

EMERGENCY TREATMENT OF SEVERE ODONTOGENIC INFECTION EXTENDING TO THE FOUR MAXILLOFACIAL SPACES: CASE REPORT

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Abstract

Severe odontogenic infection involving multiple maxillofacial spaces can lead to complications and even life-threatening. Immediate treatment is needed, mainly to prevent airway obstruction and sepsis. This case report aims to describe and discuss the immediate treatment of a severe odontogenic infection that extends to the submandibular, submental, buccal, and parapharyngeal spaces.

Case report: A 52-year-old male patient came to the Emergency Department (IGD) Hasan Sadikin Hospital, Bandung, with complaints of swelling in the lower jaw and right neck, painful swallowing, and difficulty opening the mouth wide preceded by a history of toothache. Extraoral; facial asymmetry, right submandibular swelling, right cheek, neck, and chest, redness, warm, localized, fluctuating, and painful palpation. Intraoral; trismus generalized hyperemia of the gums, pulp necrosis of tooth 46, and impacted tooth 48. Routine blood laboratory count of leukocytes 18,280 mm³ and platelets 510,000 mm³. Neck Soft Tissue AP-Lat radiograph shows soft tissue swelling in the right submandibular with multiple air density radiolucency in it, suggesting an abscess. The patient's diagnosis was a right odontogenic submandibular abscess that extended to the right submental, buccal, parapharyngeal, and clavicle. Immediate management includes fluid regulation, administration of antibiotics, analgesics, and incision drainage.

Conclusion: In this case of severe odontogenic infection, the patient was saved by prompt treatment of a pus drainage incision to prevent the expansion of infection and airway obstruction.

Keywords: odontogenic infection, maxillofacial space, incision drainage, emergency

Introduction

Odontogenic infections are the most common infections in the orofacial area, especially in developing countries.[1,2,3,4,5] This infection originates from the teeth and their supporting tissues, such as pulp necrosis, periodontal disease, pericoronal, apical lesions, or complications of dental procedures. Odontogenic infections can extend to the maxillofacial area around 50%-89%.[6,7,8,9] Odontogenic infections often originate from periapical infections of the teeth (60.3%), followed by pericoronitis (27.4%), mandibles (95.9%), and teeth Molars (97.3%).[6] The mandibular molars, especially the third molars, were the most common cause of odontogenic infections (36.5%).[6,10]

Odontogenic infection usually spreads from the mandible or maxilla to the submandibular, sublingual, masticatory Emergency treatment needs to be done immediately in cases of severe odontogenic infection to prevent further.

primary spaces and finally extends directly to the parapharyngeal spaces.[5] Submandibular space is about 52.9%-54.6%.[2,5] Extension of infection from the primary space to the secondary space is due to the direct spread of infection through adjacent tissues.[6]

The spread of odontogenic infection to the maxillofacial space, especially the deeper spaces, can be life-threatening if not treated immediately. Cases of life-threatening odontogenic infections are often found in hospital emergency departments.[11] Assessment of the severity of infection is based on several variables, including the involvement of several maxillofacial spaces. Severe odontogenic infections involving multiple spaces can potentially lead to complications such as sepsis, necrotizing fasciitis, mediastinitis and airway obstruction.[9,12,13,14]

Appropriate treatment of severe infections should be carried out immediately, such as giving antibiotics,

analgesia, incision drainage, and hospitalization to control the progression of the disease.[1,2,3,15] Immediate treatment considerations are if the airway becomes obstructed and other considerations such as respiratory rate, oxygen saturation, systolic blood pressure, pulse, and level of consciousness. Definitive interventions to secure the airway in odontogenic submandibular infections that have extended to the neck are often challenging, even for experienced anesthesiologists, because of trismus, tongue shift, airway edema, distortion, or obstruction.[16] Risk of death may occur if the airway is not managed effectively.[2,3,11] The purpose of this case report is to describe and discuss the emergency management of a case of severe odontogenic infection that has extended to multiple maxillofacial spaces.

Case Report

A 52-year-old male patient came to the Emergency Room (IGD) Hasan Sadikin Hospital, Bandung, with complaints of swelling in the lower jaw and right neck. Since about two months earlier, the patient complained of toothache in the lower right area. The patient went to several private clinics, but the complaints were continuously repeated. Since two weeks before going to the ER, the patient complained of toothache in the right lower jaw again and difficulty opening his mouth. When he came to the ED, the patient complained of swelling and extending to the neck and right cheek. The patient went to several private hospitals for treatment, but there was not much change, and in fact, it was getting worse for the past four days. History of systemic disease was denied, neck stiffness (+), voice change (+), and pain when swallowing (+).



Figure 1: Asymmetrical face, there is swelling of the submandibular, right cheek and neck.

