

# Acute Management of Facial Cellulitis Secondary to Third Molar Infection

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## ABSTRACT

We report a case of a 24-year-old male military personnel who showed up to the Emergency Department of Kem Terendak Armed Forces Hospital in a feverish condition complaining of having problems in eating due to a toothache and difficulty in opening the mouth for the past three days. After a thorough history and physical examination, we came up with a diagnosis of facial cellulitis secondary to infection of the third molar. This case was treated as an emergency due to the involvement of submandibular spaces. The patient was admitted and treated with incision and drainage together with removal of the third molar under general anesthesia. The patient was then discharged after 5 days of hospitalization. We hope sharing this case of infection of the third molar can educate more primary practitioners in its clinical care as poor management of cellulitis can lead to life-threatening conditions.

**Keywords** : Emergency, Cellulitis, Infection, Military Personnel, Molar

## INTRODUCTION

Neck cellulitis or deep neck inflammations are regarded as very serious infections that can threaten a patient's health and life. It is a common, bacterial, non-purulent infection spreading diffusely along the skin<sup>1</sup>. Such inflammations can be categorised aetiologically into inflammations of odontogenic or non-odontogenic origin<sup>2</sup>. Odontogenic cellulitis denotes infections from the dentition while non-odontogenic cellulitis usually arises from trauma, sinus or skin infections, or idiopathic causes<sup>3,4</sup>. According to Doležalová et al. (2015), cellulitis is largely caused by mixed aerobic or anaerobic bacterial microflora, which commonly colonises the oral cavity and does not primarily consist of pathogenic microbial species. Approximately 50% of total hospital facial infections over a 10-year period consisted of odontogenic cellulitis<sup>5</sup>.

The common clinical findings of cellulitis include suppurative inflammation, with the tendency to delimiting and formation of abscesses. The superficial subtype of cellulitis is often called erysipelas, characterised by a sharp red erythema<sup>1,6</sup>. In some cases, cellulitis can also develop into a formation of phlegmonous nature and can then spread readily into deeper anatomy of the head and neck area<sup>2</sup>. High grade fever, involvement of jaw contracture, inflammation spreading to the surroundings along the large neck vessels, oedema or skin reddening, pain under sternum, swollen eyelids and retrobulbar pain, stridor, cough

and pain in the chest are associated with more severe cellulitis and usually carry poorer prognosis<sup>7-10</sup>.

Facial cellulitis may occur in healthy patients with poor oral hygiene. Infections of the oral and maxillofacial region are often of odontogenic origin typically secondary to caries, pulpitis, periodontal disease, postoperative infection or inflammation of the pericoronal tissues<sup>11</sup>. The spreading of the infection is usually along the lines of least resistance through the cancellous bone until it encounters the cortical plate<sup>12</sup>. The anatomical areas of the inflammation involve temporal, deep temporal, buccofacial areas carrying higher risk of compromising the respiratory tract and additional vital structures<sup>13</sup>.

The appropriate assessment of the infection severity based on its location, the types of causative microbes, immune system and systemic alterations of host defence, is the primary importance for early diagnosis establishment and treatment. Therefore, proper initial diagnosis and immediate treatment are most important<sup>12</sup>. This report presents a case of Facial Cellulitis patient derived from periapical abscess of the left mandibular wisdom tooth and a brief treatment protocol for acute management.

## CASE PRESENTATION

A 24-year-old male, military personnel came to the Emergency Department (ED) of Terendak Armed Forces Hospital with complaints of painful swelling of the left submandibular region and difficulty in opening his mouth for the past 3 days. It was associated with fever and alteration in dietary intake as the patient was only able to tolerate liquid diet due to pain.

He had presented to ED 2 weeks prior to this visit with the same complaint with intermittent toothache (pinpoint to tooth 38). He was given oral Metronidazole, Augmentin, Mefenamic acid and Paracetamol by the on-called dentist to reduce the inflammation and control the infection. An appointment was given for follow-up and further management of the problematic tooth but the patient defaulted the appointment since the swelling and pain had subsided completely.

After a week, the swelling and pain recurred. During this time, the symptoms were worse compared to the previous episode with continuous throbbing pain, pain score was 7/10 and mouth opening of one patient's finger breadth. Swelling now extends to the mid submandibular region, associated with trismus and fever. He was referred to the Dental Specialist Department for further management.

A clinical and radiographic examination was performed. The patient was noted to have fever (38.9°C), severe trismus, dysphagia, dehydration, and was not under any medication. He also has no other significant medical history. He did not smoke nor did he consume alcohol. Marked facial swelling with diameter of 7cm x 7cm was demonstrated at the left submandibular region, with significant redness radiating to the post auricular region superiorly and mid submandibular region inferiorly. There was also the presence of crusted skin with a yellowish base at the centre of the swelling. The swelling was solid, warm and tender on palpation (Figure 1). There was also the presence of regional lymphadenopathy. Mouth-opening distance was 15mm between the upper and lower central incisors. An intraoral examination was done despite limited access for view. It revealed a vertically impacted left mandibular wisdom tooth (38) with pericoronitis or inflammation of the surrounding mucosa. The buccal sulcus at the third quadrant molar region was also raised.

