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Frequency of Orbital Cellulitis in Patients with Maxillary Teeth Infection

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ABSTRACT

Background: Orbital cellulitis and orbital abscess is an uncommon condition previously associated with severe complications. If untreated, these conditions can be potentially sight and life threatening such as cavernous sinus thrombosis, intra-cranial abscess, and death. Objective of this study is to determine frequency of orbital cellulitis in patient with maxillary teeth infection. **Methods**: This is a cross sectional study conducted at Oral and Maxillofacial Surgery Department of Liaquat University of Medical & Health Sciences, Jamshoro/Hyderabad, Pakistan from March 2018 to February 2019. A total of 203 maxillary teeth infection diagnosed on clinical and radiological examination were selected for this study. Patient's history regarding age, and special investigation were taken. Patient was diagnosed on the basis of clinical finding like periorbital swelling, edema and pain and radiograph (OPG and CT) to identify cause of odontogenic infection. All collected data was entered on short proforma. **Results**: Mean age of the patients was 37.08±9.42 years. Frequency of orbital cellulitis in patient with maxillary teeth infection was observed in 18.72% (38/203) cases. Infection was the commonest cause i.e. 18.7% followed by iatrogenic 9.9% and trauma was observed in 3.4%. **Conclusion**: In this study frequency of orbital cellulitis in patient with maxillary teeth infection was high. Awareness needs to be raised among the patients regarding the quack culture prevalent in developing countries to prevent such unethical practices and life-threatening complications.

Keywords: Orbital cellulitis, Maxillary teeth infection, Periorbital, Swelling.

INTRODUCTION

Orbital cellulitis and orbital abscess is an uncommon condition previously associated with severe complications. If untreated, these conditions can be potentially sight and life threatening such as cavernous sinus thrombosis, intra-cranial abscess, and death. Fortunately, enough, with current advances in antibiotic therapy, surgical techniques and investigations the morbidity and complications are greatly reduced. Orbital cellulitis cases are characterized by initial eyelid edema, erythema, chymosis, proptosis, blurred vision, fever, headache and double vision, while the orbital abscess cases show eventually pus discharge through the medial canthus of the affected orbit. Odontogenic etiology due to progression of infection to the adjacent maxillary sinuses into to the orbital tissues through orbital floor defects and fissures had been reported. These dental infections may arise from infected maxillary molars or maxillary premolars either following periapical dental infections, maxillary molar extraction, maxillary third molar surgery, root canal treatments or infected periodontal pockets.[1-9] Odontogenic etiology of orbital abscesses had also been reported associated with deciduous teeth.[10] Fortunately, enough only few cases of orbital abscesses of odontogenic origin were reported to progress to more serious situations where patients lost their sight on the affected side or even progress to a more serious complications such as cavernous sinus thrombosis, intra-cranial abscesses and death.[11-15] The surgical removal of third molars is one of the most common procedures performed in oral and maxillofacial surgery. The overall complication ratio associated with this surgery is 7% to 10% and the risk of postoperative infection varies from 1% to 15%. A retrospective analysis conducted by oral surgeons of 1000 mandibular and 500 maxillaries third molar extractions showed that the rate of postoperative complications was 4.3% for the mandibular extractions and 1.2% for the maxillary

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extractions. Recent advances in the imaging techniques have allowed the recognition of the Subperiosteal orbital abscess (SPA) as a specific condition within the general clinical setting of the "orbital cellulitis". In 1970 Chander et al proposed the clinical system to classify periorbital and orbital inflammation. They grouped these complications into following groups: (1) inflammatory edema (2) orbital cellulitis (3) subperiosteal abscess (SPA), (4) orbital abscess and (5) cavernous sinus thrombosis. The SPA results from the accumulation of purulent material between the periorbita and the orbital bones. Its rare complication following routine dentoalveolar surgery but early diagnosis and management are important to avoid sequellae. Subperiosteal abscess is a serious problem that is capable of both rapid progression and intracranial extension.[16]

