



Odontogenic Infection and Cervico-Facial Necrotizing Fasciitis in South-East Nigeria: A New Epidemic?

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Abstract

Aims: The aim of this study was to highlight the epidemiological reality and the increasing occurrence of cervicofacial necrotizing fasciitis resulting from odontogenic infection with its high morbidity and mortality in the south-eastern Nigeria.

Patients and Methods: We carried out an evaluation of 53 cases of odontogenic infection seen at the Oral and Maxillofacial Surgery units of three specialist hospitals in the south-eastern states of Nigeria over a 2-year period from January 2021 to December 2022. The case notes of these patients were retrieved, analyzed and evaluated. All the cases were categorized by the infection site, age, sex, time of presentation and treatment outcome.

Results: Poor oral hygiene was evident in most of these cases accounting for 41 (78%). More females 32 (60%) were affected than male 21 (40%) giving a male-to-female ratio of 1: 1.5. The age range of the patient was between 12 to 83 years with mean age of 65 years. All the patients presented as emergency cases. Out of the 53 cases treated 12 (23%) had progressed to Necrotizing fasciitis at the time of presentation. We lost five patients.

Conclusion: This study has shown an increasing occurrence of Odontogenic infection with morbidity and mortality surge in the south eastern Nigeria. While emphasis should be on individual oral health care and health-seeking behaviour, there is a need also for health care policy makers to re-focus on this morbidly increasing orofacial infection through the establishment of adequate oral health care delivery system.

Keywords: Odontogenic Infection; Cervico-Facial; Necrotizing Fasciitis

Introduction

The cervical necrotizing fasciitis of odontogenic origin involves mandibular second and third molar frequently as the apices of these teeth extend below mylohyoid insertion. Infective process originating from these teeth easily traverses into the submandibular space. Cervico-facial necrotizing fasciitis originating from odontogenic infection was first described by Joseph Jones in 1871, during the U. S. Civil War according to its clinical features [1]. In 1918, Pfanner diagnosed a patient with a beta-hemolytic streptococcal infection and designated it "necrotizing erysipelas" and the term necrotizing fasciitis (NF) was first used by Wilson in 1952 to diagnosis the disease caused by odontogenic infection [1]. Odontogenic infection originates in the tooth or in tissue surrounding it, primarily from bacterial infections in the pulp or periodontal tissues. The cervical necrotizing fasciitis of odontogenic origin involves mandibular second and third molar frequently as the apices of these teeth extend below mylohyoid insertion. Infective process originating from these teeth easily traverses into the submandibular space. Symptoms include severe toothache, swelling, fever, and discharge of pus and if left untreated, can spread to surrounding tissues, leading to more severe conditions such as cervico-facial necrotizing fasciitis [2,3]. Delayed treatment often leads to the spread of infection resulting in Necrotizing fasciitis [2]. Cervico-Facial Necrotizing Fasciitis is a rare but life-threatening condition characterized by rapid progression of necrosis of fascial tissue in the head and neck region. Symptoms include severe pain, swelling, fever, and discoloration of the skin, which can quickly progress to gangrene [4]. Rapidly spreading necrosis often causes systemic sepsis, toxic shock syndrome and multiorgan failure. The disease starts suddenly and violently with a high temperature causing necrosis in subcutaneous tissue as a result of intense lymphocytic infiltration, vascular thrombosis, and oedema as it spreads among muscle layers [5,6]. The disease progresses more rapidly in patients that are diabetes, have chronic kidney failure, have insufficient immune systems, and have undergone surgery, trauma, and radiotherapy previously [7,8]. Patient with cervico-facial necrotizing fasciitis requires immediate medical attention, including surgical debridement and antibiotic therapy. Late presentation and delayed treatment can result in death from sepsis, mediastinitis, carotid artery erosion, jugular vein thrombophlebitis, or

aspiration pneumonia [9]. Necrotizing fasciitis is associated with systemic toxicity and high mortality rate if not treated timely and aggressively. While reports across the globe have shown that incidence of odontogenic infections has declined dramatically over the years the same cannot be said of most under developed places of the world [2].

