
CASE REPORT

C-MAC Video Laryngoscope is Helpful in Intubation with Ludwig's Angina and Limited Mouth Opening

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Abstract

This case describes a thirty-five years-old woman, ASA I, with Ludwig's angina that evolved from an acute odontogenic infection of one week duration. She presented with bilateral submandibular swelling. CT neck showed extensive enhancing soft tissue swelling with few small fluid collections, and massive gaseous inclusion extending down to parapharyngeal area. They called an anesthesiologist for intubation, and patient was intubated easily and shifted to SICU after stabilization. In conclusion, C-Mac can be an alternative to flexible scope fiberoptic scope for intubation.

Keywords: Ludwig Angina, ETT, Limited Mouth Opening, C-AM.

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Introduction

Ludwig's angina is a diffuse cellulitis of the submandibular, sublingual, and submental space, characterized by its propensity to spread rapidly to the surrounding tissues¹.

Ludwig's angina is a potentially lethal infection with a mortality of 8%. Early recognition and treatment of such disease are of paramount importance due to the myriad of complications that can occur, such as airway obstruction, carotid arterial rupture or sheath abscess, thrombophlebitis of the internal jugular vein, mediastinitis, empyema, necrotizing fasciitis, pericardial effusion, osteomyelitis, subphrenic abscess, aspiration pneumonia, and pleural effusion.²⁻⁴

It is usually evolved from odontogenic infections, a penetrating injury in the floor of the mouth, osteomyelitis or fracture of the jaw, otitis media, tongue piercing, sialadenitis, or sialolithiasis of the submandibular glands. Usually streptococcal and staphylococcal bacteria are the most common causative bacteria, especially streptococcus viridians, staphylococcus epidermidis, and staphylococcus aureus.¹⁰

We are reporting a case of airway management in a patient with Ludwig's angina.

Case Report

This case describes a 35-year-old woman, ASAI, with Ludwig's angina that evolved from an acute odontogenic infection of one week duration, for which she was advised to take antibiotic treatment, but she neglected. She presented to our center with perioral swelling with the involvement of bilateral submandibular and sublingual areas measuring 10cm x 5cm, accompanied by excruciating pain, fever 39 °C, pulse rate 100 b/m, loss of appetite, mild hypotension upon admission (100/60 mmHg). At that time the patient was still oriented, able to talk with drooling of saliva, and with a mouth opening of about 1 to 2 fingers.

CT of neck shows extensive enhancing soft tissue swelling with few small fluid collections, and massive gaseous inclusion (soft tissue emphysema) of the deep fascia starting at the level of the nasopharynx extending down to parapharyngeal area both masticator spaces more on the left side of the floor of the mouth and anterior to hyoid bone on the left side, keeping with necrotizing

fasciitis, but no evidence of mediastinal extension. Moreover, there was bilateral cervical lymphadenopathy with intact osseous structures.

The patient was kept for 6 hours under observation to complete her fasting hours before transferring to the operative theater for abscess drainage by the maxillofacial team. Unfortunately, her general condition started to get worsen with unstable vital signs and she started to develop, chills, fever, sweating generalized body weakness, with inability to open her mouth more than one finger.

At this moment a decision for ICU admission was made for early intubation and maintenance of patient airway since the oropharyngeal edema was aggressively increasing causing progressive narrowing of the mouth opening. Her bad general condition was described to be early sepsis (WBCs: 10.5), fever (body temperature 42°C), and sever tachypnea (respiratory rate 35 br/min) , hypotension (systolic bp 99 mmHg, diastolic bp 60 mmHg), and tachycardia (pulse rate 120 -130 b/min).

The intubation was planned to use Cmac videolaryngoscope grade 4, an endotracheal tube size 7, and a bougie. The tube position was confirmed by video

laryngoscopy, ETCO₂ and auscultation. Anesthetic drugs were, ketamine 1-2 mg/kg total given 100 mg, and propofol 50 mg. On the other hand, the choice for the use of muscle relaxant was delayed after placing the endotracheal tube as this was done in a semi-siting position.

Just after intubation patient had bronchial spasm and wheezing and back-to-back salbutamol was given and rocuronium 50 mg was added to keep the patient relaxed on the ventilator using, the following setting APV CMT VT 420 ML, RR 24 B/M PEEP 5, FiO₂ 40/% I: E 1:2.5. Fentanyl infusion was given for sedation at a rate of 1 mcq /kg/h.

The plan at that time was to start clindamycin 600 mg/8h and chlorhexidine mouth wash 15 ml/ 6h for infection in parallelwith vigorous hydration, and patient assessment every 4 -6 h, and targeting an SPO₂ >92%.

Patient underwent incision and drainage together with removal of infectedteeth under general anesthesia onthe second day of ICU admission with evacuation of significant pus. Three days later re-exploration of the left side of the neck and parapharyngeal spaces for reassessment of any remaining or new collection was negative.

According to the culture and sensitivity streptococcus anginosus was observed for which patient received ampicillin/sulbactam IV/ 6h, chlorhexidine mouth wash 15 ml/6h, in addition to fentanyl transdermal 2.5mcg/h (4.2 mg) patch for pain, alternating with paracetamol 1000 mg iv/6 hr.

The plan was to keep the patient intubated for 7 days, as the ICU team was very concerned about premature extubation and facing the same difficulty or exposing the patient to the risk of reintubation. Extubation trial was successfully done on the third postoperative day of surgery, and post-extubation with pulse rate 70-75 b/m, respiratory rate 18br/m, blood pressure systolic bp 120 mmHg, diastolic bp 70 mmHg, no fever (T:36.8 °C), and SPO2 100% on room air.

