casos secundaria a hipoxia tisular. El tratamiento es la administración de antibióticos de amplio espectro y, en algunos casos, descompresión quirúrgica de las zonas afectadas. Pero es necesario considerar los potenciales efectos adversos fetales del manejo. Es fundamental reforzar la importancia de la buena salud bucodental de la embarazada para evitar esta complicación. Se presenta un caso de angina de Ludwig durante el embarazo.

**Palabras clave.** Angina de Ludwig, Odontología preventiva, Complicaciones del embarazo, infección odontogénica, Manejo de caso.

### INTRODUCTION

Ludwig's angina is a severe cellulitis with rapid spread, then developing into fasciitis and finally into a true abscess with gangrenous induration of the connective tissues of the neck. The infection spreads through the posterior border of the mylohyoid muscle to the submaxillary, sublingual and submental spaces, which together form the submandibular space<sup>(1-3)</sup>. It can cause airway obstruction and be fatal if not treated immediately and promptly.

The etiology of Ludwig's angina in most cases is associated with preceding odontogenic infection of one or more infected and decayed teeth. Other possible etiological factors are sialoadenitis, compound mandibular fractures or puncture wounds of the floor of the mouth<sup>(1)</sup>. Pregnancy is associated with hormonal and physiological changes that favor a higher incidence of poor oral hygiene and an increase in the frequency of dental caries and secondary infections<sup>(2,4)</sup>. There are few publications on this condition in pregnant women. A case of Ludwig's angina during pregnancy is presented.

## CASE REPORT

The patient is 21 years old, primigravida, 27 weeks pregnant, who came to the emergency room for presenting increased volume and pain in the mandibular region, of moderate to severe intensity, accompanied by pain on chewing, dysphagia, fever and chills of approximately 5 days of evolution. She reported a history of untreated dental caries diagnosed 4 months before. The patient denied any important personal, medical or family history.

On physical examination the patient was in regular general condition, slightly dehydrated and oriented in all three spheres. Vital signs were body temperature of 38.5°C, heart rate of 120 beats x minute, blood pressure of 135 / 70 mmHg, respiratory rate of 18 breaths x minute and oxygen saturation of 97% in room air. Examination showed marked soft tissue enlargement of the internal and external soft tissues of the mandibular region, which extended bilaterally to the neck, with evidence of inflammatory erythema extending to the level of the hyoid bone (Figure 1). In addition, trismus was observed with mouth opening of 16 millimeters. The rest of the physical examination was within normal limits. The gynecological examination showed unchanged cervix and no evidence of genital bleeding. The obstetric evaluation revealed a single fetus in cephalic presentation with a fetal heart rate of 140 beats per minute, active fetal movements and biometry compatible with gestational age.

In view of the findings of submaxillary abscess, an evaluation was requested by the dentistry, otolaryngology and maxillofacial surgery ser-

FIGURE 1. INCREASED VOLUME OF THE SOFT TISSUES OF THE MANDIBULAR REGION WITH EXTENSION TO THE CERVICAL SOFT TISSUE.



vices. In the clinical discussion, a neck computed tomography was recommended, which showed a marked increase in the thickness of the skin and subcutaneous cellular tissue in the jaw area, with poorly defined hypointense tumors, heterogeneous in the antero-superior region, affecting both mylohyoid muscles and compatible with Ludwig's angina (Figure 2). Laboratory tests showed the following values: leukocyte count 17.800 x mL, neutrophils 91%, hemoglobin 9.1 g/dL and hematocrit 28.6%. Glycemia levels were 87 mg/dL. The values of liver and renal function tests, pH and gases, electrolyte concentrations, urine test and coagulation profile were within normal limits.

Based on clinical and laboratory findings, empirical broad-spectrum antibiotic therapy was started (amoxicillin + clavulanic acid 1.2 grams intravenously three times a day, metronidazole 500 mg intravenously three times a day and gentamicin 240 mg intramuscular single dose). At 72 hours after admission, the patient underwent submental and submandibular decompression under general anesthesia. A submental incision was made by continuous blunt dissection through the mylohyoid muscle to the sublingual region to access the abscessed area. In addition, the deeply decayed and partially impacted first and second lower right molar were extracted, which were considered the primary source of infection due to the outflow of purulent fluid through the extraction socket. Approximately

FIGURE 2. COMPUTED TOMOGRAPHY IMAGES. THE ARROWS SHOW THE AREA AFFECTED BY LUDWIG'S ANGINA.





150 mL of purulent fluid was obtained during the procedure. Multiple Penrose drains were placed to maintain drainage of purulent material and to facilitate patency and irrigation of all incision sites. These drains were removed when deemed nonfunctional and the incision sites were closed in layers.

The culture of the secretion showed polymicrobial infection with negative blood cultures. The patient continued with antibiotic therapy until postoperative day 7, when she was discharged with outpatient follow-up. No complications were observed postoperatively or during the remainder of the pregnancy and delivery.

