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Case Report

Blindness Secondary to Odontogenic Infections: Case Series from a Tertiary Health Care Facility in Sokoto, Northwestern Nigeria

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Abstract:

Blindness secondary to odontogenic orbital infection is not uncommon. We report five (5) cases of severe odontogenic orbital cellulitis causing blindness. These patients were seen and managed over a 3-year study period (from July 2019 to August 2022) at the Dental and Maxillofacial surgery clinic of Usmanu Danfodiyo University Teaching Hospital Sokoto. There were 2 male children and a female child in the age range of 6-10years with a mean±SD of 7.7±2.1, a 37-year-old male and a 24-year-old female. Cancrum oris/osteomyelitis was the primary diagnosis in one child, right maxillary osteomyelitis in two children, buccal +temporal space abscess and buccal space abscess in the two adult (male and female) patients respectively. All patients had a preceding history of toothache before the onset of other symptoms. All the patients had visual acuity of no light perception in the affected eye. Additionally, they had a varying degree of proptosis and restricted ocular motility while one child presented with purulent discharge and disorganized globe. Aggressive medical and surgical treatment was instituted in consultation with the ophthalmologists, which resulted in the resolution of the disease in all the patients.

Keywords: Blindness, Orbital cellulitis, Odontogenic

Introduction

Although the incidence of the spread of odontogenic infection to the adjacent structures has decreased over the past few decades, they do still occur commonly in our environment.[1] In most cases, odontogenic infection is localized to the periapex of the teeth, while in some instances purulent substances pass through the soft tissues especially, the fascial planes and, spread to distant areas within the head, neck and chest regions. [2, 3] Local factors such as; anatomical location of the teeth and the adjacent fascial plane, systemic factors as well as socioeconomic factors play a major role in determining the spread of infection and its pattern. [3] Haematogenous spreads especially via the dangerous area of the face is another means by which odontogenic infection could spread to other structures of the head and neck. However, the upward spread of odontogenic infection to the orbit is not uncommon. [4] Variable clinical presentations of orbital involvement ranging from preseptal cellulitis to a more severe orbital cellulitis and abscess have been reported.[1] Blindness secondary to odontogenic orbital cellulitis though rare but has been reported in previous literature. [4, 5] Early presentations and diagnosis With prompt surgical and medical intervention are necessary to prevent these infections from progressing to more serious and dangerous conditions such as cavernous sinus thrombosis, pituitary necrosis, meningitis and, brain abscess.

Case Series

A total of five (5) patients seen and managed over a 3year study period (from July 2019 to August 2022) at the dental and maxillofacial surgery clinic of Usmanu Danfodiyo University Teaching Hospital Sokoto are presented. Clinical data such as age, sex, presenting complaint, presenting visual acuity, duration of symptoms before presentation, comorbidity, primary diagnosis leading to the orbital involvement as well as the surgical treatment offered to the patients were recorded (Table 1). There were 2 male children and a female child in the age range of 6-10years with a mean±SD of 7.7±2.1, a 37-year-old male and a 24-year-old female. The duration of symptoms before presentation ranged from 5 days to 4 months. All patients gave a history of toothache preceding other symptoms. Other symptoms recorded include; swelling, discharge and, orbital pain. All the

patients had visual acuity of no light perception. Additionally, they had a varying degree of proptosis and restricted ocular motility while one child presented with purulent discharge and disorganized globe (Figure 1a).

