

# EMERGENCY MANAGEMENT OF NECROTIZING FASCIITIS AT LEFT SUBMANDIBLE REGION DUE TO ODONTOGENIC INFECTION: A CASE REPORT

Agnesthesia Ruth Stevhany<sup>\*1</sup>, Eka Marwansyah Olli<sup>\*\*</sup> and Agus Nurwiadh<sup>\*\*\*</sup>

<sup>\*</sup>Resident, Department of Oral and Maxillofacial Surgery, RSUP Dr. Hasan Sadikin, Faculty of Dentistry, Padjadjaran University, Indonesia., <sup>\*\*</sup>Department of Oral and Maxillofacial Surgery, RSUP Dr. Hasan Sadikin, Padjadjaran University, Indonesia. , <sup>\*\*\*</sup>Department of Oral and Maxillofacial Surgery, Faculty of Dentistry, Padjadjaran University, Indonesia.

**ABSTRACT Introduction:** Necrotizing fasciitis (NF)-infection of soft tissues that results in the destruction of fascia and soft tissues. Infections that occur in the region of the head and neck, in most cases, the aetiology is odontogenic. **Objective:** Early diagnosis coupled with emergent necrotomy debridement, appropriate broad-spectrum empiric antibiotic treatment, and a multidisciplinary team approach is essential for successful treatment. **Case:** We reported a 61-year-old male patient who came with swelling in the cheek, left lower jaw, chin, neck region, and there was necrotic tissue at the left submandible region. He was diagnosed with necrotizing fasciitis at the left submandible region with left submandible abscess extended to left buccal, submental, right submandible, Colli anterior, and bilateral hemithorax region, and we found multiple radices that were thought to be the source of infection. **Case Management:** The principles of early diagnosis, incision and drainage, extraction of teeth, extensive necrotomy debridement, broad-spectrum antibiotic therapy, and intensive supportive care in the treatment of NF were confirmed in the present case. **Conclusion:** The reduction of mortality of this disease depends upon early detection and early and adequate necrotomy debridement treatment. Delays in surgical intervention >14 hours are associated with significantly higher mortality, septic shock, and more repeat debridement.

**KEYWORDS** Debridement, Necrotizing fasciitis, Odontogenic infection

## Introduction

Necrotizing fasciitis (NF)-infection of soft tissues that destroys fascia and soft tissues.[1] Necrotizing fasciitis was first described by the Confederate surgeon Jones in 1871, followed by Pfanner in 1918 and Meleney in 1924[2]. A variety of organisms causes NF.[2] The infection spreads over subcutaneous tissues

and fascia but relatively preserves muscle tissue.[1] Infection that occurs in the head and neck region; in most cases, the aetiology is odontogenic.[1] Most oral infections which have an odontogenic origin are very common and can be treated by tooth extraction, endodontic therapy, or surgical treatment.[3] The clinical manifestations of necrotizing fasciitis are nonspecific but are often typical for diagnosis.[4] Patients are febrile, tachycardic, and dehydrated; the overlying skin is generally erythematous and tense.[4] The management principles include fast identification of the necrotic tissue and its radical surgical debridement as there is potentially high morbidity, combined with high-dose antimicrobial therapy.[4] Here, we present a case of necrotizing fasciitis at the left submandible region due to odontogenic infection.

Copyright © 2021 by the Bulgarian Association of Young Surgeons  
DOI: 10.5455/IJMRCR.EmergencyManagementofNecrotizingFasciitisat  
LeftSubmandibleRegion

First Received: May 9, 2021

Accepted: October 15, 2021

Associate Editor: Ivan Inkov (BG);

<sup>1</sup>Corresponding author: Agnesthesia Ruth Stevhany; Resident, Department of Oral and Maxillofacial Surgery, RSUP Dr. Hasan Sadikin, Faculty of Dentistry, Padjadjaran University, Indonesia. E-mail: agnesthesia\_ruth@yahoo.com



**Figure 1:** Patient profile picture.



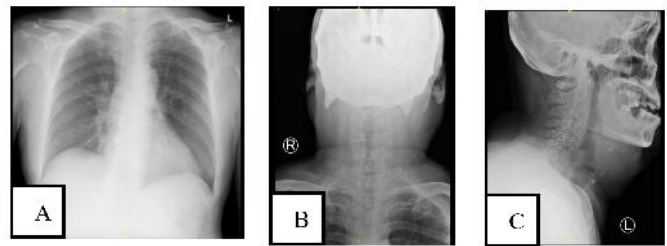
**Figure 2:** Intraoral preoperative.

