ORIGINAL ARTICLE

ODONTOGENIC MAXILLOFACIAL INFECTIONS IN A TERTIARY CARE HOSPITAL

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ABSTRACT

The study was carried out to evaluate aetiology, clinical presentation and management of odontogenic maxillofacial infections (OMI) in a tertiary care hospital.

It was a cross sectional, descriptive study and was conducted among 130 male serving soldiers at Military Dental Centre, Combined Military Hospital Malir, Karachi from November 2012 to April 2014. They were evaluated for aetiology and clinical presentation of OMI and were managed either as 'out' or inpatient. Data analysis was done by SPSS version 20.

Results of the current study exhibited a mean age of patients 28±7 years. All (100%) patients presented with swelling of facial region while 36.9% had severe and 60% had moderate pain associated with swelling. Mean mouth opening at the time of presentation was 24±12 millimeter, and 30.8% patients had fever with mean body temperature of 99.9±.73°F. Most common cause of odontogenic infections was periapical infection due to necrotic dental pulp in 83%, followed by pericoronitis in 13.1% patients. Combined buccal and submandibular spaces were the most commonly involved in OMI (48.5%), followed by buccal space (29.2%). Sixty four (49.2%) patients were treated as inpatient with mean hospital stay of 2 days. Most commonly employed surgical treatment was extraction of tooth with intra-oral incision and drainage of abscess in 69.2% cases.

OMI if not treated earlier can end up with grave complications. Despite advanced dental treatment facilities, military soldiers still present with OMI that in many cases require hospitalization for management.

Key Words: *Odontogenic infection, aetiology, clinical presentation, surgical management.*

INTRODUCTION

One of the most difficult problems to manage in dentistry is Odontogenic Maxillofacial Infections (OMI) and majority of them arise from teeth but can spread to the alveolar process and deeper tissues of the maxillofacial region.[1] Spreading OMI is a serious illness and potentially a life threatening condition.[2]

The clinical course and spread of OMI depends on multiple factors including anatomy of teeth, muscle attachment and host defense mechanism.[3] Although the majority of OMI are readily managed by minor surgical procedures and supportive medical therapy (antibiotic administration), but a few can progress and become severe and life threatening within a short period of time.[4,5] Potential complications of these infections consist of orbital infections[6], necrotizing fasciitis[7], cavernous sinus thrombosis[8], cerebral abscess[9] and mediastinitis.[10]

The purpose of this study was to evaluate the aetiology, clinical presentation and management of OMI in army soldiers who undergo routine dental inspections, dental hygiene lectures and have appropriate dental care facilities at all military garrisons but still develop OMI.

METHODOLOGY

This cross sectional descriptive study was carried out in Military Dental Centre (MDC) located within Combined Military Hospital (CMH) Malir, Karachi from November 2012 to April 2014. Permission from MDCs ethical committee was obtained along with informed consent from each patient. The samples were selected through consecutive non-probability sampling and in-

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cluded 130 male serving soldiers working in different military units and regimental centers at Malir Garrison.

All those patients who presented with history of pain and swelling in maxillofacial region were evaluated by oral and maxillofacial surgeon. Based on history, clinical and radiographic examination a diagnosis of OMI was made and pre-designed proforma was filled for each patient. Patients with maxillofacial infections secondary to fractures of facial bones, infected cysts and tumours or any other non-odontogenic reason were excluded from the study.

The criteria for hospitalization was rapidly progressing infection, deep facial space involvement, difficulty in breathing and swallowing, moderate to severe trismus, severe malaise and toxic appearance of the patient. Surgical procedures involved incision and drainage of abscess (either intraorlly or extraorally) and removal of source of infection. All the patients were prescribed amoxicillin 500 to 1000 mg and metronidazole 400mg three times a day for three to five days. All patients were encouraged to increase fluid intake and high-calorie nutritional supplements and were followed up till complete resolution of the infection. Data were analyzed using SPSS version 20. Descriptive statistics were used to describe the results including mean and standard deviation for quantitative variables, while frequency and percentages for qualitative variables.

