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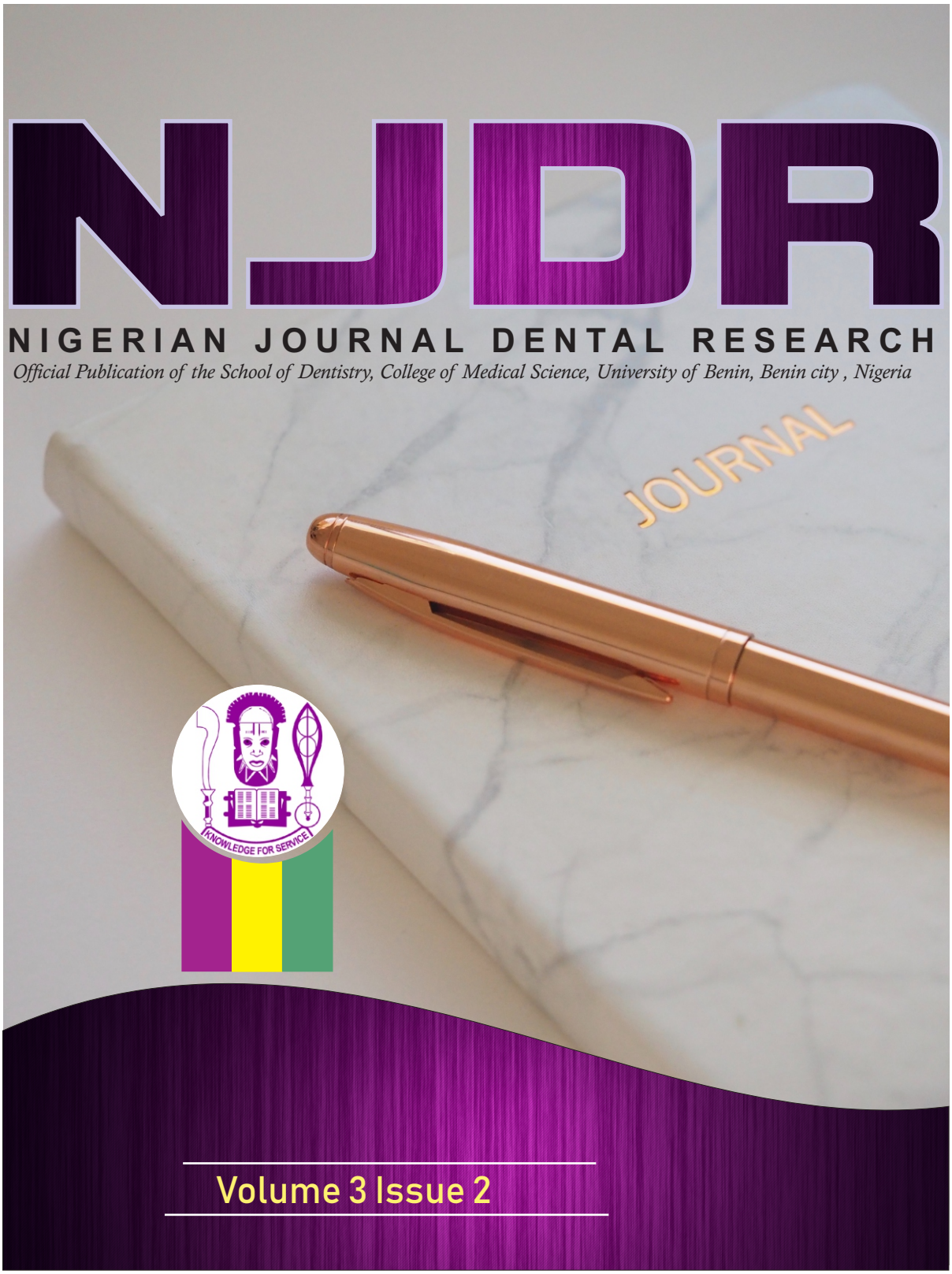

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Cervicofacial Necrotizing Fasciitis of Odontogenic Origin Following Chemotherapy: A Case report and Implications for Oral Care in Cancer Treatment

***Anthony Osemwegie OSAGUONA, **Theodore Amanze NJOKU**

*Department of Oral and Maxillofacial Surgery , School of Dentistry, University of Benin
**Department of Surgery, School of Medicine, University of Benin

ABSTRACT

Objective: Cervicofacial necrotizing fasciitis (CNF) is a rapidly spreading and often fatal infection of the soft tissues of head and neck characterized by tissue necrosis and profuse purulent discharge. This report describes a cancer patient, who had undergone chemotherapy and developed CNF of odontogenic origin to highlight the need for oral examination before commencement of chemotherapy.

