CHALLENGES IN THE MANAGEMENT OF CERVICOFACIAL NECROTIZING FASCIITIS IN A DEVELOPING ECONOMY: OUR EXPERIENCE

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ABSTRACT

BACKGROUND: Necrotizing fascitis is uncommon but a life threatening cervico-facial infection, which is characterized by aggressive spread of inflammation and necrosis of the tissues. In our environment clinical presentation is often late and patient's management at this stage is very challenging. We present the challenges in the management of this lesion as experience in our centres.

METHODS: We carried out clinical evaluation on the management and treatment options amongst the 11 patients that presented with cervicofacial necrotizing fascitis at two tertiary hospitals in South east, Nigeria over a 3-year period from 2012 to 2015. The focus was on the management challenges which include diagnosis, lack of modern facilities and treatment options, associated co- morbidities such as retroviral disease and diabetes mellitus, financial constraint and incessant industrial action by the medical and allied workforce.

RESULT: There were 7 males (63.6%) and 4 females (36.7%) giving a male-to-female ratio of 1.8: 1 aged between 27 – 78 years with a mean of 57.4 ± 17.9 years. All presented as emergency and were hospitalized. Six (54.5%) were treated successfully with mortality rate of 9.1% (one patient) recorded. Four (36.4%) were lost to follow up., two of which were referred as a result of industrial action while the other 2 were discharged against medical advice.

CONCLUSION: Patients often presents late and with limited options of treatment in a depressed economy treatment is often very challenging. Since poor oral hygiene is a modifiable risk factor, emphasis on oral health care should be a preventable measure.

KEYWORDS: Cervicofacial, Necrotizing fasciitis, Challenges, Management, Developing economy

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INTRODUCTION

Necrotizing fasciitis is a potentially fatal, progressive, rapidly spreading inflammatory soft tissue infection located in the deep fascia with secondary necrosis of the subcutaneous tissue[1, 3]. These infections respect no anatomic boundaries and present to surgeons of all specialties, maxillofacial surgeons inclusive. It is a global phenomenon with a high prevalence before the introduction of antibiotics and comprises about 2.6% of all head and neck infection. The mortality rate is approximately 30% which points to a far cry from optimal success rate in its management[6, 19]. The disease state was first described by Joseph Jones in 1871 while Wilson in 1952 coined the name due to the characteristic fascia necrosis associated with it[12].

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The presence of co-morbid conditions coupled with airway challenges contribute to high morbidity and mortality of the condition. Other contributory factors include, late surgical intervention, mediastinal and thoracic extension of infection, polymicrobial nature of the infection, delayed hospitalization, diagnosis and inappropriate treatment due to difficulty in recognizing the condition, financial constraint, late referrals from rural health clinics and long distance to the tertiary hospitals[12, 20].

A review of the literature shows that while some authors agree that pre existing ill health, co morbid states like Diabetes mellitus, alcoholism, retroviral disease, vascular insufficiency, neutropenia play a vital role in the pathogenesis of the disease,[6, 8, 21] others think otherwise[10].

Periapical infections of the mandibular molars, pericoronitis and impacted third molars are common origins of the disease. However other sources include trauma, tonsilar and pharyngeal infections, cervical adenitis, tumour infections, mastoid and salivary

gland infections as well as postauricular lymphadenitis. The bacterial infective state leads to thrombosis of blood vessels that pass through the fascia thereby interrupting the subdermal blood supply to the overlying skin and as such resulting in necrosis. This is made worse by the synergistic action of anaerobic and facultative bacteria in a hypoxic environment which promotes the production of enzymes and endotoxins that suppress host defenses, resulting in the dissemination of infection[14,20].

Our study focused on encountered challenges in the course of management of these patients and these ranged from diagnostic, late presentation, poor patients' attitude to their health care, financial incapacity, and industrial actions and complications relating to co-morbidities. To the best of our knowledge, no previous study about it has been reported from the South Eastern part of the country.

The article is aimed at highlighting and sharing our experiences in the management of this condition and to suggest ways of improving management in such a depressed economy like ours.

METHODS:

We carried out a prospective clinical evaluation on the management and treatment options amongst the eleven consecutive patients that presented with necrotizing fasciitis affecting the head and neck region at two tertiary institutions of University of Nigeria Teaching hospital Enugu, Nigeria and Federal Teaching Hospital Abakailki, Ebonyi State. The hospitals have patient catchment area from the 5 south eastern states of Nigeria and beyond. The study spanned a 3 year period from 2012 to 2015. The patients were aged between 27 – 78 years and admission was through the Oral and maxillofacial clinics and the Accident and emergency department of the hospitals. A total of 11 patients were seen and treated within the study period.