RESULTS

There were a total of 130 male patients of 18 to 47 years of age (mean age: 28±7 years). Thirty two (24.6%) were smokers and 98(75.4%) were non-smokers. Mean duration of presence of clinical symptoms was 2±1 day. All 130 (100%) patients presented with swelling of facial region while pain was of varying intensity among all patients based on visual analogue scale. Limited mouth opening was present in 101 (77.7%) patients at the time of first inspection (mean mouth opening: 24±12 millimeter). Ninety (69.2%) patients presented with fever (mean temperature 99.9 + .73ºF). Etiology of OMI is shown in Table 1 while resultant facial space involvement is shown in Table 2. Sixty-six (50.8%) patients were treated as outpatients, while 64 (49.2%) were hospitalized for their management and mean duration of hospital stay was 2±1 days. Surgical procedures were done in all patients to remove the source of infection; detail of these procedures is given in Table 3.

TABLE 1: ETIOLOGY AND SOURCE OF ODONTOGENIC MAXILLOFACIAL INFECTIONS

Source of infection	No. of patients	Percentage
Carious tooth/Necrotic pulp(Periapical source)	108	83.1%
Pericoronitis	17	13.1%
Deep Periodontal Pockets	5	3.8%
Total	130	100%

TABLE 2: ANATOMIC SPACES INVOLVED IN ODONTOGENIC MAXILLOFACIAL INFECTIONS

Facial space involved	No. of patients	Percentage
Submandibular and Buccal	63	48.5%
Buccal	38	29.2%
submandibular	12	9.2%
Infraorbital	6	4.6%
Vestibular	5	3.8%
Palatal	3	2.3%
Submental	3	2.3%
Total	130	100%

TABLE 3: SURGICAL PROCEDURES PERFORMED IN ODONTOGENIC MAXILLOFACIAL INFECTION

Surgical Procedure	No. of patients	Percentage
Extraction of involved tooth and intraoral Incision & drainage of abscess	90	69.2%
Endodontic treatment of involved tooth and intraoral incision & drainage of abscess	20	15.4%
Extraction of involved without incision & drainage of abscess	3	2.3%
Extraoral incision & drainage of abscess	17	13.1%
Total	130	100%
Palatal	3	2.3%
Submental	3	2.3%
Total	130	100%

DISCUSSION

Results of this study signify that OMI is a frequently encountered problem in dental surgeries and often require referral to maxillofacial surgeons. The mean age i.e. 28, of the current study group corresponds to that of many studies[11,12] carried out worldwide, which indicate highest prevalence of OMI in 20 to 35 years old patients. Influence of tobacco smoking as a risk factor in development of OMI is not very clear in the literature, but the role of smoking in the pathogenesis of periodontal disease is evident.13 In the present study

24.6% patients had history of tobacco smoking, while in a study carried out by Bakathir AA et al[14] the prevalence of smokers among OMI patients was 80%. Time period from the onset of symptoms to the presentation of patients with OMI is highly variable in literature and ranges from 2 to 14 days.[15-18] In the current study mean time elapsed from onset to presentation was closer to the earlier part of the stated range.

Pain and swelling were the two most common presenting complaints of the patients of this study group. All patients (100%) presented with swelling that confirms the data of other studies[2,12] which reports swelling as presenting symptom in 100% patients of OMI. In the present study, 60% patients had pain of moderate severity while in 36% cases pain was of severe nature. In other studies pain in the facial region as a presenting symptom was reported as 89.47%[19], 97%[12] and 96%.[2] In a patient with OMI, trismus results from the involvement of the muscles of mastication by the inflammatory process. Increasing trismus is an indication that infection has involved masticator, pterygomandibular, parapharyngeal and retropharyngeal spaces. In the present study, mild to moderate trismus (mean mouth opening 24mm) was present in 77.7% patients while in a study conducted by Sato FR et al[20] trismus was present in 43.33% cases. In another study[21] trismus was reported in over 70% of cases that correspond to the current study. In general infections frequently cause fever and a temperature higher than 101ºF indicate a greater likelihood of severe infection.[22] In this study 69.2% patients had fever due to OMI and the mean temperature recorded was 99.9ºF. In many other studies[2,20] fevers of varying degrees were reported in patients of OMI which indicate that an increase in temperature is a sign of spreading OMI in facial spaces.

