CERVICOFACIAL NECROTIZING FASCIITIS: CASE SERIES AND REVIEW OF THE LITERATURE

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ABSTRACT

Necrotizing fasciitis is a severe, potentially fatal infection involving the subcutaneous soft tissues. It may involve any part of the body, but commonly affect the extremities. It comprises 2.6% of all head and neck infections. A study that spanned the period from January 2006 to June 2012. Parameters studied include age, sex, medical status, etiology and bacteriology of infection, routine laboratory investigations (Hematology and chemical pathology) including Fasting blood glucose, antimicrobial treatment, and duration of symptom, surgical treatment and complications. There were 4 females and 3 males. The age ranged between 25 to 72 years with a mean of 45 yrs. All the patients had co morbid illnesses with nutritional anemia affecting 5(70%) out of the 7 patients followed by diabetes mellitus that affected 2(27%) patients. The etiological factor was odontogenic in 85% (6) of the patients with the lower molars being the culprit. Antimicrobial treatment, debridement, and fasciotomy improved healing. Delay before appropriate treatment had an adverse affect on outcome, and two patients died of septic shock and respiratory obstruction. Early diagnosis and prompt referral can reduce the morbidity of cervical necrotizing fasciitis.

Key words: Necrotizing, fasciitis, cervicofacial, head and neck

INTRODUCTION

Cervical necrotizing fasciitis (CNF) is a fulminant infection that spreads with high mortality, and the necrosis of connective tissue that spreads along the facial plane. It was first clinically defined by Joseph Jones in 1871, during the U. S. Civil War. In 1918, Pfanner diagnosed a patient with a beta-hemolytic streptococcal infection and designated it “necrotizing erysipelas”. Wilson was the first person to use the term necrotizing fasciitis (NF) in 19521.

In general, the disease is limited only to the subcutaneous tissue, muscle involvement is rare. The fact that CNF causes tissue necrosis and spreads rapidly along the facial plane is
due to its being polybacterial and the synergistic effect of enzymes formed by the bacteria. The causative agents have classically been described as being group A beta-hemolytic streptococci, staphylococci, and obligate anaerobic bacteria. While involvement in the head and neck area is rare, it is more common in extremities, the genital region, and the abdomen. The main reasons for the disease are odontogenic infections and trauma. Tonsillar infections, salivary gland infections, otogenic and dermatologic infections are other rare causes. Predisposing factors that have been identified in association with CNF include extremes of age, immunosuppression, diabetes mellitus, alcohol, and tobacco smoking and malignancy. Although there are no clinical features that are pathognomonic for CNF, certain physical signs increase its likelihood. Pain, hyperpyrexia, and tachycardia that are out of keeping with the degree of soft tissue involvement are more suggestive of CNF. Furthermore, anesthesia of the affected area as a result of nerve involvement is an early sign of CNF. The early stage of the disease looks like abscess and cellulite. The covering skin is usually red and taut. Hyperesthesia or anaesthesia can be identified by touch. This benign image is the most important reason behind late diagnosis. Treatment of the disease is early diagnosis, a careful aggressive debridement, parenteral antibiotic treatment, and supporting treatment controlling an underlying preparative, and aggravating factors. This paper presents our experience with seven cases and the challenges associated with them. It also reviews the necessary literature.

CASE REPORT

A. Patients and method

The setting was the Maxillofacial Surgery clinic of the Ahmadu Bello University Teaching Hospital Shika Zaria. As the oldest referral centre in Northern Nigeria, our centre receives patients from the North West and North Central geopolitical zones of Nigeria (approximate population 35,915,167 million from the 2006 census). A study that spanned the period from January 2006 to June 2012. Parameters studied include age, sex, medical status, etiology and bacteriology of infection, duration of symptom, routine laboratory investigations (Hematology and chemical pathology) including Fasting blood glucose, antimicrobial treatment, and surgical treatment and complications.

B. Results

Of the 7 patients (Table 1), four (57.14%) were female while 3 (42.85%) were male. The age range was between 25 years to 72 years with the average of 45.428 years. The duration of toothache ranged between 21 to 42 days with an average of 27 days.
Cervicofacial necrotizing fasciitis

Table 1. Summary table.

<table>
<thead>
<tr>
<th>Age/Sex</th>
<th>Aetiology</th>
<th>Time of presentation</th>
<th>Duration of toothache</th>
<th>Co-morbidity</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>25yrs/M</td>
<td>Odontogenic(lower molar), Apical periodontitis</td>
<td>10 days</td>
<td>42 days</td>
<td>Anemia</td>
<td>Jaundice, septicemia, death.</td>
</tr>
<tr>
<td>30yrs/F</td>
<td>Odontogenic(lower molar), Apical periodontitis</td>
<td>6 days</td>
<td>35 days</td>
<td>Anemia</td>
<td></td>
</tr>
<tr>
<td>36yrs/F</td>
<td>Odontogenic(lower molar), Apical periodontitis</td>
<td>6 days</td>
<td>21 days</td>
<td>Diabetes Mellitus</td>
<td>Mediastenitis, pleural effusion, death.</td>
</tr>
<tr>
<td>45yrs/F</td>
<td>Odontogenic(lower molar), Periodontal infection</td>
<td>9 days</td>
<td>28 days</td>
<td>Anemia</td>
<td></td>
</tr>
<tr>
<td>50yrs/M</td>
<td>Odontogenic(lower molar), Periodontal infection</td>
<td>10 days</td>
<td>35 days</td>
<td>Diabetes Mellitus</td>
<td></td>
</tr>
<tr>
<td>60yrs/F</td>
<td>Odontogenic(lower molar), Apical periodontitis</td>
<td>6 days</td>
<td>28 days</td>
<td>Anemia</td>
<td></td>
</tr>
<tr>
<td>72yrs/F</td>
<td>Dermatological</td>
<td>8 days</td>
<td></td>
<td>Anemia, hypertension.</td>
<td></td>
</tr>
</tbody>
</table>