## DISCUSSION

Ludwig's angina is a rapidly progressive gangrenous cellulitis that has been described as a rare complication of untreated periodontal disease. It was first described in 1836 as a gangrenous cellulitis of the soft tissues of the floor of the mouth (submandibular and sublingual spaces) and neck<sup>(5)</sup>. It usually appears in patients with poor oral hygiene (75-95% of cases) due to aerobic and anaerobic bacteria (in more than 50% of cases the infections are polymicrobial) of the normal oral flora. To date, there are about 25 described cases of this complication during pregnancy<sup>(5,6)</sup>.

During gestation there are both local changes in the mouth and physiological, hormonal and immune modifications that can put women at greater risk of infections of any type and origin<sup>(7-10)</sup>. The anatomy of the floor of the mouth also plays an important role in the development and spread of infectious processes. Soft tissue infections of ontogenic origin tend to spread along planes of lower resistance, from the supporting structures of the affected teeth to various nearby spaces, even perforating bone tissue and extending to deep aponeurotic spaces<sup>(8-10)</sup>.

The decrease in the immune response, in some cases, allows a more rapid progression of infections, since there are alterations in cellular immunity, neutrophil chemotaxis and natural killer cell activity<sup>(7)</sup>. Hormonal changes affect the gingival tissues, which are more sensitive and susceptible to irritation and inflammation. Dental plaque can accumulate on the teeth and become hard deposits with large numbers of bacteria

that constantly produce local infections<sup>(2)</sup>. All these changes lead to the development of an exaggerated local inflammatory response, which can lead to erythematous and edematous inflammation of the gums. Approximately 70% of pregnant women present this type of condition, even in those with routine oral care<sup>(8)</sup>.

Ludwig's angina usually begins as a periapical tooth abscess of the mandibular second or third molar, whose roots extend below the insertion of the mylohyoid muscle. Thus, infection of either of these teeth can penetrate the thin bony cortex of the mandible and affect the posterior margin of the muscle and reach the submandibular space. The deep cervical fascia and the hyoid bone limit the expansion of tissue edema, resulting in both the floor of the mouth and the base of the tongue being displaced upward and backward, resulting in potential compromise of the airway<sup>(9)</sup>. The infectious process may extend into the mediastinum and/or carotid sheath resulting in severe thoracic infections. If the condition is not treated in a timely manner, mortality is close to 100%, both for acute sepsis and airway obstruction<sup>(10)</sup>.

The diagnosis of Ludwig's angina is eminently clinical. Several diagnostic criteria have been proposed for the diagnosis, such as: inflammatory process with gangrenous, serosanguinous and fetid infiltration, with scarce purulent secretion, affecting connective tissue, fasciae, muscles and, rarely, glandular structures, and whose regional extension is by continuity<sup>(5)</sup>. Other manifestations that may accompany the clinical picture include dysphagia, bilateral enlargement of the cervical region, dysphonia, elevation and swelling of the tongue, jaw pain, decreased neck movements and stridor, which may suggest imminent airway obstruction<sup>(11)</sup>.

The treatment of this complication should consider both the physiological changes of pregnancy and the perinatal effects of the treatment<sup>(4,9)</sup>. Broad-spectrum antibiotic therapy has allowed timely treatment of most oral infections, preventing them from progressing to Ludwig's angina. The mortality rate has decreased from 50% to 5%<sup>(5)</sup>. Surgical decompression is indicated in cases with large abscesses or abscesses that do not respond to antibiotic therapy. Possible surgical approaches include surgical removal of the source of infection (extraction of the decayed



tooth), wide surgical incision and drainage of the affected area with airway protection<sup>(11)</sup>.

Pregnant women with maxillofacial infections need special attention. Oral infectious processes can lead to increased concentrations of proinflammatory cytokines, which cause obstetric complications such as preterm delivery, premature rupture of membranes and low birth weight<sup>(12,13)</sup>. All these complications are associated with decreased systemic tissue oxygenation affecting the feto-placental unit<sup>(9,14)</sup>. Therefore, the goals of treatment of Ludwig's angina during pregnancy are to avoid the use of teratogenic drugs, to limit hypoxia and intrauterine fetal acidosis, and to prevent termination of pregnancy in any trimester<sup>(15)</sup>.

Preventive oral care, together with timely treatment of periodontal disease during pregnancy, decreases the frequency of serious obstetric and perinatal complications associated with dental infections<sup>(14)</sup>. If any oral/maxillofacial problems are identified during pregnancy, dental care needs to be planned to control active disease or limit potential complications. Dental treatments such as routine cleanings, crowns, tooth extractions, gum treatment, and continuation of any orthodontic treatment can be performed during pregnancy, preferably during the second trimester. Although dental anesthetics can cross the feto-placental barrier, they generally do not reach high enough blood concentrations, as they are used locally and in small doses during routine dental procedures<sup>(7)</sup>. Obstetricians and dentists should work together to advise on the importance of maintaining optimal oral health care during pregnancy.

In conclusion, Ludwig's angina is a life-threatening infectious complication causing airway occlusion due to inflammation of the submandibular, sublingual and submental spaces. Treatment during pregnancy is based on empirical broad-spectrum antibiotic therapy and surgical decompression. Specific and timely treatment is essential to avoid obstetric and perinatal complications. Pregnant women should be advised on the oral health measures necessary to avoid this condition.

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