Malnutrition plus anaemia was recorded in one child, anaemia only in one child and, the adult male (check Table 1) patient is a known diabetic who has been on medication for about 2 years. Maxillary osteomyelitis of odontogenic origin was the primary diagnosis in two children (Figures 1a-1f and 2a-2b) whereas Cancrum oris/maxillary osteomyelitis was diagnosed in the other child patient (Figures 3a-3e). Buccal space infection and buccal and temporal space infection were the secondary diagnoses in the female and male adult patients respectively (Figure 4). Baseline investigations were done on all the patients. Microbiological culture and sensitivity (MCS) yielded no growth in all the patients. The requested computed tomography result was available only for two patients (Figures 1d, 3c and 3d) because of serious financial constraints. Aggressive medical and supportive therapy including antibiotics, analgesics, I.V fluid, blood transfusion, and nutritional support were instituted. Surgical treatment including teeth extraction + incision and drainage was done in 2 (40%) patients, teeth extraction + sequestrectomy in 2(40%) while teeth extraction + sequestrectomy + orbital exploration in 1 (20%) was done in consultation with the ophthalmologists. No mortality was recorded and all the patients. They were followed up until the resolution of the disease. The visual acuity at discharge remained as no perception of light for all the patients. Additional resolution of the proptosis and full ocular motility was observed in the patients except for the child that had orbital exenteration; who had a dry, neat and empty socket (Figure 1b).

Table 1: Clinical summary of patients with blindness secondary to odontogenic infection

	Case 1	**Case 2**	**Case 3**	**Case 4**	**Case 5**
Age	9years	10years	6years	38years	28years
Sex	F	M	M	M	F
Presenting visual acuity	Nil perception of light	Nil perception of light	Nil perception of light	Nil perception of light	Nil perception of light
Symptoms duration	4months	1 month	3 weeks	9 days	2 weeks
Comorbidity	Nil	Malnutrition+ Anaemia	Anaemia	Diabetes mellitus	Nil
-Primary diagnosis	Maxillary osteomyelitis of odontogenic origin	Cancrum oris/Maxillary osteomyelitis of odontogenic origin	Maxillary osteomyelitis of odontogenic origin	Buccal space abscess 2^0 to dental caries of the right maxillary first molar	Buccal + Temporal space abscess 2^0 to dental caries of the right maxillary first molar
Surgical treatment	Teeth extraction + Sequestrectomy	Teeth extraction + Sequestrectomy	Teeth extraction + Sequestrectomy + Orbital exenteration	Incision and drainage + tooth extraction	Incision and drainage + tooth extraction

Figure 1a: Clinical photograph showing patient who presented with destroyed right eye.

Figure 1b: Clinical photograph showing an empty right eye socket.

Figure 1c: Clinical photograph showing a right maxillary osteomyelitis.

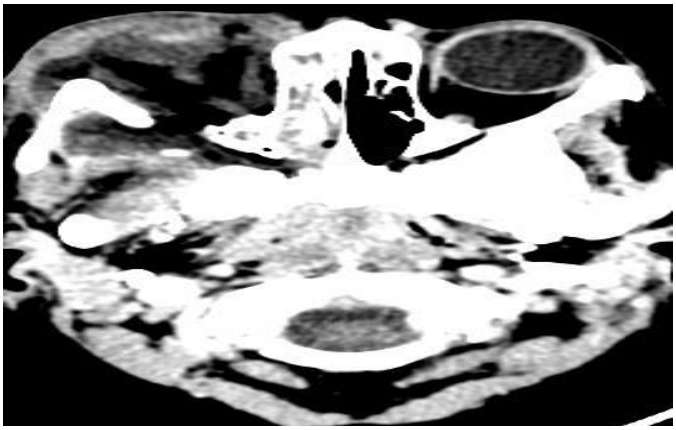

Figure 1d: Axial CT view showing above right orbit without the globe

Figure 1e: Clinical photograph showing clean area after teeth extraction and sequestrectomy

Figure 1f Clinical photograph showing teeth and sequestrum

Figure 2a÷ Clinical photograph showing the left facial swelling, depression on the lower orbital wall and proptosis of the left eye

Figure 2b: Clinical photograph showing osteomyelitis

Figure :3a Clinical photograph showing large maxillary sequestrum extending to the left eye

Figure 3b: 3D CT radiograph showing destruction of left medial and floor of the orbit