Case description: A 68 years old retired gardener who developed CNF from infected right permanent mandibular first and second molars. He had undergone surgery and had 3 cycles of Cisplastin, 5-Fluorouracil and Adriamycin on account of carcinoma of the head of pancreas. No oral assessment was carried out prior to commencement of chemotherapy to detect a potential source of infection. Management included removal of the causative teeth, incision and drainage, repeated debridement, daily dressing of wound with Povidone-iodine solution and intravenous antibiotic based on pus microscopy, culture and sensitivity report. He however succumbed to the disease 23 days later.

Conclusion: CNF of odontogenic origin is an extremely fatal condition. Early detection and prompt aggressive treatment is a key to successful outcome. Clinicians involved with management of cancer patients should routinely seek the expertise of a dentist for a pre-chemotherapy oral assessment and all potential sources of infections are removed before chemotherapy begins.

Keywords: Cervicofacial necrotizing fasciitis, chemotherapy, oral care, carcinoma

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Correspondence
Dr A.O. Osaguona
Department of Oral and Maxillofacial Surgery , School of Dentistry
University of Benin
Email: aosaguona@uniben.edu

INTRODUCTION

Cervicofacial necrotizing fasciitis (CNF) is a fulminating soft tissue infection characterized by extensive necrosis of the subcutaneous tissue along the fascia planes in the head and neck region. It is considered a rare occurrence in the head and neck region, but it commonly affects the limbs, perineum, scrotum and abdomen. Tung-Yin et al reported an incidence of 2.6%.[1] CNF is often fatal, with a high rate of morbidity and mortality ranging from 8.7% to 84%, with sepsis and multiple organ failures as the cause of death.[2]

Necrotizing fasciitis in the head and neck region results mainly from odontogenic infections,[3] other causes are mild injuries to the head and neck,[3,4] insect bites, throat infections,[5] ear infections,[4] sinusitis[6] and infected dental cysts.[7] Mathieu et al.[8] reported that 75% of the 45 cases of CNF in the head and neck region was from odontogenic sources. Predisposing factors are cancers, chemotherapy, diabetes mellitus, chronic alcoholism, human immunodeficiency viral (HIV) infection, severe nutritional anaemia and renal problem.[1,9,10,11]

This report describes a cancer patient, who had undergone chemotherapy and developed CNF of odontogenic origin, to highlight the need for oral assessment before commencement of chemotherapy.

CASE DESCRIPTION

A 68-year old retired gardener was referred from the general surgery unit to the oral and maxillofacial clinic of the University of Benin Teaching Hospital on account of toothache and right facial swelling. He had been managed by the general surgery unit for carcinoma of head of pancreas. He had a triple bypass surgery as well as 3 cycles of chemotherapy before the incidence of toothache. The chemotherapy regimen was intravenous Adriamycin 50mg/m2/day on day 1, 5 Flourouracil 300mg/m2/day days 1 to 5, intravenous Cisplastin 20mg/m^2/day day 1 to day 5. Medical history reveals that he had prostatectomy and was diagnosed with diabetes mellitus 2 years earlier and has been on

Glibenclamide tab. 5mg 12 hourly and Metformin 500mg 12 hourly. No oral assessment was carried out before cancer therapy.

Examination revealed an elderly man, with a diffuse tender swelling on the right side of the face. The skin over the swelling was dry and wrinkled. There were enlarged and tender submental and submandibular lymph nodes. The patient's mouth opening was less than 2cm and pus exuded from the buccal gingival crevice of grossly mobile teeth 46 and 47 (right first and second permanent mandibular molars). Periapical radiographs showed periradicular bone loss with furcation involvement of 46 and 47, indicative of an

Table 1: Seven strategies to overcome barriers to oral care as proposed by McGuire22