Examination of vital signs showed a Visual Analogue Scale (VAS) 4/10, compos mentis consciousness, blood pressure 90/70 mmHg, pulse 102x/minute, temperature 38.5 oC, respiration 26x/minute, and SpO₂ 96% in free air. Extra-oral clinical features (figure 1), asymmetrical face with right submandibular swelling, right cheek, neck, and chest measuring 8x4x3 cm, reddish, warm, localized, fluctuating, and painful to palpation. Clinical features intraoral, about 2 cm dilatation, generalized hyperemia of the gums, calculus

of all regions, and enlarged tonsils T1 size. Odontogram showed pulp necrosis of 46, medial caries of 47, and impacted tooth 48. The routine blood laboratory examinations showed an increase in the number of leukocytes to 18,280 mm³ and platelets to 510,000 mm³. Neck Soft Tissue AP-Lat radiographs showed soft tissue swelling in the right submandibular with multiple air density radiolucency, which showed a submandibular abscess and an open airway cavity (figure 2).

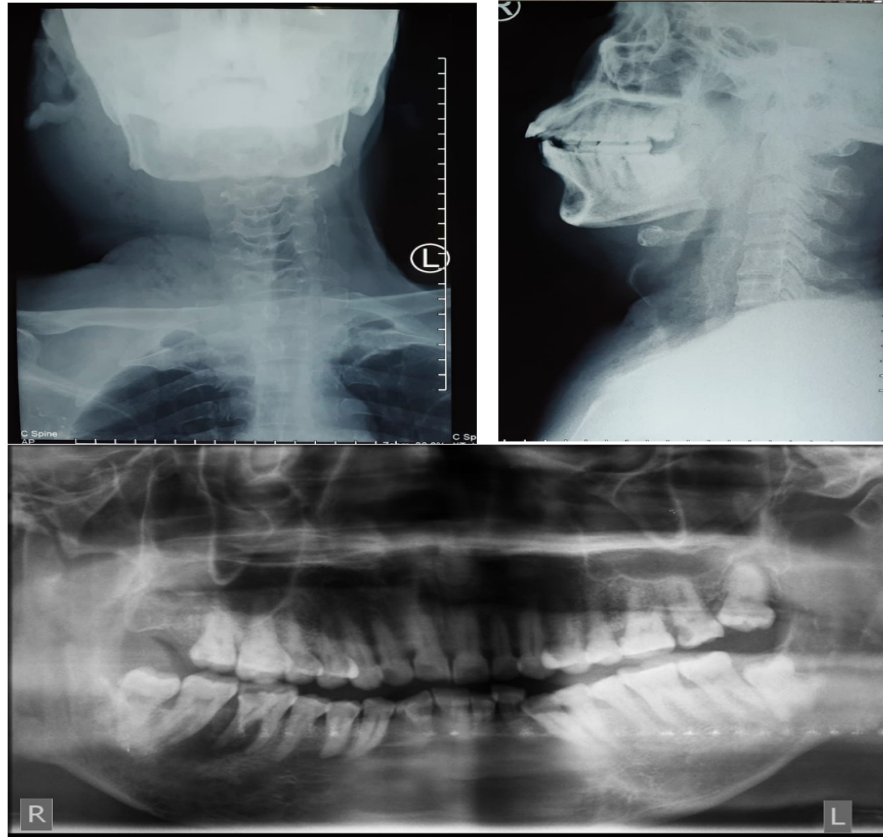


Figure 2: AP-Lat Neck Soft Tissue radiography and Jaw Panoramic

The patient's diagnosis was a right odontogenic submandibular abscess that extended to the right submental, buccal, parapharyngeal, and clavicle. Emergency treatment carried out included administering Ringer Lactate intravenous fluids 60 drops/minute for the first 6 hours, nasal cannula with oxygen 3 liters per minute, and urinary catheter (the patient's initial urine was 40 cc). The patient was tapped for pus in the right mandibular region, and \pm three cc of pus was obtained and examined in the laboratory for culture and bacterial resistance tests. The

patient was given Cefotaxime inj 1 g IV, Metronidazole inf 500 mg IV, Ketorolac inj 30 mg IV, Omeprazole inj 40 mg IV. The patient underwent an incision, removed pus, placed a drainage rubber on the right submandibular region to penetrate the neck region, and extracted teeth 46, 47,48 under general anesthesia (figure 3). The patient was then hospitalized and closely controlled, and there was an improvement in his general condition and a decrease in the degree of infection