Anemia was the predominant co-morbid disease followed by diabetes mellitus. One patient had both anemia and hypertension. All patients were admitted and placed on intravenous infusion of 0.9% normal saline alternated with 4.3% dextrose saline. All patients presented with cervicofacial swelling which was warm, erythematous and associated with fever. The temperature on admission ranged between 37.5 and 39.9°C. In those patients with swelling, bullae formation became evident within 48 hrs to 72 hrs of admission. Purulent exudate was also observed from the wound at this stage. All patients had incision and drainage with debriement under local anesthesia and fascia necrosis was demonstrated during exploration. Broad spectrum antibiotics (crystalline penicillin, we noticed it is not abused in our environment) were administered intravenously along with metronidazole and gentamycin immediately after pus was obtained for culture. From the laboratory, streptococcus pyogenes was cultured in 2 (28.57%) patients. Pseudomonas sp. Staphylococcus aureus were other organisms cultured. No organisms were cultured in 5 (71.42%) most likely because the patients have been on systemic antibiotic medications prior to their referral from the peripheral and rural hospitals. Following incision and drainage, rubber drains were inserted and at the appropriate time necrotic tissues were excised (Figure 1, 2). Fasciotomy was done and wound dressed twice daily with gauze soaked with dilute hydrogen peroxide and EUSOL. The patients with odontogenic causes had extraction of the offending teeth.
Figure 1. A male patient with drain.
Cervicofacial necrotizing fasciitis

Figure 2. Patient with debrided extensive wound waiting for skin graft.

Figure 3. Patient with jaundice
DISCUSSION

Necrotizing fasciitis is a severe, potentially fatal infection involving the subcutaneous soft tissues. It may involve any part of the body, but commonly affect the extremities\(^7\). CNF is an infection that rapidly progresses on the facial plane, even if cases are rare. It comprises 2.6% of all head and neck infections\(^1\).

CNF has been described under various synonyms, including hospital gangrene, hemolytic or acute streptococcal gangrene, gangrenous or necrotizing erysipelas, suppurative fasciitis, Melaney’s gangrene and Fournier’s gangrene\(^4\). There are 3 types of necrotizing fasciitis based on causative organism: Type I: polymicrobial infection, Type II: Group A streptococcal infection and Type III: Gas gangrene or clostridial myonecrosis\(^6\). The causative agents have classically been described as being group A beta-hemolytic streptococci, staphylococci, and obligate anaerobic bacteria\(^2\).

The condition has probably been under-diagnosed in the past, and is being increasingly recognized nowadays. CNF is rarely seen in the head and neck, however, its occurrence is probably more than the reported cases would suggest\(^4\).

In our series the etiology was odontogenic in about 85.71(6) % with the mandibular molar being the focus. This is in agreement with other studies\(^1,7\). Other causes have been reported such as tonsillar infections, salivary gland infections, otogenic and dermatologic infections are other rare causes\(^5\). In this series, one patient’s (14.2%) etiology was dermatological.

Our study showed more female than male in ratio 4:3. This is in agreement with Obimakinde et al\(^7\). But according to same author, earlier studies from Southwest Nigeria showed higher males. Iynen et al\(^1\), also concurred with the high male preponderance. The possible reason we could advance for having more female in our study is that they are more health conscious than men.

Soft tissue X-ray of the neck is a useful initial investigation in less suspicious cases and it can detect air in the soft tissues. However, in suspicious cases, one should have a low threshold for performing a CT scan. The role of the CT scan in CNF is twofold, namely, to help establish the diagnosis at an early clinical stage and to help detect complications due to progressive tissue necrosis after initial surgical management\(^6\).

Other diagnostic tests include skin biopsy, culture and sensitivity and Gram staining\(^6\).

The role of Co morbidity in the etiology and prognosis of NF is well documented in the literature\(^7\). We found diabetes mellitus (n=2), hypertension (n=1), nutritional anemia (n=5) as co morbid diseases.

The treatment for necrotizing fasciitis is a combination of surgical debridement, appropriate antibiotics and optimal oxygenation of the infected tissues\(^8\).

Hyperbaric oxygen therapy can be administered as adjunctive therapy although its use is controversial and further studies are required to support its effectiveness in treating necrotizing fasciitis\(^3\).

The complications of CNF are both local and systemic. Direct and distant spread of the infection can lead to complications that include intracranial, retropharyngeal, pulmonary infections and mediastinitis. Systemic complications such as septic shock, rheumatic disease, and cardiac problems\(^2,5\). The complications we observed in our study were mediastinitis, pleural effusion, jaundice, septic shock and death.
Several factors have been found to influence survival in CNF: a delay in surgery, the development of mediastinitis, and the presence of medical comorbidities; old age, female sex (especially with age > 60 years), uncontrolled diabetes mellitus, anemia, coexistent pulmonary diseases, delayed referral (greater than 6 days)\textsuperscript{2}. In our series all the patients presented late due to late referral. All our patients had co-morbidity, one patient developed mediastinitis, the other septicemia and both died. Our patients that died were both less than 60 years (a male and a female). CNF carries an average mortality rate of about 19-40 \%\textsuperscript{1,3}. In our study, 28.5\% (2 patients) was the mortality rate. The current coverage of national health insurance is restricted to employees of government and our resource poor environment complicates the issues.

In conclusion, rapid progression of the disease, financial constraints, delayed referrals from rural clinics and distance to the tertiary hospital caused complications.

**CONSENT**

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

**COMPETING INTERESTS**

The authors declare that they have no competing interests.

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**REFERENCES**