ORIGINAL ARTICLE

PATTERN OF THE ORO-FACIAL INFECTIONS IN PATIENTS PRESENTING TO AYUB MEDICAL INSTITUTE, ABBOTTABAD

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Background: Orofacial space infections are commonly odontogenic in origin and the anatomical locations along with mode of spread to critical areas (e.g., orbit, brain, mediastinum) can result in morbidly and mortality if not diagnosed and treated well in time. This study was aimed to analyzing the incidence and pattern of oro-facial infections. **Methods:** This Descriptive case series was carried out at Oral Surgery unit (Ayub Medical College) Abbottabad from January 2016 - May 2017. The sample was collected using purposive, consecutive non-probability sampling. The demographic data, infection site and clinical features were recorded. The data was analyzed by using SPSS version 21. All the descriptive variables were analyzed for percentages & frequencies. **Results:** Thirty-six patients were included in the study. The male (23) to female (13) ratio was (1.7:1). Right Submandibular space was most common site. In one case each, there was involvement of retropharyngeal and retromandibular space. Majority of the patients presented with swelling (88.89%). Diabetes mellitus was the most commonly found systemic disorder in the patients affecting aggressiveness of infection. **Conclusion:** The most common source of odontogenic facial space infections is mandibular molars resulting spread to submandibular space. Diabetes Mellitus was the most common systemic disorder affecting host immunity. The proximity of oro-facial spaces with the critical areas makes it crucial for clinicians to identify the condition promptly and provide pertinent treatment in order to avoid the fatal complications as the rate of spread of facial space infection is very rapid.

Keywords: Orofacial space infection; Odontogenic infection; Facial spaces

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INTRODUCTION

Prevalence of infections is most common in maxillofacial region.[1] Rapid spread of the infection in orofacial region is a serious condition that oral & maxillofacial surgeon encounter. It ranges from simple dental caries to life threatening conditions, such as Ludwig's angina & mediastinitis. Facial space infections can be classified into odontogenic & non-odontogenic by origin.[2] The clinical presentation of these infections vary from initial localized dento-alveolar infection (peri-radicular abscess) progressing and quickly spreading via the tissue planes, with more risk of morbidity & mortality.[3]

The anatomical boundaries of facial spaces communicate with multiple potential spaces & connecting pathways, brain, orbital cavity & inferiorly to the mediastinum (airway) along with spinal vertebral region. The anatomical characteristics of the oro-facial region plays vital role in rapid spread of infection, through the path of least resistance or follow haemo-lymphatic pathway.[4] If facial space infections are left untreated, it can spread beyond the confines of the jawbone and involve more than one spaces & sometimes progresses to life-threatening infectious conditions, septicaemia or intracranial spread & airway obstruction.[5] Spreading along the path of least resistance via connective tissue & facial planes, infection may diffuse remotely from its odontogenic source, resulting in damage to the adjacent structures.[6]

The facial space infections associated with maxillary teeth involve infratemporal, buccal, infraorbital, maxillary sinus, eyes & brain, while facial space infections associated with mandibular teeth involve sublingual, submandibular, submantle & masticatory space.7 The spread of infection into adjacent fascial spaces may lead to additional complications preceding to death.4,8,9 The morbidity and mortality related to these orofacial infections depend on the site of involvement and the degree of spread to the other tissues and micro-organism involved and host defense system. Usually, these infections are polymicrobial involving both aerobes & anaerobes.8,10

The objective of this descriptive study was to analyze the pattern of oro-facial infections, with clinical presentation and involved tooth for odontogenic infections in patients reporting at Dental

section of Ayub Teaching Hospital Abbottabad. The analysis will provide the guidance regarding incidence and importance of recognizing these clinical conditions in order to provide appropriate well-timed interventions, saving life of the patients and promote culture of practicing preventive & evidence-based dentistry.