### Case report

A 61-year-old male patient was referred to the emergency room Oral and Maxillofacial Surgery department at Hasan Sadikin hospital with swelling in the cheek, left lower jaw, chin, and neck region. About one week prior to admission, the patient complained of swelling in the left cheek region, but the patient did not seek any treatment. In the past 4 days, the patient complained of swelling at the left cheek extended to the left lower jaw region. However, the patient's condition was getting worse 1 day ago, so that he was brought to Hasan Sadikin hospital for further treatment.

The patient felt pain on swallowing with stiffness in the neck. There was no sign of hoarseness, hot potato voice, or altered voice. History of systemic disease was denied. Examination of vital signs in the emergency room showed the patient's blood pressure rate 120/80 mmHg, heart rate 110 times/minute, body temperature 36,6 C, respiratory rate 20 times/minute, and SpO<sub>2</sub> rate 97% (free air). Extraoral examination revealed the presence of an asymmetrical face and necrotic tissue (Figure 1d). Asymmetrical face, swelling at left cheek region extended to left lower jaw, chin, right lower jaw, neck, and upper chest region with 10x5x4 cm in size (Figure 1). The swelling is localized, reddish coloured, followed by febrile temperature, hyperemia, fluctuation, and pain on palpation. On oral examination, trismus was found with approximately 1.5 cm mouth opening and calculus in the maxilla and mandible on intraoral examination. There was no pus discharge from the lower left molar region (Figure 2). The first molar was tender and mobile. As well as mobility of tooth 36, Pulp necrosis in tooth 47, a remaining tooth root of teeth 11,16,17.

The laboratory findings showed there was leukocytosis



**Figure 3:** Chest x-ray, neck soft tissue AP and Lateral x-ray.

12.94 (N:4.500- 11.000)/mm<sup>3</sup>, an increase of prothrombin time 13.5(N:9.1-13.1) second, hiperuremic 88.5 (N:15-39) mg/dL, hypoalbumin 2.19 (N:3.4-5.0) g/dL and other laboratory findings were within normal limit without any signs of systemic disease, then Anti SARS-CoV-2 was negative. Some radiographic examinations were performed in the emergency room, such as chest x-ray, neck soft tissue AP and lateral x-ray. From the chest x-ray, there was Cardiomegaly without the pulmonary dam, atherosclerosis aorta, and no sign of bronchopneumonia/pneumonia (Figure 3A). The neck soft tissue AP and the lateral x-ray showed the appearance of soft tissue density opaque with lucent colli region suggestive abscess air column still opening (Figure 3B,3C).

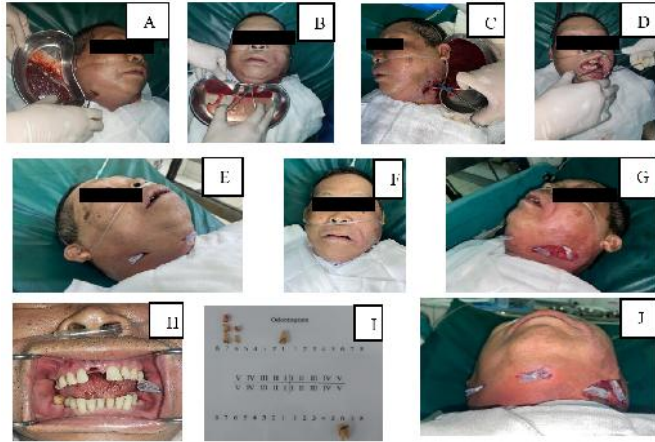
The patient was consulted to the Internal Medicine department, ENT Department, cardiothoracic surgery department, and anesthesiology department. Consulted to internal medicine department due to hyperuremia and hypoalbuminemia before performing necrotomy debridement, incision drainage through and through, and teeth extraction. Further advice from the Internal Medicine department suggested bed rest, Rehydration 1500 cc 6 hours, 1500 cc 18 hours, 1500 cc 24 hours, Soft diet 150 kkal, KH L, Antibiotic according to Oral Maxillofacial Surgery department, and Check urine catheter after rehydration.

