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CLINICAL INFORMATION

Airway management in Ludwig's angina – a challenge: case report



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Abstract

Background: Ludwig's angina (LA) is an infection of the submandibular space, first described by Wilhelm Frederick von Ludwig in 1836. It represents an entity difficult to manage due to the rapid progression and difficulty in maintaining airway patency, a major challenge in medical practice, resulting in asphyxia and death in 8–10% of patients.

Objective: Describe a case of a patient with Ludwig's angina undergoing surgery, with emphasis on airway management, in addition to reviewing the articles published in the literature on this topic.

Case report: Male patient, 21 years, drug addict, admitted by the emergency department and diagnosed with LA. Difficult airway was identified during the anesthetic examination. In additional tests, significant deviation from the tracheal axis was seen. Undergoing bilateral thoracoscopic pleural drainage, we opted for airway management through tracheal intubation using fiberoptic bronchoscopy, and balanced general anesthesia was proposed. There were no complications during the surgical-anesthetic act. After the procedure, the patient remained intubated and mechanically ventilated in the intensive care unit.

Conclusions: Airway management in patients with Ludwig's angina remains challenging. The choice of the safest technique should be based on clinical signs, technical conditions available, and the urgent need to preserve the patient's life.

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PALAVRAS-CHAVE

Vias aéreas;
Angina de Ludwig;
Mediastinite

Manejo da via aérea na angina de Ludwig – um desafio: relato de caso**Resumo**

Justificativa: A angina de Ludwig (AL) constitui uma infecção do espaço submandibular, primeiramente descrita por Wilhelm Frederick von Ludwig em 1836. Representa uma entidade de difícil manejo devido à rápida progressão e dificuldade na manutenção da via aérea pérvia, um importante desafio na prática médica, que culmina em asfixia e morte em 8-10% dos pacientes.

Objetivo: Descrever o caso clínico de um paciente com angina de Ludwig submetido a procedimento cirúrgico, com ênfase no manejo da via aérea, além de revisar os artigos disponíveis na literatura médica a respeito desse tema.

Relato de caso: Paciente masculino, 21 anos, drogadito, admitido pelo pronto socorro e diagnosticado com AL. Na propedêutica anestésica constatou-se via aérea difícil. Nos exames complementares foi possível observar importante desvio do eixo traqueal. Submetido à toracoscopia bilateral com drenagem pleural, optou-se pelo manejo da via aérea através de intubação nasotraqueal por fibrobroncoscopia e foi proposta anestesia geral balanceada. Não houve intercorrência durante o ato cirúrgico-anestésico. Após procedimento paciente permaneceu intubado e em ventilação mecânica na Unidade de Terapia Intensiva.

Conclusões: O manejo da via aérea nos pacientes com angina de Ludwig permanece desafiador. A escolha da técnica mais segura deve ser embasada no quadro clínico, nas condições técnicas disponíveis e na necessidade premente de preservação da vida do paciente.

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Introduction

Ludwig's angina (LA) is an infection of the submandibular space, first described by Wilhelm Frederick von Ludwig in 1836.¹ The presence of dental caries, oral trauma, immunosuppression, and continuous use of psychoactive substances, such as alcohol and drug abuse, are predisposing factors for the onset of this infection.² The infection progression may cause the involvement of the retropharyngeal space delimited by the deep cervical fascia, which starts at the skull base and extends to the upper mediastinum.³

It is an entity difficult to manage due to the rapid progression and difficulty in maintaining airway patency, resulting in asphyxiation and death in 8–10% of patients.⁴

The challenge of establishing a patent airway in high-risk patients motivated this case report.

Case report

Male patient, white, 21 years old, cocaine and crack user, was admitted to the emergency room with dyspnea and severe neck and jaw pain on the right, which worsened while attempting to open the mouth. Physical examination showed septic teeth, swallowing pain, chest pain, edema, hyperemia and subcutaneous emphysema in the anterior cervical region and mandibular on the right, inspiratory stridor, and respiratory effort. With fever (axillary temperature 38 °C), blood pressure 80 × 45 mmHg, HR 113 bpm, RR 25 breaths.min⁻¹, and SpO₂ 88% in room air. Computed tomography of the neck and chest showed impairment of mediastinal region in which there was an important amount of gas dissecting the muscle and fat planes, especially on

the right, and determining a significant deviation from the tracheal axis to the contralateral side. It also showed gas dissecting the posterior space of the nasopharynx and extending to the upper mediastinum. The vascular structures were preserved. After the diagnosis of Ludwig's angina, antibiotic therapy was started with ampicillin and gentamicin at recommended doses and bilateral thoracoscopy with pleural drainage was proposed.

The patient was monitored with electrocardiogram (DII and V5), pulse oximetry, and noninvasive blood pressure. Venous puncture was performed with 18G venous catheter.

Airway evaluation showed the impossibility of oro-tracheal intubation due to the patient's mouth opening difficulty (<1 cm), Mallampati score 4, and immobility of the cervical region because of pain and swelling in right mandible. We opted for nasotracheal intubation using fiberoptic bronchoscopy.