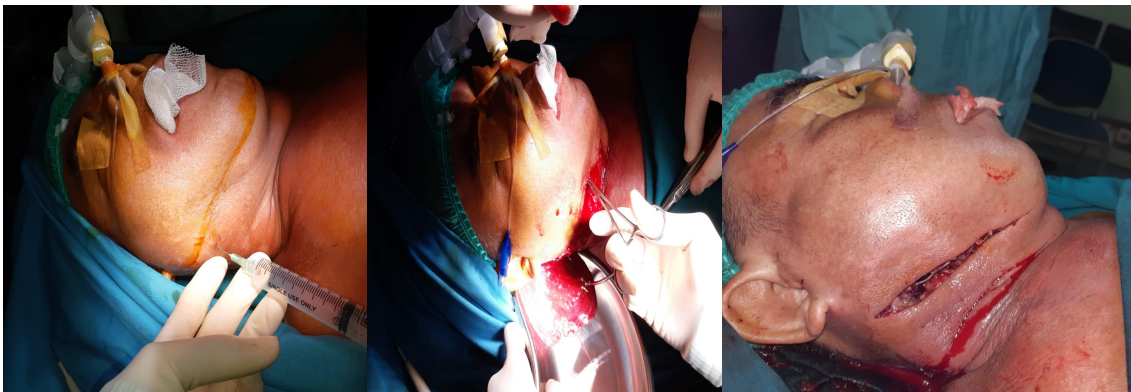


Figure 3: Incision, removing pus, and placing a drain

Discussion

This case includes severe odontogenic infection because there is a history of toothache and carious teeth or dental pulp disease as a source of infection.[2,6] Lower molars are a common source of odontogenic infection, and often extend to the submandibular space.[2,5,6,10] Anatomically, some mandibular molars have long roots passing through the mylohyoid muscle thus facilitating the spread of infection to the submandibular space. The spread of infection to the surrounding area or extends to more distant areas can be through adjacent tissues or between spaces.[2,6]

Severe odontogenic infection is characterized by several spaces, especially the submandibular, parapharyngeal, and retromandibular spaces, which result in difficulty breathing or airway obstruction.[3,5,9] Severe cases like this can cause complications of airway obstruction, mediastinitis, necrotizing fasciitis, cavernous sinus thrombosis (CST), sepsis, thoracic empyema, cerebral abscess, and osteomyelitis, and can even cause death.[2,3]

In this case, clinical and laboratory symptoms indicate severe odontogenic infection were involvement of multiple spaces, trismus, rapid respiration, decreased blood pressure, fever, decreased oxygen saturation, leukocytosis, and thrombocytosis. Severe symptoms of odontogenic infection can lead to complications and death, so urgent care in the hospital and close observation are needed.[2,7,8] Treatment can be started by maintaining the airway, administering antibiotics, analgesics, and pus drainage incisions.[5,8,17]

Empirical broad-spectrum antibiotics for aerobic and anaerobic bacteria should be administered immediately while waiting for culture and bacterial resistance results. Empiric antibiotics should cover both aerobic and anaerobic, Gram-positive and Gram-negative bacteria. Second or third-generation cephalosporins as primary empiric antibiotic therapy, together with metronidazole or ornidazole, are usually used in odontogenic infections.[4,5,18] In this case, the patient has been given Cefotaxime 1 g IV and Metronidazole inf 3x500 mg IV.

Immediate surgical incision and drainage remain controversial (especially for cellulitis). Some clinicians worry that it will worsen if surgical intervention is carried out immediately. Some clinicians argue that surgery may be necessary if there is a compromised airway, clinical signs of sepsis, or a poor response to antibiotic treatment in the first 48 hours.[5,11] Surgical drainage incisions can shorten hospital stay.[8] In this case, a drainage incision was immediately performed under general anesthesia because there were signs of airway obstruction, trismus, difficulty swallowing, decreased blood pressure, and leukocytosis. The drainage incision, in this case, was performed extra orally in the submandibular area that

penetrated the neck. Extraoral access drainage incisions are more accessible and more comprehensive in removing pus but interfere with the cosmetic appearance and risk of injury to the surrounding conditions than intraoral.[5]

Surgical intervention under general anesthesia is more comfortable for the patient. It allows greater flexibility in exploring the spaces involved. However, the absence of a safe airway (e.g., a fixed endotracheal tube) carries the risk of abscess rupture, aspiration, and complete airway collapse.[19] Therefore, it is imperative to secure a definite airway prior to surgical manipulation of this patient. Knowledge of head and neck anatomy, anesthetic techniques, surgical skills and specialist equipment sufficient to provide prompt and definitive treatment for an odontogenic abscess is essential for the medical team.[20]

Conclusion

In this case of severe odontogenic infection, the patient was saved by prompt treatment using empiric antibiotics, analgesics, incisional drainage of pus, oxygenase, and regulation of body fluids. Surgical drainage incisions for odontogenic infections need to be carried out immediately in cases with existing respiratory symptoms because the extension of the abscess to the submandibular space and its surroundings can cause airway obstruction.

Conflict-of-Interest Notification: no Conflict-of-Interest

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