MATERIAL AND METHODS

This Descriptive case series was conducted at Oral Surgery unit (Ayub Medical College) Abbottabad from January 2016 - May 2017. The ethical approval was obtained from the institution ethical committee of AMC. The sample was collected using purposive, consecutive non-probability sampling technique. Patients presenting with pain, swelling and infection and willing to participate were included. Those patients who are currently using antibiotics or used them within last two weeks were excluded from the study. Informed consent was taken. The patients were evaluated by History, Clinical examination & investigations (x-rays, Blood test etc). A quick assessment was done by patient's appearance (toxic or not) GPE (General Physical Examination) & vitals including conscious level & airway patency etc. The demographic data, including age, gender, site of infection along with clinical features was recorded by one principal investigator. The data analysis was done using SPSS version 21. All the descriptive variables were analyzed for percentages & frequencies.

RESULTS

The study enrolled 36 patients of which 23 were male & 13 were female (1.7:1). The submandibular space of right side was most commonly involved followed by buccal space infection in 11 cases, palatal space in 7 cases and canine space in 2 cases. In one case each, there was found involvement of retropharyngeal and retromandibular space and simultaneous involvement of the submandibular, submental & sublingual space resulting into Ludwig's angina. This severe infection resulted in fatal outcome. Diabetes mellitus was the most commonly found system disorder in the patients affecting aggressiveness of infection.

Table-1: The Frequency of involvement of Facial Spaces

Spaces Involved	Frequency (n)	Percentage
Submandibular	14	38.9
Buccal	11	30.5
Palatal	7	19.4
Canine	2	5.5
Retropharyngeal/ submandibular, sublingual, sub-mental (Ludwig's angina)	1	2.8
Pterygomandibular	1	2.8
Total	36	100%

Table-2: Most Frequent symptoms associated with Oro-facial infections

Sign/Symptom	Number (n)	Percentage (%)
Swelling	32	88.89
Pain	25	69.45
Fever	7	19.45
Trismus	2	5.56

Table-3: Distribution of Tooth involvement in oro-facial Infections with respect to Dentition & Arch

Arch	(n)	(%)	Dentition	(n)	(%)
Maxillary	11	30.6	Primary	2	5.6
Mandibular	25	69.4	Permanent	34	94.4

DISCUSSION

Maxillofacial infections are most commonly caused by odontogenic sources.[11] Dental caries is the most common cause of facial space infections, followed by periodontal disease and pericoronitis. Mandibular teeth are most commonly involved in odontogenic infections, while maxillary posterior teeth contribute much less frequently to these infections.[12] Acute dental abscess is commonly underestimated regarding its sequalae in terms of morbidity & mortality. The appearance of these infections can vary from a simple vestibular swelling to more fatal complication, as sepsis & Ludwig's angina[13] compromising airway& are among the most common dental emergencies encountered in the Emergency Department. The advent of antibiotics has caused reduction in severity of odontogenic infections, these infections occasionally, if managed poorly, may result in considerable morbidity.[2]

In the present study, more male patients reported with the facial space infections as compared to female (male: female ratio is 1.7:1). In few other studies similar ratios with respect to gender distribution regarding incidence of facial space infection is reported. Singh, et al and Habib et al, stated that more male patients reported with the facial space infections as compared to females.[14,15] This may be due to smoking, snuff dipping habits and neglect in Oral hygiene in males as compared to females. In contrast to the studies by Ishfaq *et al*. indicated that more prevalence of orofacial infections was found in female patients.[16,17] Oro-facial fascial space infections are relatively uncommon in the paediatric age group. Their occurrence in children is however of importance, and may be a critical sign of social neglect and poverty.[18] The rapid spread of infection to involve the fascial spaces in the head and neck area, becoming extremely dangerous & more fatal in paediatrics as compared to the adult population.[19] In this study, the involvement of deciduous teeth was found to be 5.6%, and permanent teeth as 94.4% of total cases of odontogenic facial space infections.