Carious teeth with periapical infection was the most common aetiological factor in the development of OMI in the present study group that was present in 83% of patients followed by Pericoronitis in 13% cases. This data is in accordance with international data. Han X et al[2] reported periapical origin in 60.3% cases followed by pericoronitis in 27.4% cases. In another regional study12 the pulpal origin of OMI reported in 71% cases followed by periodontal 17% and pericoronitis in 5% cases.

Odontogenic maxillofacial infections, if untreated, may progress to involve deep neck space infection, which can spread upward to brain causing brain abscess, meningitis and cavernous sinus thrombosis.[23] Determining the exact anatomic location of infection is a key step in determining its severity and management.[22] In the present study, the most commonly involved facial space was the combination of buccal and submandibular space that was involved in 48.5% cases. This data is comparable with the data of other studies which report involvement of submandibular space infection in 54.6%[2], 47.2%[15], and 29.1%.[23] Submandibular space is in close proximity to mandibular molar and buccal space and this is the reason that this space along with buccal space is first affected by the septic process, and from this level infection spread to the facial level. Second most common space involvement in this study was the buccal space in 29.2% cases. Zhang C et al[23] in their study also reported similar results and in their patient's buccal space was involved in 26% cases. The reason of common involvement of buccal space is that infection from both maxillary and mandibular posterior teeth can drain in buccal space.

Setting of care in OMI depends on seriousness of infection and hospital stay of inpatients is variable in literature that ranges from one day to 18 days.[11] The most important determinants regarding prolong hospitalization are indicators of infection severity such as an extension of OMI and the need for an extraoral incision to drain the infection.[24] In the present study 49.2% patients were treated as inpatient and mean hospital stay was 2 days with a range of 1 to 5 days. In this setting patients were admitted only for short duration and as soon they were treated surgically and had signs of improvement, they were discharged from the hospital.

Surgical drainage and removal of cause of infection is the primary principle in the management of OMI. Surgical treatment can range from simple tooth extraction to treatment as complex as wide incision of soft tissue in the submandibular and neck region or even open drainage of mediastinum.[22] In the present study, 69.2% patients were treated simply by extraction of involved tooth along with intraoral incision and drainage, while 13.1% patients required extra-oral incision and drainage. Data of the current study slightly differ from the study of Methew GC et al[12] as they reported extra-oral incision for the drainage of abscess in 45% cases, and 27% of their patients had only intraoral incision and drainage made, while 27% had both intra- and extra-oral incisions. This difference may be because patients of this study reported early for the treatment which prevented them from developing more serious infections and a need for extra-oral incisions to drain abscess.

OMI are caused by mixed aerobic and anaerobic microorganisms. Dental abscesses are caused by resident microflora of the oral cavity, which enters the normal tissues.[25] Streptococcus viridans and staphylococcus aureus are the most common aerobic bacteria involved in OMI. Bacteroides and Prevotella are the most common anaerobes. There is usually a mixed growth of aerobic and anaerobic microbes.[26] So Co-Amoxiclav is given along with Metronidazole for effective treatment of OMI. Microorganisms were not isolated in the present study. These antibiotics are prescribed without routine culture and sensitivity tests.[27]

There is a need to educate soldiers of general oral hygiene. Their regular dental check-ups can not only prevent infections from carious teeth, but also prevent progression of any infection to deep neck space infection. This prevention includes removal of any source causing caries, trauma, pulpal and periodontal diseases. This will help lower the burden on health care system.

CONCLUSION

OMI are mostly related to the dental carries and necrotic pulp that if not treated earlier can end up with grave complications. Early surgical intervention along with appropriate antibiotic therapy can prevent spread of these infections to deep spaces of face and neck and hence many untoward complications can be avoided. Despite advanced dental treatment facilities, patients still present with OMI that in many cases require hospitalization for management.

Competing interests:

The authors declare that they have no competing interests.

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