The patient started to open her mouth, communicate, and was able to tolerate solid diet orally, and was discharged from the ICU to the ward after being admitted for 8 days.

Discussion

Ludwig's angina is a diffuse cellulitis of the submandibular, sublingual, and submental space, characterized by its propensity to spread rapidly to the surrounding tissues.¹ Early recognition and treatment for

Ludwig's angina are of paramount importance due to the myriad of complications that can occur in association with Ludwig's angina. Possible complications of Ludwig's angina are airway obstruction, carotid arterial rupture or sheath abscess, thrombophlebitis of the internal jugular vein, mediastinitis, empyema, necrotizing fasciitis, pericardial effusion, osteomyelitis, subphrenic abscess, aspiration pneumonia, and pleural effusion.²⁻⁴

The risk for developing Ludwig's angina increases with any of the following conditions such as jawbone fracture, tongue piercing, jawbone infection, mouth injury, tonsil abscess, salivary gland infection, thyroglossal cyst.

The symptoms include pain or tenderness in the floor of the mouth with tongue swelling that causes the tongue to push against the hard palate resulting in difficulty swallowing, drooling, and problems with speech. Also, painful swelling, redness of the neck, together with generalized weakness fatigue, fever up to chills, and confusion may result in sever neglected cases.

Diagnosis can be done by physical examination of the neck, jaw, lymph nodes, the inside of the mouth, chest, and lungs. In most cases, the physical exam shows enough

symptoms to diagnose Ludwig's angina, (Fig. A). It is a serious infection that can spread rapidly. So immediate treatment to get the infection under control and ensure that the airway remains open is crucial.

The first line of treatment is to make sure that the patient is breathing properly. If the breathing pattern is partially restricted, an airway tube through the patient's mouth or nose should be applied. If breathing is severely restricted, tracheostomy procedure must be performed as a life-saving maneuver to insert an endotracheal tube.¹⁰

Three options for intubating our patient were considered. The first option consisted of using awake fiberoptic intubation. However, the patient's nasal opening was too small to insert a 6.5 or 6 ID endotracheal tube. In addition, the patient was very agitated and not cooperative. The second option consisted of awake submental intubation or surgical tracheostomy. However, the patient refused this option for fear of procedure and its side effects. The third option consisted of an attempt to use the C-MAC videoscope with a back-up plan of performing a surgical tracheostomy in case of failure.

Intubation was done in a semi-sitting position using C mac blade 4 for superior vision, with the use of a bougie over which a normal cuffed endotracheal tube size 7, was pushed and fixed at 22 cm at the mouth angle. Ketamine 1-2 mg/kg and propofol (50 mg) were given before intubation.

The use of muscle relaxant was delayed until after making sure of adequate tracheal opening under vision to facilitate placing the endotracheal tube.

Ludwig's angina is a serious infection that can spread rapidly causing lot of fluid buildup in the neck and jaw area; so, it's important to drain this fluid to relief the pressure on the patient's airway and ensure its patency. Streptococcal and staphylococcal bacteria are the most common types of bacteria that lead to Ludwig's angina, especially *Streptococcus viridians*, *Staphylococcus epidermis*, and *Staphylococcus aureus*.

Broad spectrum intravenous (IV) antibiotics are usually prescribed immediately for treatment of causative bacteria in the mouth.

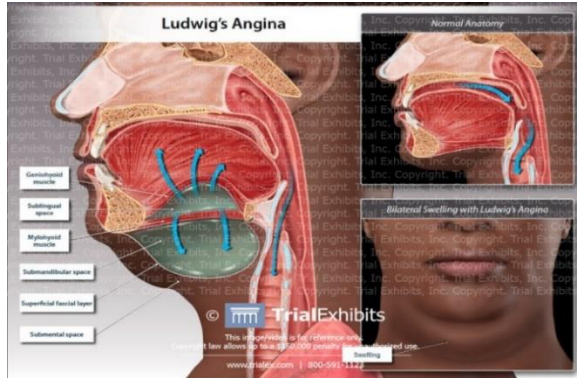


Figure A. Ludwig's angina space

Diagnosis is made by blood and salivary culture as well as by computed tomography (CT) or magnetic resonance imaging (MRI) scan using contrast dye. These procedures scan patient's mouth, neck, and jaw to look for swelling, gas, pus, or inflammation, (Fig. B and Fig. C).

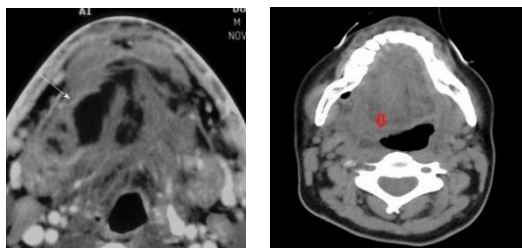


Figure B. CT axial view

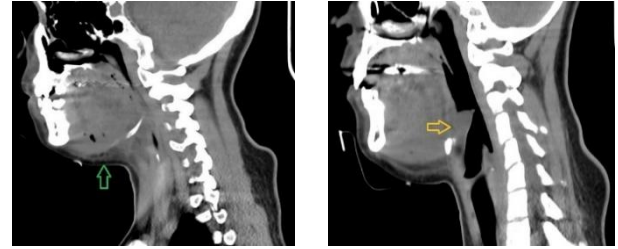


Figure C. CT sagittal view

Conclusion

This case describes the successful airway management of Ludwig's angina, a potentially lethal clinical condition. Early recognition and aggressive treatment can help in preventing complications in Ludwig's angina. Timing for usage of muscle relaxant is crucial. Early preparation for difficult intubation along with readiness for additional plan (surgical tracheostomy) are essential.

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Conflict of interest

The authors declare no competing interests.

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