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FROM ROUTINE TO RUIN: AN ASTONISHING COMPUTED TOMOGRAPHY SCAN REVEALS CATASTROPHIC LUDWIG'S ANGINA AND NECROTIZING MEDIASTINITIS AFTER A SIMPLE DENTAL PROCEDURE

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ABSTRACT

Ludwig's angina is a rare, life-threatening cellulitis of the submandibular space, if unchecked, can rapidly progress to severe complications such as necrotizing mediastinitis, a condition with significant morbidity and mortality. We report the case of a 32-year-old male who developed this rare complication following wisdom tooth extraction. The patient presented with throat swelling and hematemesis, and contrast-enhanced computed tomography (CT) imaging had a decisive role in capturing the full extent of the infection, revealing severe airway narrowing, mediastinal free air, and a suspected superior vena cava thrombus. These imaging findings shaped critical clinical decisions, leading to urgent surgical drainage performed jointly by thoracic and ear, nose and throat teams along with aggressive therapy. CT not only guided treatment but also provided a roadmap for tracking disease resolution and detecting complications. Despite severe systemic involvement, including sepsis and hypotension, the patient responded well to a targeted antimicrobial regimen and supportive care. This case highlights the importance of multidisplinary work in such extensive cases, and emphasizes how radiology is more than a diagnostic tool and is an active force in shaping the management and outcome of complex infections, allowing for precise intervention before irreversible complications arise.

KEYWORDS

Ludwig's angina, necrotizing mediastinitis, odontogenic infection, computed tomography, CT

LEARNING POINTS

- Ludwig's angina can rapidly progress to necrotizing mediastinitis, even after a routine dental procedure, making early recognition and timely intervention critical.
- Computed tomography is essential in assessing the extent of infection, identifying airway compromise and mediastinal involvement, which directly influence management decisions.
- A multidisciplinary approach, including early surgical intervention and aggressive antibiotic therapy, is crucial for optimizing outcomes in complex infections like necrotizing mediastinitis.

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INTRODUCTION

Ludwig's angina is a serious, potentially life-threatening cellulitis affecting the bilateral submandibular and sublingual spaces and can often result in rapid airway obstruction. It typically arises from odontogenic infections and involves a mix of aerobic and anaerobic bacteria[1]. When Ludwig's angina advances to necrotizing mediastinitis, negative intrathoracic pressure facilitates bacterial spread along fascial planes, significantly increasing morbidity and mortality[1]. In the past, the prognosis for this infection was poor, but advancements in early detection and treatment have led to improved patient outcomes. Computed tomography (CT) has become an essential tool for its prompt diagnosis allowing for early intervention and more effective management. CT imaging plays a crucial role in identifying the extent of infection, guiding surgical decisions, and improving survival rates[2]. This case-report presents a 32 year old male with no significant medical history who developed severe Ludwig's angina and necrotizing mediastinitis following a dental extraction.

CASE DESCRIPTION

A 32-year-old male with no prior medical history presented to the emergency department (ED) with progressive throat swelling and hematemesis 3 days after wisdom tooth removal. He had initially been prescribed antibiotics by his dentist, but his symptoms worsened, prompting his ED visit. On arrival he was hemodynamically stable. Laboratory results showed leukocytosis (white blood cell count 18.8 $\times 10^9$/l) and a lactate level of 1.7 mmol/l. CT scan revealed significant laryngeal airway narrowing, superior vena cava thrombus, and extensive free air in the neck extending into mediastinum, consistent with Ludwig's angina and necrotizing mediastinitis. The patient was started on dexamethasone and broad-spectrum antibiotics. Given the severity of his condition urgent surgical drainage was performed by thoracic and ear, nose and throat (ENT) teams. The patient was nasally intubated and admitted to the intensive care unit (ICU) for further management. He developed sepsis with severe hypotension and recurrent fever spikes, treated with norepinephrine, piperacillin-tazobactam, vancomycin, clindamycin, and fluconazole. Blood cultures identified *Streptococcus constellatus* and *Prevotella*. The patient experienced additional complications, including pulmonary and pericardial effusion, which required bilateral chest tube placement and pericardial window procedure. The patient gradually improved and was extubated and transitioned to close monitoring. However, he later developed a neck hematoma, necessitating surgical drainage and the placement of a Jackson-Pratt drain. Following continued improvement and negative follow-up blood cultures, he was discharged on oral antibiotics.