Orbital cellulitis and discrete abscess formation around the orbit is mainly a sequel of spread of infection from the neighboring paranasal sinuses in about 70-80% of the cases. Odontogenic etiology of orbital infection constitutes a lesser percentage of about 10% of the cases. Maxillary teeth are usually the source of odontogenic infection of the orbit although it was reported that infection from the mandibular teeth can also reach the orbital content and induce orbital involvement. The Odontogenic infection can reach the orbit directly by spreading backwards into the pterygopalatine and infra temporal fossae then via the inferior orbital fissure to reach the orbital tissues. On the other hand, spread of odontogenic infection into the maxillary sinuses can eventually reach the orbit either by direct continuity or via the venous system as a thrombophlebitis resulting in a purulent orbital infection. Delay in irradiation of orbital infection may result optic neuritis and permanent blindness as a result of extreme congestion and edema of the orbital content and obstruction of blood flow through the retinal artery. In addition, even more serious complications as a result of its further spread into the cranium such as cavernous sinus thrombosis, intra-cranial abscess, and eventually death may occur.[17]

MATERIALS AND METHODS

This is a cross sectional study conducted at Oral and Maxillofacial Surgery Department of Liaquat University of Medical & Health Sciences, Jamshoro/Hyderabad, Pakistan from March 2018 to February 2019

Sampling technique:

Non-probability/consecutive.

Sample Selection

Inclusion Criteria:

- Age 22 to 70 years with orbital cellulitis arising from maxillary teeth infection diagnosed on clinical and radiological examination
- Either gender

Exclusion Criteria:

- Known case of any systemic disease diabetes, patients with asthma.
- Patients who received radio or chemotherapy for oral cancer within one year of presentation.
- Patients having missing maxillary teeth.

Data Collection Procedure

The study was performed after the permission of ethical committee of hospital and written informed consent for the study was obtained from the patient. Patients fulfilling the inclusion criteria all patients take detail history regarding age, and special investigation. Procedure was done by consultant with 5 years experienced in this field. Patient was diagnosed on the basis of clinical finding like periorbital swelling, edema and pain and radiograph (OPG and CT) to identify cause of odontogenic infection.

Blood investigation was carried out to identify co inside e.g Blood cp, PT, APTT, LFT, urea creatinine, HBsAg, and screening. All collected data was entered on short proforma.

Data Analysis Procedure

The data was analyzed by SPSS version 20. The entire qualitative variable like gender, ethnicity, socioeconomic status, orbital cellulitis and causes of orbital cellulitis was calculated as frequency and percentage. The quantitative variable like age was computed as mean and standard deviation. The chi square test was applied in between effect modifiers (Age, gender, ethnicity, socioeconomic status) and orbital cellulitis to check the statistical difference. The p value ≤ 0.05 was considered as significant.

RESULTS

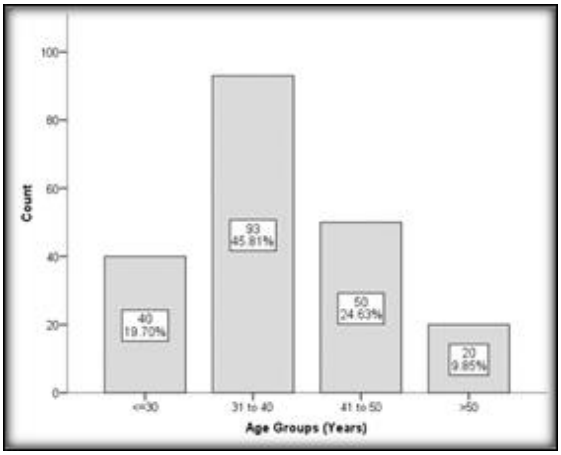

Figure 1: Age Distribution of the Patients n= 203

A total of 203 maxillary teeth infection diagnosed on clinical and radiological examination were selected for this study. Most of the patients were 31

to 50 years of age [Figure 1]. Mean age of the patients was 37.08±9.42 years. There were 126 (62.07%) male and 77 (37.93%) female [Figure 2]. Frequency of orbital cellulitis in patient with maxillary teeth infection was observed in 18.72% (38/203) cases as presented in figure 3. Infection was the commonest cause i.e 18.7% followed by iatrogenic 9.9% and trauma was observed in 3.4% as reported in [Table 1]. Frequency of orbital cellulitis in patient with maxillary teeth infection was not statistically significant among age groups (p=0.63) as shown in [Table 2]. It was significantly high in female patients as compare to male (p=0.015) as shown in [Table 3].