Strategy	Importance	Rationale
1. Recognition of the need for oral care standards	Without explicit agreement, a substantive effort is unlikely	Recognition moves oral care to the status of a clinical priority
2. Formulation of an interdisciplinary task force or work group	Oral care is an interdisciplinary problem requiring interdisciplinary solutions	A collaborative team effort is more successful in achieving commitment and participation
3. Provision of administrative priority and support	Support at the highest levels is essential for success	This support can translate into resources, including time, supplies, personnel, and other factors
4. Development of evidence-based oral care standards	Oral standards must reflect the available research knowledge base	Agreement upon content and foundation of standards facilitates adoption
5. Education of health-care providers.	Providers need to know about and understand the standards and the process	Agreement upon content and foundation of standards facilitates adoption
6. Integration with existing institutional practice	Practice innovations are more successful when they are integrated with current practices	Change is easier to accept when it occurs in a logical and transitional
7. Education of patient and family	Recipients of care need to know about and understand goals and processes of oral care standards	Education about oral care facilitates the acceptance and participation in oral care standards

A diagnosis of acute submasseteric space abscess extending to the temporal and submandibular region was made. The offending teeth were extracted and immediate submandibular and submental incisions, and drainage was carried out, with 2 corrugated rubber drains placed insitu. Pus and blood specimens were taken for microscopy, culture and sensitivity (MCS) and full blood count respectively. Metronidazole 500mg infusion 8 hourly was added to intravenous ceftriaxone 1 g daily instituted by the surgical team. A review of the patient two days later revealed that there was an increased spread of the abscess to the neck and the skin over the swelling was necrotic (Figure 2). There was the typical "dish water" exudate characteristic of cervicofacial necrotizing fasciitis. More necrotic material was removed underneath the masseter muscle and the temporal space through a wider access under general anaesthesia (Figure 3). The fascia spaces were copiously irrigated with Povidone iodine solution and normal saline. Pus microscopy and culture yielded growth of *Escherichia coli (E.coli)* which was only sensitive to Imepenem. However, the patient could not afford the drug, so intramuscular Gentamicin injections 80mg 8 hourly was added to previous medication. Dressing of the wound was done daily and healing was slow but progressive. However, the patient succumbed to the disease 23 days after his initial presentation and the probable cause of death was septicemic shock.

Figure 1:Perapical radiograph showing alveolar and fucation bone loss involving the right permanent mandibular first and second molars.

Figure 2: Presentation 48 hours after initial incision and drainage

Figure 3, Wound debridment under general anaesthesia

DISCUSSION

Medically compromised states increase the risk of developing CNF and a greater risk of mortality.[1] Lin et al., [12] 2001 reported that 89.4% of cases had an underlying systemic disease with over three-quarters being diabetic. Nutritional anaemia accounted for most the common underlying factor in another study carried out in Northern Nigeria.[11] This patient was diabetic; he had cancer of the head of pancreas and had received 3 cycles of chemotherapy before presentation.

The oral mucosa, like myleproliferative cells are the worse hit by the direct cytotoxic effects of chemotherapy. Additionally, the manifestations of myelosuppression during chemotherapy are also evidently seen in the oral cavity. There was atrophy of mucosa and distortion of the normal flora with growth of opportunistic organisms. The predominant growth of gram-positive organisms give way to gram-negative organisms and fungi and other unlikely residents of the oral cavity like *Klebsiella, Escherichia coli* and *Candida.*[13] Mixed pathogens have been implicated in the aetiology of CNF, isolates include *Clostridium, Bacteroides, Enterobacteriacea, Staphylococcucaureus, Prevotella, Porphyromonas, Streptococcus* and a host of others.[2]

Diabetes mellitus has been linked with an increased susceptibility to infection affecting several systems[14] including oral infection.[15] The exact mechanism is unknown, however, it is thought to be a T-cell mediated immune response and impaired neutrophil functions. Several studies have shown a relationship between diabetes mellitus and periodontal diseases. The relationship has been described as a 2-way relationship. That is, an increase in tissue destruction as seen in diabetic periodontitis and periodontal infections may also complicate the severity of diabetes mellitus and its metabolic control.[16,17] Also, the role of cancers in inducing immunosuppression depending on the host immune system processing or failure to process the presence of cancer cells and factors elaborated by cancer cells.[18] These co-morbid conditions would have acted synergistically to severely compromise the patient's general health.