The patient was also consulted to ENT Department for assessment and treatment for tracheostomy pre-operative, suspect retropharyngeal and parapharyngeal abscess, and the examination result showed there was no sign of retropharyngeal, parapharyngeal abscess, and upper airway obstruction, no indication for tracheostomy and not agree for tracheostomy pre-operative and no specific treatment from ENT Department. Consulted to Cardiothoracic surgery department for assessment and treatment for suspect anterior hemithorax of this patient. Further advice from the Cardiothoracic department there was a sign of anterior hemithorax. The patient was also consulted to the anesthesiology Department plan to perform necrotomy debridement, incision drainage through and through, and extraction of teeth under general anaesthesia. The examination result showed there was Suggest performing in local anaesthesia.

The patient was diagnosed with necrotizing fasciitis at left submandible region with left submandible abscess extended to left buccal, submental, right submandible, Colli anterior, and bilateral hemithorax region due to chronic apical periodontitis of tooth 36, Chronic apical periodontitis due to gangrene pulp of tooth 14 and radices of teeth 11,16,17, moderate dehydration due to low intake and hypoalbuminemia. In this emergency unit, Department of Oral and Maxillofacial Surgery, After the diagnosis was made, moderate rehydration was done to the patient, and a urine catheter was inserted to evaluate the urine output. Tapping Pus and swab was performed for culture resistance test and to the sensitivity of the antibiotic test (Figure 4). The empirical antibiotics (Ceftriaxone 1 gram, Metronidazole



**Figure 4:** Tapping Pus.



**Figure 5:** Emergency Management.

500 mg) and analgesic (Ketorolac 30 mg) were given through intravenous infusion. In addition, omeprazole 40 mg IV was also provided to decrease stomach acid production.

Necrotomy debridement with local anaesthesia at left submandible region (figure 5G), Incision drainage through and through at left submandible (Figure 5C), right submandible (Figure 5A), submental (Figure 5B), and left buccal intraoral region (Figure 5D). Application of penrose drain intraoral and extraoral (Figure 5E,5F,5G,5H,5I), Application of modern dressing at left submandible region, and extraction of teeth 11,14,16,17,36 with local anaesthesia (Figure 5H,5I).

After the necrotomy procedure, the wound was treated with modern dressing cadexomer iodine 0.9% and polyurethane foam absorbent dressing after necrotomy debridement. Dressing selection was based on wound characteristics. For this kind of wound, cadexomer iodine 0.9% was chosen as an antiseptic and polyurethane foam absorbent dressing as an absorber. After the wound was cleaned, the antiseptic dressing was sown with a thickness of about 3 mm and an absorber attached to the wound. The dressing and bandage changed twice a day.

Five days after the procedure in the emergency room, the patient was taken to the operating room for necrotomy debridement under general anaesthesia, underwent extensive incision



**Figure 6:** Panoramic x-ray Post-Emergency Management.



**Figure 7:** Joint operating with the cardiothoracic Surgery department.



**Figure 8:** Post-operative joint with the cardiothoracic surgery department.



**Figure 9:** Reconstructive surgery with the Department of Plastic and Reconstructive Surgery.



**Figure 10:** Post-Operative reconstructive two months.



**Figure 11:** Post-Operative reconstructive three months.

and drainage of the swelling (figure 7). Join operating with cardiothoracic surgery department. Reconstructive surgery was performed after ceasing the infection with Plastic and Reconstructive Surgery (Figure 9). The wound was closed with a skin graft taken from the right thigh. The patient recovered and was discharged from the hospital three months after admission (Figure 11). Complete healing of the cervical and submandibular regions was obtained.