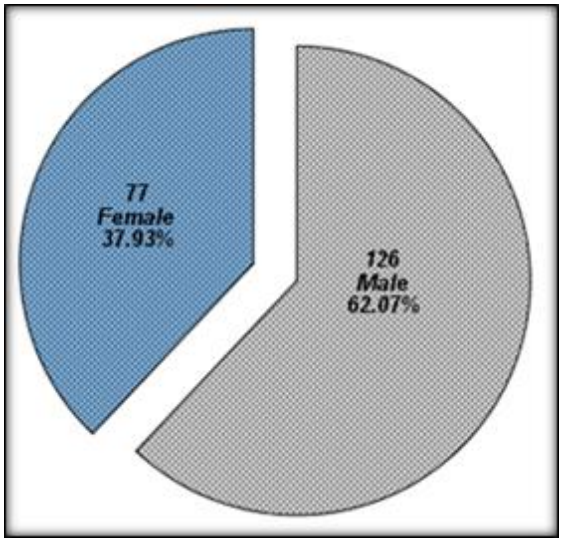

Figure 2: Gender Distribution of the Patients n= 203

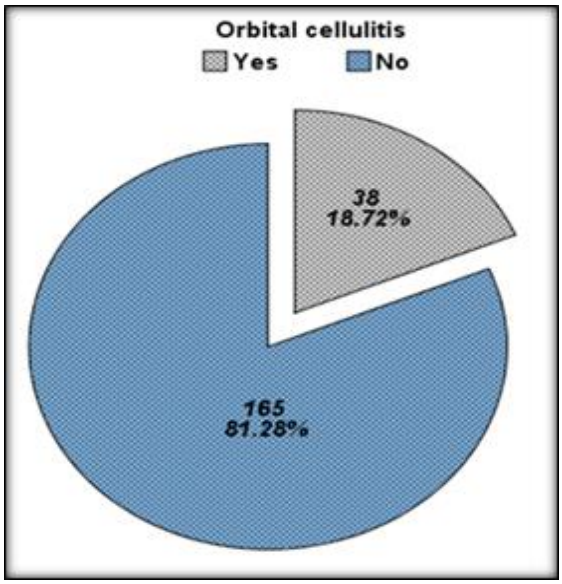

Figure 3: Frequency of Orbital Cellulitis in Patient with Maxillary Teeth Infection n=203

Table 1: Causes of Orbital Cellulitis

Causes	Frequency	Percentage
Iatrogenic	20	9.9%
Infection	38	18.7%
Trauma	7	3.4%

Table 2: Frequency of Orbital Cellulitis in Patient with Maxillary Teeth Infection by age Groups n=203

Age Groups (Years)	Orbital Cellulitis		Total	P-Value
	Yes	No		
≤ 30	5 (12.5%)	35 (87.5%)	40	0.630
31-40	19 (20.4%)	74 (79.6%)	93	
41-50	9 (18%)	41 (82%)	41	
>50	5 (25%)	15 (75%)	15	

Table 2: Frequency of Orbital Cellulitis in Patient with Maxillary Teeth Infection by Gender n=203

Gender	Orbital Cellulitis		Total	P-Value
	Yes	No		
Male	17 (13.5%)	109 (86.5%)	126	0.015
Female	21 (27.3%)	56 (72.7%)	77	

DISCUSSION

Orbital cellulitis and discrete abscess formation around the orbit is mainly a sequel of spread of infection from the neighboring paranasal sinuses in about 70-80% of the cases.[18] Odontogenic etiology of orbital infection constitutes a lesser percentage of about 10% of the cases.[19] Maxillary teeth are usually the source of odontogenic infection of the obit although it was reported that infection from the mandibular teeth can also reach the orbital content and induce orbital involvement.[20,21] The Odontogenic infection can reach the orbit directly by spreading backwards into the pterygopalatine and infratemporal fossae then via the inferior orbital fissure to reach the orbital tissues. On the other hand spread of odontogenic infection into the maxillary sinuses can eventually reach the orbit either by direct continuity or via the venous system as a thrombophlebitis resulting in a purulent orbital infection.[21] Delay in irradication of orbital infection may result optic neuritis and permanent blindness as a result of extreme congestion and edema of the orbital content and obstruction of blood flow through the retinal artery. In addition, even more serious complications as a results of its further spread into the cranium such as cavernous sinus thrombosis, intra-cranial abscess, and eventually death may occur.[22,23]