The focus was on the management challenges and treatment outcome which bothered on diagnosis, lack of modern facilities and treatment options, associated co- morbidities such as retroviral disease and diabetes mellitus, financial constraint on the part of the patients, negligence of patients towards their health care and incessant industrial actions by the workforce. All patients that presented with other cervicofacial infections other than necrotizing fasciitis were excluded from the study.

The diagnoses were made by the investigators and our criteria were majorly clinical as was evidenced by initial presence of unusual skin erythema with accompanying bullae formation, reduced skin sensation and subcutaneous crepitation which progressed to frank skin necrosis. All the cases were characterized with the same spectrum of ailment; wide spread cervico-facial necrosis extending to the anterior mediastinum in some of the patients, purulent discharge and offensive odour, soft tissue gangrenous cellulitis (Figs. 1 & 2).

The same standard treatment protocol was followed in the management of all the patients and these included admission, resuscitative measures with fluids, microscopy, culture and sensitivity, administration of intravenous broad spectrum antibiotics, elimination of primary focus of infection, timely and aggressive serial debridement and fasciotomy, adequate nutritional support, daily dressing with pure honey and management of associated co-morbidities when present. Outcome was assessed based on age of patients, presence of co-morbid states, immune status, and clinical extent of disease as well as survival and mortality rates.

Standard of Living Index (SLI) using a Proportionate Possession Weighting (PPW) was used to grade the socio economic status of the patients[22].

RESULTS

A total of 11 patients presented with necrotizing fasciitis during the study period. As depicted in table 1, 7 (63.6%) were males and 4 (36.4%) female giving a male: female ratio of 1.8:1. They were within an age range of 27-78years with a mean age of 57.4±17.9years. The socio demographic characteristics of the patients are also depicted on table 1. All the patients managed were from Ibo tribe of South Eastern Nigeria except for one from Birom tribe of Plateau State.

Lower molar teeth were implicated as the focus of infection in all the cases with the right side constituting 81.82% and left side 18.18%. Of the teeth involved, first molars constituted 7(63.6%) of cases, second molar 3(27.3%) and the third molar 1(9.1%). Table 2 shows the co- morbid conditions associated with the patients, with majority of them (63.6%) presenting with diabetes mellitus and all diagnosed after presentation.

Seven (63.6%) of the patients presented with frank clinical features of necrotizing fasciitis whereas 4(36.4%) developed it on admission. Micro organisms isolated ranged from gram positive rods, gram negative rods, cocci, coliforms to anaerobes. These included Staphylococcus aureus, Streptococcus viridans, E coli, Klebsiella, and Proteus species. One of the cultures showed no growth of micro organisms probably because the patient may have been on antibiotics prior to presentation.

The treatment outcome (Table 3) was successful in six patients (54.5%), one (9.1%) died during the course of treatment whereas 4 (36.4%) were lost to follow up. Of the four patients, two were discharged against medical advice while two were referred as a result of industrial action. Figs. 1 & 2 shows two of the patients at presentation, Fig. 3; debridement procedure, Fig. 4; post debridement and Fig. 5 post treatment of one of the patients.

DISCUSSION:

Necrotizing fasciitis is a serious, life threatening, fulminating soft tissue infection, which is characterized by aggressively spreading inflammation and necrosis of the skin, subcutaneous tissue and fascia[5, 6, 15]. It can affect any part of the body, but commonly affects the extremities[6]. When it involves the head and neck region it is known as cervicofacial necrotizing fasciitis. Cervicofacial necrotizing fasciitis is uncommon, possibly due to highly vascular nature of this area[6, 7]. It has variously been known by terminologies such as necrotizing soft tissue infections, soft tissue gangrene, necrotizing cellulitis, non- clostridial gas gangrene etc[2]. The aetiology is mostly polymicrobial and includes group A streptococcus (streptococcus pyogenes), staphylococcus, clostridium perfringens, bacteriodes fragilis, and aeromonas hydrophilia[3].

The management principle entails prompt recognition of the presence of the signs and symptoms of the disease, treatment of the focus and timely serial surgical debridement, resuscitative measures and supportive therapy, in combination with high antimicrobial doses and management of associated co-morbidities[2].