The mandibular teeth were the most common odontogenic cause of infection. Mandibular 3rd molar were found to be associated with infections in most of the patients, followed by 2nd and 1st molar. The most posterior location, difficult visual access, lack of hygiene maintenance & the combination of poorly oxygenated pericoronal flap along with entrapment of food particles serves as an excellent medium for oral microorganisms and ultimately resulting in infections.[2] Odontogenic infections of the mandibular third molar can spread rapidly due to the anatomical location of this tooth at the crossroads of the masticator, submandibular, and buccal fascial spaces with adjacent anatomical access to contiguous pterygomandibular, parapharyngeal, parotid and other spaces.[8,1]

In other study, the mandibular 1st molar (27%) was largely commonly involved followed by mandibular 3rd molar (13%)[14] In contrast Patankar *et al.*, reported in his prospective study that up to (66%) of the teeth responsible for odontogenic infection were maxillary teeth followed by the mandibular teeth (44%).[20]

In current study, the most frequently involved facial space by odontogenic infection was Submandibular space. This finding is in agreement with the findings reported in Middle Eastern and south Asian studies.[8,21–23] On the contrary, the Nigerian investigators found buccal space to be involved in most of the cases.[24] The 2nd & 3rd mandibular molar teeth are important origin of infections in deep neck region, as their roots extend to the junction of the mylohyoid muscle & the mandibular corpus adjacent to the submandibular and parapharyngeal spaces, leading to the most frequent involvement of submandibular space by facial space infections.[16]

The most frequent presenting complaint found was swelling and pain. In majority of the patients, swelling was present in submandibular region. These results are in correspondence with the analysis reported in other studies in the literature. Mutwiri *et al*, found the presence of swelling in 96.3% of cases and pain in 58.9% of patients.[1] Similar trend was reported by Fu *et al* and Eltohami and his colleague, i.e., the swelling was most common clinical presentation followed by the pain in such cases.[6,25]

In immune-competent patients with well localized abscess, surgical drainage & dental therapy in the form of tooth extraction /endodontic treatment were able to resolve the infection with oral antibiotics.

The severe cases were immediately hospitalized & were supported by medical treatment in the form of IV antibiotics, followed by the aggressive surgical intervention including intubation & tracheostomy.

Diabetes mellitus aggravates the facial space infection[4] it was also observed that there were 9 patients who gave positive history of Diabetes Mellitus & all of them presented with severe degree of infection in the form of toxic look, trismus & high-grade fever. All the patients were with the opinion that the facial swelling, temperature trismus were exaggerated when the blood sugar level was uncontrolled.

The patient with Ludwig angina was unable to survive despite of the advance surgical management in the form of tracheostomy.

As Ayub Medical complex is a tertiary care hospital so this study will help the practicing dentists and specialist to identify the anticipated complications of orofacial space infections and developing a culture of educating patients regarding preventive measures and oral hygiene maintenance. The limitation of study is being a single centered study and thus the results cannot be generalized to the population.

CONCLUSION

The most common source of odontogenic facial space infections is mandibular molars & the submandibular space was found to be most frequently involved. Diabetes Mellitus was the most common systemic disorder affecting host immunity. The proximity of submandibular space with the airway makes it crucial for clinicians to identify the condition promptly and provide pertinent treatment in order to avoid the fatal complications as the rate of spread of facial space infection is very rapid.

The main stay of treatment is surgical intervention while antibiotics have as supporting role. The incision and drainage of affected anatomical spaces should be done aggressively and adequacy of surgical access should be given precedence over cosmetic consideration. The emphasis on maintaining oral hygiene can reduce the development and progression of disease, improving quality of life and decreasing burden on health care system too.

For future research, microbial analysis will help to identify the causes pathogens and selection of treatment modality along with drug of choice. Also, the study regarding the time of intervention and outcome of the treatment can help to design a most appropriate patient management plan.

AUTHORS' CONTRIBUTION

Alamgir: Literature review and data collection. AR: Drafting the main scrip. AKH: Data analyses and data interpretation. HH: Proof reading. WH: Proof reading. BS: Final Changes.

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