DISCUSSION

This case report describes a 32-year-old male who developed severe complications following wisdom tooth extraction, emphasizing the importance of early recognition and management of post-extraction infections and their potential sequelae. The patient's presentation of throat swelling and hematemesis, in the context of a recent dental procedure, were suggestive of a serious infectious process, ultimately diagnosed as Ludwig's angina complicated by necrotizing mediastinitis.

Ludwig's angina is a rapidly progressive infection of the submandibular space that can rapidly extend to the cervical and mediastinal spaces, leading to airway compromise and systemic infection if untreated. It is often associated with dental infections and can cause significant airway compromise due to progressive swelling of the submandibular and sublingual spaces[1,3]. In this case, the CT imaging was instrumental revealing severe narrowing of the laryngeal airway and extensive free air in the neck extending to the mediastinum *(Fig. 1)*. These findings were consistent with Ludwig's angina complicated by necrotizing mediastinitis and provided critical information for determining the treatment strategy and guiding a multidisciplinary approach. Necrotizing mediastinitis, associated with a mortality rate of up to 50%, remains a critical condition despite advancements in antibiotics, imaging, and surgical techniques that have reduced mortality to an estimated 20–40%[4]. Despite these

Figure 1. A computed tomography scan of the neck showing air throughout the ventral neck, and fluid and air collections extend into the mediastinum, indicating mediastinitis.

improvements, it still remains challenging to manage, and contemporary data on outcomes are limited. CT imaging is an indispensable tool for diagnosing mediastinitis, offering high accuracy in detecting hallmark features such as airway compromise and mediastinal involvement[5]. For patients presenting with oropharyngeal or odontogenic infections, contrast-enhanced CT scan of the neck and chest is essential for assessing the infection's spread. Furthermore, serial CT imaging plays a pivotal role in monitoring treatment progress and ensuring infection control measures are effective. In this case, early and follow-up CT imaging facilitated timely surgical drainage and intensive care, enabling a favorable outcome in an otherwise critical condition.

The management of Ludwig's angina and necrotizing mediastinitis requires a integrative approach. Airway stabilization was the first priority, requiring nasotracheal intubation and ICU admission for close monitoring and supportive care. To control the infection and prevent further spread, the patient underwent urgent incision and drainage performed by thoracic and ENT surgical teams[1,6]. This step was crucial in controlling the infection and mitigating further complications.

Ludwig's angina and necrotizing mediastinitis are typically polymicrobial, with common causative organisms including *Streptococcus* species, anaerobes such as *Bacteroides* and *Prevotella*, and, in some cases, Gram-negative rods[1]. Blood cultures from this case confirmed *Streptococcus constellatus* and *Prevotella*, both commonly implicated in deep neck infections and mediastinitis[7]. Due to the aggressive nature of the infection, the patient was started on broad-spectrum antibiotics, including piperacillin-tazobactam, vancomycin, clindamycin, and fluconazole, providing coverage for aerobic, anaerobic, and potential fungal pathogens.

The patient's clinical course was further complicated by sepsis, hypotension, and recurrent fever spikes, requiring vasopressor support with norepinephrine and intensive care. Additionally, pulmonary and pericardial effusions developed, likely resulting from systemic inflammation and direct infectious spread, necessitating bilateral chest tube placement and a pericardial window procedure to prevent futher hemodynamic instability. These complications highlight the need for close monitoring and aggressive intervention when Ludwig's angina extends beyond its initial site.

Despite gradual clinical improvement and successful extubation, the patient later developed a postoperative neck hematoma, requiring additional surgical drainage and placement of a Jackson-Pratt drain. This highlights the importance of continuous postoperative monitoring to promptly identify and manage complications that may arise even after initial infection has been controlled.

This case emphasizes the rare but serious complications of Ludwig's angina progressing to necrotizing mediastinitis following a routine dental procedure. CT imaging was instrumental in assessing the extent of infection, identifying airway compromise, extensive free air, and mediastinal involvement, thereby guiding urgent interventions. This report underscores the necessity of prompt diagnosis and aggressive treatment in managing Ludwig's angina and necrotizing mediastinitis. Early surgical intervention, appropriate antibiotic therapy, and coordinated intensive care support from a multidisciplinary team are essential for optimizing patient outcomes in such complex cases.

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