## Discussion

Necrotizing fasciitis is an aggressive soft tissue infection that can be polymicrobial or due to a single organism.[5,6] Classic manifestations of necrotizing fasciitis include soft-tissue edema (in 75% of cases), erythema (72%), severe pain (72%), tenderness (68%), fever (60%), and skin bullae or necrosis(38%).[7] The early stages in NF may resemble odontogenic cellulitis or an abscess.[8] In early signs, the skin usually is tonic and red.[8,9]

Multiple organisms, as well as mixed infections, have been reported to cause necrotizing fasciitis of odontogenic origin.5 The microbes isolated ranged from multiple species of Staphylococcus and Streptococcus to mixed anaerobic species and less common bacteria such as Prevotella and Fusobacterium.[5,10]

Necrotizing fasciitis often results in the sequestration of fluid which may lead to septic shock.[4] Odontogenic infections usually originate from pulpal necrosis with bacterial invasion of the periapical tissue, producing purulent collections.[4] The aetiology in most case reports is periapical abscess due to extensive caries and periodontal diseases.[11] The cause of odontogenic originated infection is molar, primarily teeth in the mandible. These teeth apices are lying under the zone where the mylohyoid muscle sticks to the mandible provide infections resulting from these teeth reaching the submandibular zone.[12] Periodontitis is a chronic inflammation of supporting structures of teeth related to the oral biofilm, which destroys connective tissue attachment to the tooth, alveolar bone resorption, and tooth loss.[3] The most frequent areas are the first and second molars.[3] Porphyromonas gingival is the main aetiology of periodontitis.[3] It can colonize on the oral soft-tissue surfaces and interacts with other oral bacteria inducing an immune response and finally invading host cells.[3]

The management principles include fast identifying the necrotic tissue and its radical surgical debridement as there is potentially high morbidity, combined with high-dose antimicrobial therapy.[11] Early diagnosis, emergency surgical debridement, and broad-spectrum antibiotic therapy are the most effective treatment options to minimize the bacterial load and mortality rate associated with these conditions.[5] Broad-spectrum IV antibiotics targeting the most common organisms are also vital.[5] The most common antibiotics were metronidazole, clindamycin, penicillin, and ceftriaxone but antimicrobial treatment may need to be adjusted once culture results are available in a given case.[5]

In this case, the patient was given intravenous empiric antibiotic therapy with ceftriaxone and metronidazole at the emergency room. On the three days after emergency room antibiotic substitution to ampicillin-sulbactam and use for to 3 days. The postoperative day antibiotic substitution to levofloxacin and re-evaluated after 5 days. The third-day postoperative antibiotic was evaluated and substituted with amikacin. After the twelfth day postoperative antibiotic was replaced with clindamycin, ceftazidime, and ciprofloxacin until the patient discharged.

Factors associated with increased mortality include age; comorbidities; such as diabetes, congestive heart failure, and gout; delay in antibiotic administration; delay in time to surgical intervention.[13] The mortality rate varies significantly from 10% to 40%, and figures as high as 80% have been reported without an early surgical or medical intervention.[11] The high mortality rate in NF is attributed to a delay in arriving at an accurate diagnosis, poor management, and associated systemic diseases.[11]

That delay in time from admission to first surgical debridement beyond 12 hours results in the need for significantly more total debridements.[13] We also find increased morbidity in patients in whom surgery is delayed beyond 12 hours, specifically increased risk of septic shock and renal failure.[13] Survival is further increased with earlier surgical intervention (e.g., within 6 hours) supporting the notion that the earlier surgery is performed, the better the outcome.[7]

Death results from overwhelming sepsis and multiorgan failure. It is recommended to explore and drain all involved areas surgically.[14] Excision of necrotic tissues should be carried out.[11] Loss of the covering skin and cosmetic disfiguring could be avoided by early surgical intervention. Sequential debridement of skin should be done.[11] Extensive reconstructive procedures may be necessary once the necrotizing fasciitis is resolved, but surgical debridement to prevent mortality is of paramount importance.[5] Some investigators have reported that hyperbaric oxygen treatment has a favourable effect on the diseased tissue.[15]

## Conclusion

Odontogenic necrotizing fasciitis is a relatively uncommon but life-threatening and rapidly progressive illness. Patients with odontogenic necrotizing fasciitis should be treated aggressively with surgical debridement of necrotic tissue and close monitoring with serial debridement and frequent dressing changes as indicated. Early diagnosis coupled with emergent surgical debridement, appropriate broad-spectrum empiric antibiotic treatment, and a multidisciplinary team approach is essential for successful treatment. Delays in surgical intervention >14 hours are associated with significantly higher mortality, septic shock, and more repeat debridement.

