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ORIGINAL ARTICLE

Characteristics and Pattern of Odontogenic Infections with its Treatment Modalities

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ABSTRACT

Goal: To identify the characteristics, outcomes and treatment options of odontogenic infections through a retrospective analysis of cases treated for odontogenic abscess.

Place and Duration: In the Oral and Maxillofacial department of Cat D Hospital Gara Tajik Peshawar for the duration from June 2021 to November 2021.

Methods: A total of 80 patients were included in this study. Age, gender, affected facial spaces, affected teeth, the type of antibiotic therapy, hospital stays, previous medication, past medical history and body temperature during the admission were the studied variables.

Results: Patients' age ranged from 5-85 years, and 42.4% of those who had an odontogenic infection were under 35. Most patients had body temperatures between 37 to 37.5 °C. The mandibular third molars are the most affected teeth. The 7.5% of the mandibular molars were most severely affected among children. 37.5% of patients have 1-44 days stay in hospital. The most often found bacterial strain was streptococci. The commonly involved space was the buccal space, 10 patients have Ludwig's angina and 48.8% multi-space involvement. Penicillin G with metronidazole or metronidazole and cefazoline were the most often prescribed antibiotic combinations. The 2.5% was the mortality rate and all cases have Ludwig's angina.

Conclusions: The submandibular and buccal spaces are the main affected facial spaces. Penicillin, the most widely used antibiotic, has been proven to be successful in treating infections of the jaw. Odontogenic abscesses are most frequently linked to the eruption of the mandibular molars.

Keywords: Abscess, Infection, and Antibiotics

INTRODUCTION

Odontogenic maxillofacial infections are the most prevalent infections and have a high morbidity and potential fatality rate[1]. There is still high incidence of odontogenic infections among patients admitted to tertiary care hospitals, despite improvements in socioeconomic standards of life and the development of antibiotic therapy[2-3]. If these infections are treated too late or insufficiently, the various connecting head and neck region spaces aid in the rapid spread of inflammation which results in serious side effects include mediastinal and respiratory involvement as well as sepsis that is life-threatening[4-5]. This suggest that prompt diagnosis and if necessary appropriate treatment with antibiotic therapy and surgical procedures must be done for these infections. A partially erupted mandibular third molar is the most frequent cause of odontogenic infection, and the submandibular space is the common site of involvement, according to earlier studies[6-7]. In these studies, Streptococcus α hemolyticus, Streptococcus hemolyticus and Staphylococcus epidermis were the most significant bacterias causing infections[8]. Maxillofacial infections with an odontogenic aetiology are the common encountered infections for the maxillofacial surgeons. In the early stages, odontogenic infections are treated empirically. Even, the majority of them managed as outpatient care in a dentist's office and proper hospital patient management continues to be difficult for any practitioner treating maxillofacial infections[9-10]. The literature contains comprehensive epidemiological research of odontogenic infections in various regions of the world[11]. The aim of this study is to identify the characteristics, outcomes and treatment options of odontogenic infections through a retrospective analysis of cases treated for odontogenic abscess.

METHODS

This retrospective study was held in the Oral and Maxillofacial department of Cat D Hospital Gara Tajik Peshawar for the duration from June 2021 to November 2021. A total of 80 patients were included in this study. Odontogenic infections necessitating hospitalisation (temperature>10F, dehydration, infection risk to the vital structures and respiratory tract, requirement for general anaesthesia, moderate or severe infection in anatomical areas and requirement for inpatient treatment of systemic disease were the inclusion criteria. The patients having infections of the salivary glands, peritonsilar infection, orbital infection, pathologic lesions and facial bone fracture infection were the exclusion criteria. The ethical committee of the hospital approved this study, and each participant gave their informed consent. Age, gender, affected facial spaces, affected teeth, the type of antibiotic therapy, hospital stays, previous medication, past medical history and body temperature during the admission were the studied variables. The collected data was analysed using the SPSS 22.0.

RESULTS

Patients' age ranged from 5-85 years, and 42.4% of those who had an odontogenic infection were under 35. The age range with the highest prevalence of odontogenic infection was 21–35 years old (37.6%), whereas the age range with the lowest prevalence was 5–10 years old (2.5%).

Table-1: shows the patient demographic features

Features	No	%
Males	50	62.5
Females	30	37.5
Age Range		
5-10	2	2.5
11-15	15	18.7
16-20	17	21.2
21-35	30	37.6
>35	16	20
Previous treatment		
I & D with Antibiotics	5	6.25
Antibiotics only	54	67.6
I & D	3	3.8
Ext with Ab	4	5
Ext	3	3.8
RCT with Ab	3	3.8
RCT	4	5
dexamethasone	4	5
Temperature		
37-37.5	45	56.3
37.6-38	15	18.7
38.1-38.5	12	15
>38.5	8	10

Despite the fact that there were slightly more men than women with no statistically significant difference. The majority of the subjects (56.3%) had body temperatures between 37 to 37.5 °C. The majority of patients (82.7%) had already received antibiotic treatment, and incision and drainage were done in 3 (3.8%) (Table 1).