Anesthetic sedation was performed with midazolam (2 mg) associated with fentanyl (100 mcg), both by intravenous route. During the procedure, the patient received O₂ via nasal catheter (3 L.min⁻¹).

There were no complications during fiberoptic intubation. After cuff inflation and confirmation of intubation by capnography, propofol (150 mg), fentanyl (350 mcg), and rocuronium (35 mg) were infused. Controlled mechanical ventilation was started, with tidal volume of 600 mL, 12 ventilation cycles.min⁻¹, with an inhalation/exhalation ratio of 1:2 and PEEP of 5 cm H₂O. Capnography curve was maintained ranging from 35–40 mmHg.

It was used a FiO₂ of 60%, which was sufficient to establish a hemoglobin saturation in 99–100%. We opted for using the inhaled anesthetic sevoflurane in 2% concentration established with calibrated vaporizer during the intraoperative

period. After surgery, the patient remained intubated and on mechanical ventilation in the Intensive Care Unit but evolved to death by septic shock on the sixth day after surgery.

Discussion

Ludwig's angina involves the submandibular, sublingual, and submaxillary spaces, which communicate posteriorly. It affects the area below the mouth floor and involves the submental triangle and submandibular muscles limited by the deep cervical fascia. The infection progression may cause the involvement of cervical and mediastinal areas with severe airway impairment.^{1,3}

The establishment of a patent airway is the main concern and emergency tracheotomy may be required.^{5,6} Suspicion of difficult airway involvement is a recommendation for fiberoptic intubation through nasal route.^{7,8}

Orotracheal or nasotracheal intubation may be impossible due to the anatomical impairment of infection, airway trauma risk, rupture of pus into the oral cavity with bronchopulmonary aspiration, as well as the potential to induce severe laryngospasm.⁹

In this context, Spitalnic and Sucov reported the case of a patient with Ludwig's angina in which the airway management through intubation with fiberoptic laryngoscopy was unsuccessful due to the swelling and anatomy distortion. Tracheostomy was then required.³

Faced with the impossibility of fiberoptic intubation, the indication for airway management is through surgical tracheostomy, although some authors advocate cricothyroidotomy because it has fewer complications, such as emergency airway.^{8,10,12}

In this report, the mouth opening difficulty with the occurrence of lockjaw established the difficult airway situation, and the signs of airway obstruction and respiratory failure were decisive for the airway management option with fiberoptic through fiber bronchoscope. Fiberoptic bronchoscopy was performed by conscious sedation with no trachea anesthetic blockade nor larynx innervation blunt due to anatomical impairment brought by the disease.

The studies, regardless of the recommended airway approach, reinforce the importance of careful clinical evaluation of the patient with rapid decision about the airway management.

Brommelstroet et al. reported two cases of patients with necrotizing mediastinitis after Ludwig's angina, whose origin was an odontogenic infection. In both cases, tracheostomy was performed to maintain the airway due to worsening of general condition and the need for cervical and submandibular abscess drainage.¹³

In 2002, Potter retrospectively studied the medical records of 85 patients with infections in deep cervical spaces and in his conclusions he did not recommend tracheal intubation in severe cases because they present risks of unplanned extubation with difficult reintubation due to edema and the possibility of infection spreading during intubation. This author believes that a careful analysis of the patient and the availability of equipment are crucial when choosing the airway management method.¹¹

Despite the risks of tracheal intubation (TI), Kassam et al. reported a case of a patient with LA who underwent TI for dental extraction and decompression of areas affected by infection and remained intubated for 72 h after the procedure. In this study, the authors emphasize the importance of maintaining the TI for a period after the procedure to reduce swelling and consequently lower the risk of airway obstruction postoperatively.⁹ In this case, the patient remained intubated via nasotracheal during the early postoperative period in order to avoid complications related to airway control, as the difficulties remain until the disease resolution.⁹

In a retrospective analysis of 29 cases of throat abscess, Wolfe et al. showed that in 19 cases (65.5%) there was evidence of respiratory involvement and in eight of the 19 cases (42%) patients required advanced techniques for airway management. In this study, no case required surgical control and there was no mortality due to ventilation management.¹⁴

The urgency in establishing our patient's airway and the adverse conditions in the management of it did not allow the use of double lumen tube (Carlens) as preoperatively planned. The possibility of selective ventilation to mediastinal drainage was supplanted by the need for the rapid establishment of a patent and safe airway in this patient. We could have used a bronchial blocker, but the hospital did not have it at the time of service.

Other techniques such as GlideScope[®], AirTraq[®], and fiberoptic laryngoscopy allow better access to the airway and prevent the surgical management.^{14,15}

In conclusion, airway management in patients with Ludwig's angina remains challenging. Choosing the safest technique should be based on clinical signs, technical conditions available, and the urgent need to preserve the patient's life.

Conflicts of interest

The authors declare no conflicts of interest.

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