Radiographic examination revealed radiolucency on the distal side of 38 crown extending to the pulp chamber and around the apex of the tooth without clear borders (Figure 2). Blood investigations showed elevation in white blood cell count (11.2x10<sup>9</sup>/L) which indicates presence of bacterial infection.

Due to the severity of the symptoms, the patient was admitted to the hospital. Intravenous antibiotic therapy (IV Augmentin 1.2g TDS) and analgesics (T. Celecoxib 200 mg BD) together with IV infusion of normal saline was given for 24 hours followed by incision and drainage extraorally under general anaesthesia (Figure 3). A corrugated drain was placed and anchored with suture until the suppuration ceased (Figure 4). Another incision was done intraorally at the buccal sulcus of lower left molar region for drainage followed by irrigation with normal saline and 0.12% chlorhexidine. Extraction of the causative tooth was performed.



**Figure 1: Pre-treatment photograph showing swelling at the left submandibular region, skin crust with yellowish base at the center.**

Patient was reviewed the next day. The swelling had reduced significantly on the third day post-op. The patient was discharged on the 5th day post op with T. Augmentin 625mg BD for 7 days. A one month review was done and submandibular edema, trismus, fever and pain had completely resolved (Figure 5).

**DISCUSSION**

This clinical report describes the acute management of left submandibular facial cellulitis secondary to third molar infection. Initial management focused on the treatment of the cellulitis to eliminate spreading of infection into deeper facial spaces. Timely intervention is of utmost importance in such a kind of infection because the infection may become life threatening if not properly handled. Incision and drainage was done under general anaesthesia with IV antibiotics given during the hospital stay. In most cases, infection that arises from the mandibular third molar can easily spread to the surrounding spaces of the mandible, especially submandibular, pterygomandibular and parapharyngeal spaces<sup>12</sup>. Whenever infection spreads to one of the facial spaces surrounding the maxilla or mandible, treatment must be aggressive<sup>14</sup>. Patients with increased temperature with an odontogenic cellulitis that is indurated should be treated in the hospital with support of the host hydration, antibiotics and analgesics<sup>14</sup>. Antimicrobial therapy is indicated when the infection has perforated the bone cortex, spread into the surrounding tissues and there is presence of systemic involvement<sup>15</sup>.

The diagnosis of facial cellulitis is based on clinical findings where the lesion commonly starts from odontogenic infection and demonstrates a typical solid and tender swelling on palpation<sup>12</sup>. According to Mahmood and Mahmood (2005), deep dental caries from the mandibular wisdom tooth initiates inflammation



**Figure 2: Radiolucency on the distal side of the crown extending to the pulp chamber and around the apex of the tooth**



**Figure 3: Incision was done extraorally under GA, pus mixed with blood was drained from the swelling**

of the dental pulp which causes vasodilation and oedema in the pulp chamber. Consequently, the pressure leads to strangulation of the blood supply to the tooth through the apex thus, necrosis of the pulp. The necrotic pulp provides a perfect setting for bacterial invasion into the bone tissue leading to cellulitis.

Odontogenic infection would initially extend to the masticatory space and then spread downwards into the submandibular space directly from the masseter or medial pterygoid muscle through the investing layer of the deep cervical fascia<sup>16</sup>. Signs of spreading inflammation such as pyrexia, lymphadenopathy, difficulty in swallowing and lockjaw will be noted<sup>17</sup>. Dysphagia often occurs when infection spreads into the parapharyngeal space<sup>18,19</sup>. The parapharyngeal space is often involved following infection of the masticatory space, especially from the medial pterygoid muscle<sup>18,20</sup>.

Incision and drainage under general anesthesia was done in this case via both intra oral and extra oral approach. Patency of drainage via intra oral approach is more difficult to maintain as the drain gets blocked by movement of buccal muscles. However drainage from the cutaneous side is more likely to leave a scar<sup>14</sup>. The current recommendations in the literature are to extract the infected teeth as soon as safely possible to prevent fascial space infection<sup>21</sup>. Thus, the mandibular wisdom tooth had been extracted together during the surgery.



**Figure 4: Corrugated drain was sutured for drainage**



**Figure 5: One month review post-surgical drainage**

## CONCLUSION

Facial cellulitis can be managed easily with early recognition, diagnosis and management of dental infections, especially in emergency care situations to avoid or minimize complications and to reduce healthcare cost<sup>22,23</sup>. Involvement of the deep cervical spaces secondary to odontogenic infection is an uncommon but life threatening event. A large proportion of deep neck infections are the result of odontogenic infection. Initial treatment of this patient requires immediate hospitalization, host support, maintenance of airway, intravenous antibiotic therapy and incision and exploration of the involved spaces. We recommend thorough surgical treatment in combination with correct and sufficient antibiotic therapy.