Early recognition of the clinical features of CNF is the key to successful outcome of management because CNF has an innocuous presentation. It is often difficult to make an initial and prompt clinical diagnosis. Initial presentation mimics odontogenic fascia space infection and this is a dilemma to the unsuspecting surgeon. Clinical presentation is varied, in a case series of 7 patients by Lee et al.,[19] the common presenting symptoms were sore throat, fever and neck pain. A much larger review of CNF cases over a 12 year period showed neck cellulitis and pain as the most constant feature.[12]Frequently, diagnosis is made about 48 hours after initial presentation when an incision and drainage is being carried out. Erythema, dark and dusky grey skin, cutaneous anaesthesia, vesicle formation, subcutaneous crepitation and sloughing of fascia, copious amount of “dish water” exudate and necrotic matter are evidently seen.[2]

The most common cause of CNF is from odontogenic origin and mandibular molar tooth is often involved.[1,11] Baker[20] identified potential sites of oral infection and dental–related trauma. These are periodontal pockets depth greater than 6mm, periodontal diseases involving furcation in molar teeth, pericoronitis, advanced caries involving the pulp tissues, tooth sensitivity to percussion, Herpes simplex seropositivity, clinical suspicion of bacterial, viral and fungal infection, sub and

supra-gingival calculus. Others are fractured tooth or restorations, ill-fitting prostheses, orthodontic bands and exfoliating teeth.

A pragmatic approach to oral care is utmost in cancer care whether it is before, during and after cancer treatment. Evidently, there are several reports highlighting the significance of oral care in the prevention and reduction of the deleterious effect of cancer therapies. The 1989 consensus meeting in Bethesda, Maryland on oral complications of cancer therapies reviewed several documents and several recommendations from experts. The decision reached was that "All cancer patients should have an oral examination before initiation of cancer therapy and that treatment of pre-existing or concomitant disease is essential in minimizing oral complications in all cancer patients".[20,21] It is believed that an oral examination before commencement of chemotherapy in this case would have prevented the development of CNF. The causative teeth which had periodontal infection were potential source of infection and thus would have been extracted. Also prophylactic cleaning of the mouth would have been done. It is advocated that a dentist with experience in cancer care should be included into the oncology team. The dentist should have access to these patients for periodic oral check. The role of the dentist in the team is to: (1) schedule oral health appointment prior to cancer therapy; (2) educate patients about the risk of oral infection, how to recognize signs of oral infection during cancer treatment and the need to seek immediate treatment for their oral health concerns; (3) perform dental treatment to restore or remove any diseased areas and to ensure meticulous oral hygiene regimen is maintained; (4) assess medications for the potential to produce xerostomia side effects; (5) implement fluoride therapy in the clinic and at home to reduce the risk of dental caries; and (6) advice those with smoking and alcohol addictions to seek cessation programs. These measures become effective if they are individualized based on the patient's oral health needs.

This paper is expected to stimulate cancer care givers on the role of dentist in preventing or ameliorating the effects of cancer treatment, improving quality of life and reducing the cost of care. The existing information related to oral care in cancer patients have not been widely imbibed in many hospital settings worldwide. Thus there must be concerted efforts by all concerned in cancer care to adopt these practices. In a review by McGuire,[22] several barriers to optimal oral care for cancer patients were elucidated. These are: gaps in knowledge among oral care givers, reliance on old traditional oral care practices which lack scientific basis, absence or use of inconstant oral care assessment tools, diverse oral care regimens and practices, insufficient and conflicting evidence bases, lack of acceptable universal standards of oral care, and administrative and clinical trial issues. McGuire also proposed strategies to overcome these barriers (Table 1)

CNF of odontogenic origin is an extremely fatal condition. Early detection and prompt aggressive treatment is a key to successful outcome. Clinicians involved with management of cancer patients should routinely seek the expertise of a dentist for a pre-chemotherapy oral assessment and treatment of all potential sources of infections before chemotherapy begins. This report advocates a pragmatic approach to oral care and suggests areas for further studies in designing guidelines for oral care practices for cancer patients in our environment.

CONCLUSION

CNF of odontogenic origin is an extremely fatal condition. Early detection and prompt aggressive treatment is a key to successful outcome. Clinicians involved with management of cancer patients should routinely seek the expertise of a dentist for a pre-chemotherapy oral assessment and all potential sources of infections are removed before chemotherapy begins.

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