## Funding

This work did not receive any grant from funding agencies in the public, commercial, or not-for-profit sectors.

## Conflict of interest

There are no conflicts of interest to declare by any of the authors of this study.

## References

1. Egils K. Clinical Case: Necrotizing Fasciitis of the neck after surgery of a Mandibular Radicular Cyst. *Journal of Oral Health and Craniofacial Science*. 2017;2(4):110-7.
2. Lee MH, Votto SS, Read-Fuller AM, Reddy LV. Necrotizing fasciitis of the scalp stemming from odontogenic infection. *Proc (Bayl Univ Med Cent)*. 2020;33(1):110-2.
3. Irani S. Orofacial Bacterial Infectious Diseases: An Update. *J Int Soc Prev Community Dent*. 2017;7(Suppl 2):S61-S7.

4. Camino Junior R, Naclerio-Homem MG, Cabral LM, Luz JG. Cervical necrotizing fasciitis of odontogenic origin in a diabetic patient complicated by substance abuse. *Braz Dent J.* 2014;25(1):69-72.
5. Gore MR. Odontogenic necrotizing fasciitis: a systematic review of the literature. *BMC Ear Nose Throat Disord.* 2018;18:14.
6. F. Pampin IA, C. Mayer, F. Pinedo,. Cervical necrotizing fasciitis of odontogenic origin: tissue regeneration with L-PRF. *International Journal of Oral and Maxillofacial Surgery.* 2019;48:236.
7. Stevens DL, Bryant AE. Necrotizing Soft-Tissue Infections. *N Engl J Med.* 2017;377(23):2253-65.
8. Rajanikanth BR, Madhuri B, Prasad K, Vineeth K, Kumarpal Munoyath S. Odontogenic infection progressing to necrotizing fasciitis: An unusual clinical emergence. *Oral and Maxillofacial Surgery Cases.* 2019;5(1).
9. Lorenzini G, Picciotti M, Di Vece L, Pepponi E, Brindisi L, Vessio V, et al. Cervical necrotizing fasciitis of odontogenic origin involving the temporal region—a case report. *J Craniomaxillofac Surg.* 2011;39(8):570-3.
10. Bambang Hudiworo KD EM, Indra Hadikrishna. Emergency Management of Parapharyngeal And Retropharyngeal Abscess due to Right Submandible Abscess with Complications of Right Pulmonary Empyema: Case Report. *International Journal of Science and Research (IJSR).* 2019;10(1).
11. Yadav S, Verma A, Sachdeva A. Facial necrotizing fasciitis from an odontogenic infection. *Oral Surg Oral Med Oral Pathol Oral Radiol.* 2012;113(2):e1-4.
12. Bahl R, Sahai N. Chronic Necrotizing Fasciitis / the Flesh Eating Bacterial Disease – An Unusual Sequel of Odontogenic Infections *International Dental Journal of Student's Research.* 2015;3(3):132-5.
13. Kobayashi L, Konstantinidis A, Shackelford S, Chan LS, Talving P, Inaba K, et al. Necrotizing soft tissue infections: delayed surgical treatment is associated with increased number of surgical debridements and morbidity. *J Trauma.* 2011;71(5):1400-5.
14. Sjamsuddin E, Putra D, Adiantoro S. Early Management and Wound Dressing Selection for Cervical Necrotizing Fasciitis: A Case Report. *International Journal of Medical Reviews and Case Reports.* 2019(0).
15. Nugroho SS, Syamsudin E, Hardianto A, Riawan L. Surgical management of necrotizing fasciitis due to odontogenic infection with sepsis: a case report. *Journal of Dentomaxillofacial Science.* 2017;2(1).