Approximately 84% of orbital cellulitis is caused by infections of the paranasal sinuses, with other less common causes being skin infections, trauma, and hematogenous spread from other infections located elsewhere in the body.[24] Odontogenic orbital infections are less common and account for 2% to 5% of all orbital cellulitis cases. Infections can arise from any tooth however, most develop from maxillary premolars and molars.[10,25,26] in present study frequency of orbital cellulitis in patient with maxillary teeth infection was observed in 18.72%. Infection was the commonest cause i.e 18.7% followed by iatrogenic 9.9% and trauma was observed in 3.4%. It is estimated that odontogenic infections account for approximately 10% to 12%

of all cases of sinusitis One can hypothesize that oral pathogens from dental infections can trigger inflammation of the sinus mucosa and propagate the proliferation of sinus organisms, eventually overcoming the natural host defenses and spreading to the orbit. Vision loss caused by orbital cellulitis in the preantibiotic era has been reported to be 20%, however, with the advent of antimicrobial therapy, the incidence has decreased to approximately 11%.[27] In contrast, the incidence of severe vision loss (light perception or NLP) from our review of odontogenic orbital cellulitis cases was 46%.[28,29] Could the nonphysician be selecting more virulent organisms by empirically treating dental patients? Analysis of orbital organisms cultured (Gram-positive aerobic vs. anaerobic) revealed no correlation between vision loss and type of bacterial infection involved (p=0.31 and p =0.50, respectively). In general, patients who initially sought treatment for little or no decrease in vision tended to have a good visual outcome,[23,30] whereas those who sought treatment for poor vision, e.g., NLP, regained no vision.[31,32]

Presentation of odontogenic orbital cellulitis usually includes a history of recent tooth infection, extraction, or dental surgery, followed by the onset of trismus or temporal fullness. The presence of severe periodontal disease should prompt the physician to investigate an odontogenic source of infection.[33] As the infection spreads to the orbit, preseptal and orbital signs start to manifest in a manner described by Chandler.[34] The presence of eyelid swelling can obscure both the patient's awareness of any change in vision (patient 1) and the physician's ability to recognize orbital involvement, which can lead to severe and permanent vision loss. CT imaging is thus indicated in such patients with severe eyelid edema precluding examination of the eye, and those with proptosis, ophthalmoplegia, and decreased visual acuity. CT is helpful in identifying sinus involvement, orbital abscesses, and cerebral complications such as cerebritis and brain abscesses. Gas demonstrated within the orbit is strongly suggestive of an orbital abscess, arising from gas-forming organisms or from a communication of the orbit with an adjacent paranasal sinus. Posterior globe tenting is an ominous sign and should alert the physician to vision-threatening orbital congestion. Also, CT can identify the anterior facial and posterior retromaxillary soft tissue and muscle plane involvement.[35] MRI can be useful in evaluating the retromaxillary soft tissues and cavernous sinus. Initial treatment of odontogenic orbital infections consists of empiric antibiotic coverage for aerobic Gram-positive and anaerobic organisms, but should also cover for typical oral pathogens.[36] Reversal of vision loss has been reported to occur if treatment is initiated at the first sign of visual deterioration. Abscessed teeth should be extracted if they are determined to be a source of infection,[37] with the establishment of adequate intraoral drainage.

CONCLUSION

In this study frequency of orbital cellulitis in patient with maxillary teeth infection was observed in 18.72%. Orbital complications secondary to an odontogenic cause are not common. This condition, if untreated in due time, carries the impending risk of loss of vision, rendering a vital organ non-functional. The patient may not present with a dental complaint in an acute presentation. Hence, the clinician must have a low threshold for suspicion for such an entity, which requires a multidisciplinary approach for aggressive management. Awareness needs to be raised among the patients regarding the quack culture prevalent in developing countries to prevent such unethical practices and life-threatening complications.

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