Figure 3c: Axial CT showing left globe deformity and lens destruction

Figure 3d: Clinical photograph showing the affected craniofacial area after removal of the sequestrum

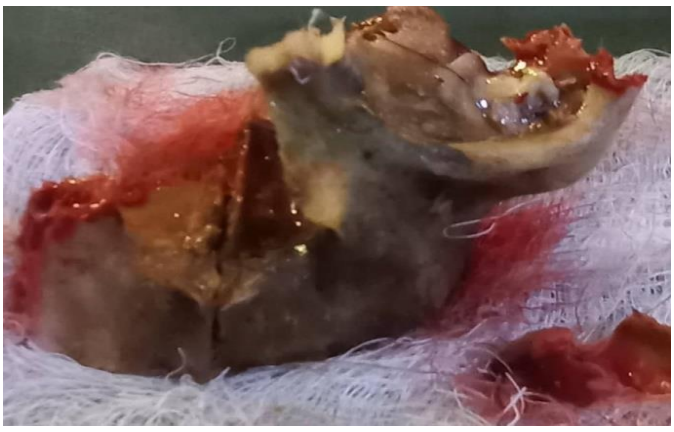

Figure 3e: Clinical photograph showing removed bone fragment

Figure 4: Clinical photograph showing buccal and temporal abscess.

Discussion

Odontogenic infections, if left untreated can spread widely as far as the brain in an upward spread and to the chest structures in a downward spread. [3] The upward spread involving the orbit is a common occurrence but it rarely causes blindness. [2] Orbital cellulitis of various etiology including those of dental origin is commoner in children. [5] This case series agrees with most of the findings in the literature as three out of the five patients are children [1, 2]. Orbital spread of infection could result since the orbital cavity has thin bones bounded by air-filled sinuses especially the orbital floor that is formed by the maxillary antral roof which makes it susceptible to the spread of odontogenic infection. [1] Long standing nature of odontogenic infections and the presence of predisposing factors such as anaemia, malnutrition and, diabetes mellitus in 3 (60%) of this current case series could have potentiated the severity of the orbital involvement resulting in blindness. Furthermore, this could also potentially explain the orbital destruction that led to orbital exenteration in one of this series.

Visual loss from odontogenic infections is usually through multifactorial mechanisms. The loss of vision may be due to optic nerve compression, interruption of the blood and nutrients supply to the optic nerve or the eye and, proptosis-induced stretching of the optic nerve. [6] Destruction of the orbital contents by the infectious process as evidenced in this case series could also be the cause of loss of vision. Central retinal artery occlusion, ophthalmic vein occlusion and toxic neuritis were suggested mechanisms of loss of vision especially when the spread is beyond the orbit such as in cavernous sinus thrombosis.[7]

Early presentation and prompt aggressive management could have prevented the orbital spread with the consequent loss of vision. In this series, all the patients presented with varying clinical features including proptosis, ophthalmoplegia, orbital pain, and periorbital edema while one patient (a child) presented with disorganized orbital contents. However, they all had loss of vision as a common presenting symptom. Microbiological culture and sensitivity were done in all cases and no microbial growth was recorded. This may likely be due to the anaerobic nature of the causation microbes (especially the obligate anaerobes) which require special transport media that is not available in our setting. Another possibility is the chronicity of the primary diagnosis (maxillary osteomyelitis) in some of the cases in this series where patients could have been using antibiotics before presenting to our clinic. A mycotic infection could also be considered as a possible etiological agent. However, our choice of antibiotics was largely empirical based on previous studies on prevalent organisms implicated. [8,9] Both extraoral and intraoral approaches were the surgical access used to drain the purulent materials. Extraction of the offending teeth, removal of bony sequestra, orbital exenteration in one of the cases and, serial explorations were done. All the patients had resolution of their symptoms at discharge. Patients were closely monitored to prevent further spread to the cranial cavity and the care givers of the children were counselled on care of the functional contralateral eye.

Conflict of interest:

There is no conflict of interest

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Nil

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