The management is fraught with so many challenges even to the experienced surgeon in more advanced countries [17]. This is not to say the least in a depressed economy where 68.0% of the populace lives on less than $1.25 per day[4]. In our experience, all the cases were of odontogenic origin. The most common reported causes of this condition include dental caries, periodontal disease and pericoronitis,[8,9,10] with the mandibular second and third molar teeth being the most implicated[7,8]. However, in this study the first and second molars were mostly involved.

Seven males representing 63.6% and 4 females (36.4%) were seen and managed in our study. Six (54.5%) of them were successfully treated. This success rate could be attributed to our timely intervention. This male predominance is in agreement with similar studies[10,11,13,] while it contrasts with some others[6,12]. The patients' ages ranged from 27-78 years (mean 57.4±17.88years). This also favorably compares with other studies [10,13,14].

The role of co-morbidity in the progression of necrotizing fasciitis is well documented[6,10,14]. Findings from our study reveal diabetes mellitus contributing 63.6%, retroviral disease 9.1%. Benign prostatic hyperplasia (BPH) was seen in two of the patient who also had diabetes mellitus however; the role of this pathology in the progression of the disease could not be ascertained.

The incidence (63.6%) of diabetes mellitus in our study is similar to that found in studies done by Mastronikolis et al and Hefny et al.,[16,17] but in contrast to that of obiechina et al.,[10]. High glucose level in diabetic patients is known to impair leucocytes function, serves as a culture medium for bacterial growth which predisposes to an environment of low oxygen tension and therefore further depresses the host immunity. Diabetics also have reduced lymphocytes, T – cell and polymorphonuclear cell function, with compromised antibody response, which contributes to their impaired ability to fight infection [7]. The role of uncontrolled HIV in immune suppression is also documented in its progression [16].

Socio economic status of the patients played a key role in determining the outcome. The middle class which comprised 4 patients (36.4%) had an appreciable level of education from our observation. This group presented early and had a better outcome when compared with the seven (63.6%) of the low socio economic group (Table 1). Majority of them (63.6%) presented late with frank clinical features of the disease. Medical history however, showed that some had sought medical attention from quacks and road side chemists prior to presentation to the hospital. This buttresses the role of adequate education in creating awareness about oral health needs, which will purposely address the laissez faire attitude of patients to their health care, thereby encouraging disease prevention and early seeking of medical attention which was not the case in this study.

Diagnosis of necrotizing fasciitis could be quite challenging[17], and may be misdiagnosed because it presents with features similar to other odontogenic infections especially at the early stages of the infection[7,10,14,18]. The main stay in its diagnosis is a thorough history, adequate knowledge of the clinical presentation, accompanied by microbiological investigation, advanced radiographic imaging such as computed tomography (CT) scan and magnetic resonance imaging (MRI)[7,15,16]. The roles of these advanced radiological imaging techniques in the early diagnosis of this disease condition cannot be over

emphasized. In our centres, lack of MRI and constant breakdown of CT facility were some of the challenges we faced in the early diagnosis of this condition. Also unavailability of Hyperbaric Oxygen which has received much attention as an effective adjuvant therapy to antibiotics and surgery in its treatment hampered our success rate. Authorities responsible should be encouraged to provide these necessary facilities in all tertiary institutions especially in the developing economies and make available funds and expertise for their regular maintenance.

We observed that poverty was a major factor in the management of these patients as most of them found it difficult to provide the needed medication. A similar ascertion was made by Sikkerimath and Sikkerimath[20]. Presently the National health insurance scheme (NHIS) does not cover many services, and is not inclusive of the entire populace. Legislations should be enacted to ensure more effective operations of the scheme and its coverage extended to all citizens especially the less financially privileged. By so doing, the poor in the society will be adequately catered for.

Two of the patients were lost to follow up as a result of industrial action. Many preventable deaths are known to occur during these periods. We therefore advocate for urgent resolution of conflicts by constituted authorities and where possible factors that lead to them should be nipped in the bud even before they arise.

CONCLUSIONS

The article has highlighted and shared our experiences in the management of this condition as well as suggested ways of improving the management in a depressed economy like ours which may serve as a useful template to other less developed economies.