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REFERENCES

1. Stevens DL, Bisno AL, Chambers HF, et al. Practice guidelines for the diagnosis and management of skin and soft tissue infections: 2014. update by the Infectious Diseases Society of America. *Clin Infect Dis*. 2014;59:e10–e52.
2. Doležalová H, Zemek J, Tuček L. Deep neck infections of odontogenic origin and their clinical significance. A retrospective study from Hradec Králové, Czech Republic. *Acta Medica*. 2015;58(3):86-91
3. Israele V, Nelson JD. Periorbital and orbital cellulitis. *Pediatr Infect Dis J*. 1988;6:404.
4. Dodson TB, Perrott DS, Kaban LB. Pediatric maxillofacial infections: a retrospective study of 113 patients. *J Oral Maxillofac Surg*. 1989;47: 327-30.
5. Biederman GR, Dodson TB. Epidemiologic review of facial infections in hospitalized pediatric patients. *J Oral Maxillofac Surg*. 1994;52: 1042-5.
6. Raff AB, Kroshinsky D. Cellulitis: a review. *JAMA*. 2016; 316:325–337.
7. Trifonova K, Stoyanov V, Atanasov M, Slaveykov K. Ocular complications with odontogenic origin. *Medical Biology Studies, Clinical Studies, Social medicine and Health Care*. 2017;7(1): 45-48
8. Boscolo-Rizzo P, Da Mosto MC. Submandibular space infection: a potentially lethal infection. *Int J Infect Dis IJID* 2009 May; 13(3): 327–33.
9. Santos Gorjón P, Blanco Pérez P, Morales Martín AC, et al. Deep neck infection. Review of 286 cases. *Acta Otorrinolaringológica Esp* 2012 February; 63(1): 31– 41.
10. Lee J-K, Kim H-D, Lim S-C. Predisposing factors of complicated deep neck infection: an analysis of 158 cases. *Yonsei Med J* 2007 February 28; 48(1): 55–62.
11. Sanchez R, Mirada E, Arias J, Pano JR, Burgueno M: Severe odontogenic infections: epidemiological, microbiological and therapeutic factors: *Med Oral Patol Oral Cir Bucal*. 2011; 16:670-6.
12. Mihaylova Z, Aleksiev E. Phlegmon in the buccal, temporal and deep temporal space from mandibular wisdom tooth: Case report. *International Journal of Science and Research*. 2017;6(3):2340-2342
13. Zamiri BA, Hashemi SB, Hashemi SH, Rafiee ZC, Ehsani S. Prevalence of Odontogenic Deep Head and Neck Spaces Infection and its Correlation with Length of Hospital Stay. *JDENT*. 2012; 13:29-3.
14. Mahmood MHS, Mahmood SSAA. Odontogenic Neck Infections. *The Journal of Teachers Association*. 2005;18(1):55-59
15. Dirks SJ, Terezhalmay GT. The patient with an odontogenic infection. *Quintessence Int*. 2004;35:482–502.
16. Arijji Y, Gotoh M, Kimura Y, Naitoh M, Kurita K, Natcume N, Arijji E. Odontogenic infection pathway to the submandibular space: imaging assessment. *Int J Oral Maxillofac Surg*. 2002;31:165-169
17. Lin YT, Lu PW. Retrospective study of pediatric facial cellulitis of odontogenic origin. *Pediatr Infect Dis J*. 2006;25:339–42.
18. Peterson LJ. Contemporary management of deep infections of the neck. *J Oral Maxillofac Surg* 1993; 51: 226–231.
19. Schuman NJ, Owens BM. Ludwig’s angina following dental treatment of a five-year-old male patient: report of a case. *J Clin Pediatr Dent* 1992; 16: 263– 265.
20. Yonetsu K, Izumi M, Nakamura T. Deep facial infections of odontogenic origin: CT assessment of pathways of space involvement. *AJNR Am J Neuroradiol* 1998; 19: 123–128.
21. Johri A, Picuch J F. Should teeth be extracted immediately in the presence of acute infection? *Oral Maxillofac Surg Clin North Am* 2011; 23:507-11.
22. Cachovan G, Phark JH, Schön G, Pohlenz P, Platzer U. Odontogenic infection: An 8-year epidemiologic analysis in a dental emergency outpatient care unit. *Acta Odontologica Scandinavica*. 2012:1-7
23. Thikkurissy S, Rawlins JT, Kumar A, Evans E, Casamassimo PS. Rapid treatment reduces hospitalization for pediatric patients with odontogenic-based cellulitis. *Am J Emerg Med* 2010;28:668–72.

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