Patients and Methods

We carried out an evaluation of 53 cases of odontogenic infection seen at the Oral and Maxillofacial Surgery units of three specialist hospitals in the south-eastern states of Nigeria over a 2-year period from January 2021 to December 2022. The case notes of these patients were retrieved, analyzed and evaluated. We recorded and reviewed all the 53 patients with odontogenic infection during this period from notes kept in the Records department of the Hospital. We recorded and noted the 12 cases that developed Cervicofacial Necrotizing Fasciitis. Relevant information retrieved included patients' oral habits, past medical and drug history, socio-demographic data, onset of symptoms and the treatment outcome. Oral cavities were properly assessed to identify the affected tooth as well as the periodontal tissues using Sillness-Löe plaque index and Sulcus Bleeding Index (SBI). Apart from the 12 cases with life threatening cervico-facial infection characterized by aggressive spread of inflammation and necrosis of the surrounding tissues (Figure 1a and 1b), all the odontogenic infection cases presented with the same spectrum of clinical features; cellulitis, abscess formation, fever and generalised malaise (Figure 2a and 2b). Clinical and laboratory findings carried out were also noted. Some of the patients also presented with oral lesion characterized by the presence of patchy white plaques and confluent pseudo-membranous mucosa suggesting opportunistic infection with oral candidiasis. We identified the trends in the number of cases categorized by the age, sex and treatment outcome.

Results

All the 53 patients seen and treated were Nigerians from lower economic class of the society and lived at a subsistence level with little or no formal education. Most of them were artisans, petty traders and pensioners. There was no history of alcohol, tobacco and para-functional dental habits while Eight (15%) were suffer-



Figure 1: a,b: Life threatening cervicofacial infection characterized by aggressive spread of inflammation and necrosis of the surrounding tissues under debridement.



Figure 2: a, b: Odontogenic infection cases presenting with the same spectrum of clinical features; cellulitis and abscess formation

ing from long standing diabetes (Table 1.). More females 32 (60%) were affected than male 21 (40%) giving a male-to-female ratio of 1: 1.5. The age range of the patient was between 12 to 83 years with mean age of 65 years + SD 6.4. All the patients presented as emergency cases. Poor oral hygiene was evident in most of these cases accounting for 41 (78%). The laboratory results showed that twenty-nine patients (55%) had heamoglobin below 10g/dl in

comparison to the normal value. The highest number of cases 13 (24.5%) adjusted by age and sex was seen in the age group 60-69 years and occurred more in females (Table 1). Females were more affected amongst the age group 50-59 years with a total of 8 (15%) recorded. Patients within the age group of 10-19 were the least affected accounting for 1(1.8%) and was seen in female. The trend in the number of yearly occurrences within the 2 years study period

Age (yrs)	Male	Female	Total (%)
10-19	0	1	1 (1.8)
20-29	0	2	2 (3.7)
30-39	2	1	3 (5.8)
40-49	4	5	9 (17)
50-59	3	8	11 (20.8)
60-69	6	7	13 (24.5)
70-79	5	5	10 (18.8)
80-89	1	3	4 (7.6)
Total	21(40%)	32 (60%)	53 (100%)

Table 1: Age and gender distribution of Odontogenic Infection Amongst the 53 Patients.

shows that the year 2022 recorded the highest number of cases (29; 55%) presented (Table 2). Gender distribution adjusted by the yearly occurrence amongst the 53 Patients shows that more females were affected (18;34 %) in the year 2022 out of the 53 total number of patients seen in the 2-year study period. Male patients were also more affected (11; 21%) in the same year 2022. Out of the 53 cases treated 12 (23%) had progressed to Necrotiz-

ing fasciitis at the time of presentation. Of the 12 cases of necrotizing fasciitis treated 7 (58%) had total remission while 5 (42%) patients were lost due to co-morbidity and associated complications. Total remission in this context means disappearance or abatement of clinical signs and symptoms of the disease within the period of the study. We took photographs to document these stages of remission (Figure 3a and 3b).

Years of Presentation	Male	Female	Total (%)
2021	10 (19%)	14 (26%)	24 (45%)
2022	11 (21%)	18 (34%)	29 (55%)
Total	21 (40%)	32 (60%)	53 (100%)

Table 2: Gender distribution of Odontogenic Infection Adjusted by the Yearly Occurrence amongst the 53 Patients.