Table A1: Socio-demographics of the respondents

Sex	N	Frequency (%)
Male	7	63.6
Female	4	36.7

Occupation	Age(yrs)	Sex	Socioeconomic status
Civil servant	54	M	Middle
Farmer	55	M	Low
Housewife	29	F	Low
Farmer	60	M	Low
Retired Civil servant	70	M	Middle
Graduate applicant	27	M	Middle
Seamstress	38	F	Low
Farmer	76	M	Low
Trader	78	F	Low
Farmer	68	F	Low
Retired Civil servant	76	M	Middle

TableA 2: Co-morbid conditions

Cases	N	Frequency (%)
Diabetes Mellitus	7	63.6
Hypertension	1	9.1
Retroviral disease	1	9.1
Benign prostatic hyperplasia	2	18.2

Table A3: Outcome of patients' management

Outcome	N	Frequency (%)
Successfully treated	6	54.5
Death	1	9.1
Lost to follow up		
Secondary to industrial action by work force	2	18.2
Discharged against medical advice	2	18.2

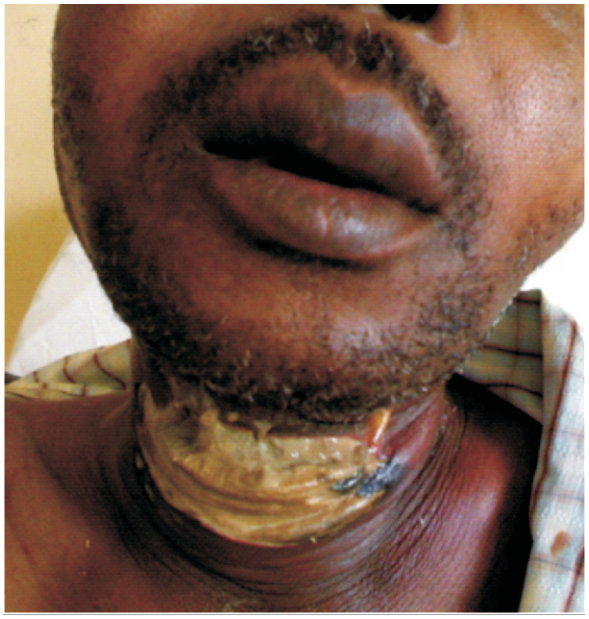

Fig. 1: A patient with cervicofacial necrotizing fasciitis (CNF) at presentation.

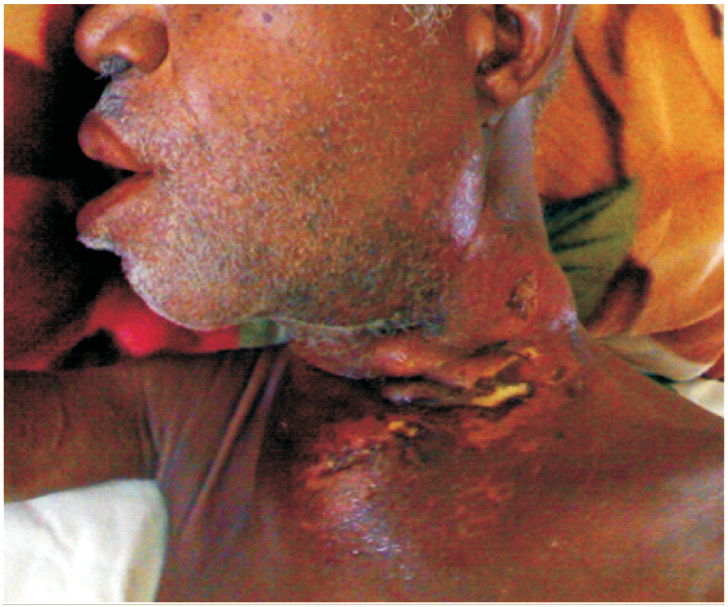

Fig. 2: Another case of CNF patient at presentation with extension to the anterior mediastinum.

Fig. 3: Surgical debridement and fasciotomy procedure

Fig. 4: Post debridement of necrotic tissue in a patients

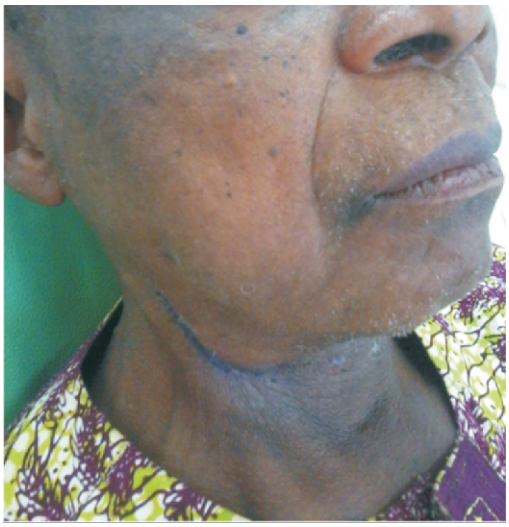

Fig. 5: Post treatment

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