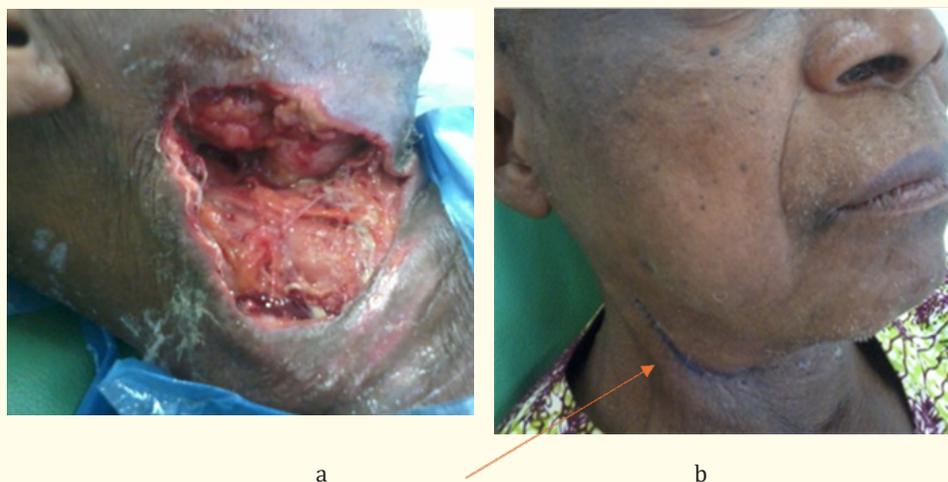


Figure 3: a: After debridement; b: Total remission after treatment.

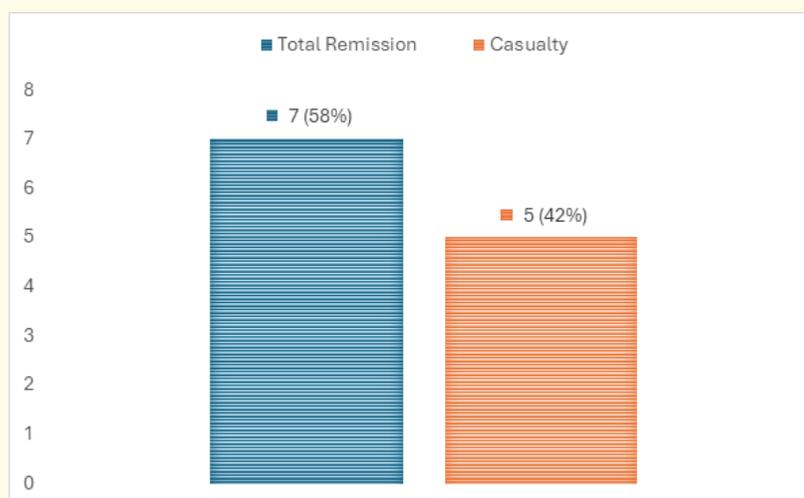


Figure 4: Treatment outcome Amongst the 12 cases of Cervico-facial Necrotizing Fasciitis.

Discussion and Conclusion

Odontogenic infections are typically caused by bacteria that are normally present in the oral cavity. The periapical infection is the most common form of odontogenic infection. Although odontogenic infections are usually confined to the alveolar ridge vicinity, they can spread into deep fascial spaces. These infections can range from mild to life-threatening and are a significant public health concern. Rapid surgical intervention in combination with a preferably pathogen-specific antibiotic therapy can ensure patients' survival [10]. The most common bacteria implicated in these infections are: *Streptococcus mutans* which is gram-positive bacterium that is commonly found in dental plaque, *Staphylococcus aureus* also a gram-positive bacterium that can cause skin and soft tissue infections and an Anaerobic bacterium such as *Bacteroides*, *Fusobacterium*, and *Peptostreptococcus*, which thrive in low-oxygen environments [11]. If untreated, odontogenic infections can break through the limitation, disseminate to other organs or spaces, and cause high mortality rates [12]. Locally an untreated odontogenic infection can result to abscess formation in the tissues around the infected tooth, causing pain, swelling, and potentially leading to more severe infections [13]. Cellulitis and spread of infection to the fascial spaces, leading to severe swelling, pain, and potentially life-threatening complications [11]. Systemic complications include sepsis which can cause organ failure and death, endocarditis

leading to heart failure and death, meningitis due to the spread of infection of the membranes surrounding the brain and spinal cord, which can lead to seizures, coma, and death [14,15]. In most cases Ludwig's angina which is characterised with severe infection of the submandibular space occurs, which can lead to airway obstruction and death [14]. Localized infections are often treated at bedside in the emergency unit or in the outpatient setting with antibiotic and simple incision and drainage but once disseminated into the fascial spaces of the head and neck, incision and drainage should be carried out in the operating room setting [16,17]. This is in line with our experience. Treatment of cases that have advanced to necrotizing cervicofacial fasciitis are often more challenging [18-20]. In our study the 53 cases that presented, 12 (23%) progressed to acute necrotizing cervicofacial fasciitis and were treated as life threatening emergencies with lost of five patients.

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