The mandibular third molars are the most affected teeth. The 7.5% of the mandibular molars were most severely affected among children. (Table-2)

Table-2: shows the numbers of affected teeth

Maxillary Permanent Teeth	
1	1(2.9%)
2	3(8.6%)
3	7(20%)
4	6(17.1%)
5	4(11.4%)
6	6(17.1%)
7	3(8.6%)
8	5(14.3%)
Mandibular Permanent Teeth	
1	1(2.2%)
2	1(2.2%)
3	2(4.4%)
4	2(4.4%)
5	5(11.1%)
6	14(31.1%)
7	7(15.5%)
8	13(28.9%)
Deciduous Teeth	
A (maxillary)	
B (maxillary)	1(1.3%)
C (maxillary)	1(1.3%)
D (maxillary)	1(1.3%)
D (mandibular)	1(1.3%)
E (mandibular)	2(2.5%)
	2(2.5%)

37.5% of patients have 1-4 days stay in hospital. 45% of the patients stay 5-7 days in the hospital. The average length of stay was 8.5 days (Table 3).

Table-3: shows the duration of stay in hospital

Stay in Hospital (Days)	No	%
1-4	30	37.5
5-7	36	45
7-9	7	8.7
10-13	4	5
14-15	2	2.5
16-18	1	1.3

Table-4: shows the affected facial spaces

Facial Space involvement	n(%)
Vestibular abscess	6(14.6%)
Buccal	15(36.6%)
Submandibular	10(24.4%)
Temporal	1(2.4%)
Submental	3(7.3%)
Canine	3(7.3%)
Lateral pharyngeal	1(2.4%)
Pterygomandibular	2(4.8%)
Submassetric	1(2.4%)
Multi Space	39(48.8%)
Submandibular &Pterygomandibular	10(25.7%)
Submandibular &Submental	2(5.1%)
Submandibular & Lateral pharyngeal	1(2.6%)
Submandibular &Sub-masseter	3(7.7%)
Sub mandible & Sublingual	2(5.1%)
Pterygomandibular &Buccal	2(5.1%)
Submandibular &Buccal	4(10.3%)
Pterygomandibular & Temporal	1(2.6%)
Buccal& Canine	4(10.3%)
Buccal & Sub-masseteric	1(2.6%)
Temporal & Submandibular	1(2.6%)
Buccal & Temporal	1(2.6%)
Pterygomandibular & Sub-masseteric	1(2.6%)
Sub-massetric & Submental	1(2.6%)
Lateral pharyngeal & Pterygomandibular	2(5.1%)
Submental & Sub lingual	2(5.1%)
Sub-masseteric & Sublingual	1(2.6)

The most often found bacterial strain was streptococci. The commonly involved space was the buccal space, 10 subjects have Ludwig's angina and 48.8% multi-space involvement. (Table 4).

The patients responded well to ten different antibiotics Penicillin G with metronidazole or cefazoline and metronidazole were the most often prescribed antibiotic combinations. The 2.5% was the mortality rate and all cases have Ludwig's angina. 20% of patients had systemic diseases. Diabetes was the predominant systemic disease (75%). (Table 5).

Table-5: shows the patients distribution according to systemic disease

Past Medical History of Disease	n (%)
Diabetes	12(75%)
Splenectomy	1(6.3%)
Kidney graft	1(6.3%)
Lymphoma	1(6.3%)
Arteritis	1(6.3%)
	Total = 16(100.0%)

The minor treatment-related complications occur in one patient with lymphoma and 2 patients with diabetes mellitus.

DISCUSSION

According to the study's findings, patients between the ages of 20 and 35 had the highest prevalence of odontogenic abscesses, which increased with age[12]. The third molars' eruption and bad dental hygiene may be the reason for this. Therefore, periodontal teeth and tissues, particularly mandibular 3rd molars, should receive extra attention in this age range. The findings of this analysis are in line with already published literature, where the patients' mean age was between 20 and 30 years[13-14]. The majority of dental abscesses are brought on by mandibular third molars because they frequently exhibit partial friction and the soft tissues that surround them provide an ideal habitat for bacterial growth[15-16]. First and second molars on the mandible are important for mastication and are more prone to decay and periodontal disease[17-18]. The sub-masseter and submandibular spaces infection spread from these teeth, making surgical treatment by regular dentists in dental clinics difficult. Deciduous molars were the commonly involved teeth, though compared to some earlier research, the incidence of odontogenic abscesses in children was less[18].

When the mandible was involved, the stay in hospital was 1.2 times lengthier than when the maxilla was involved. Gravity and good blood supply help in drainage of maxillary abscesses as compared to mandible where there is prolonged involvement. This is consistent with findings from research by Dvori et al[19]. There were fewer patients with high body temperatures, with the majority of them having temperatures between 37 and 37.5 ° C. A thorough prospective investigation is necessary to establish a conclusive link between body temperature, the type of bacteria causing the infection, and the affected space[20]. Odontogenic abscesses frequently involve multiple anatomical spaces (46.6%), demonstrating the interrelated nature of the majority of the head and neck's anatomical spaces. As a result, odontogenic infections can spread quickly and pose a serious risk to patients[21]. According to the study's findings, diabetes mellitus is the systemic condition most frequently linked to odontogenic abscesses[22]. Therefore, in these patients, infection prevention and management are crucial, and diabetic patients should receive specific attention for periodontal and dental cavities.

Penicillin is efficient against oral bacteria, has few side effects (aside from allergic responses), and is less expensive than other antibiotics, it is the medication of choice for odontogenic infections[23]. There have been reports of this antibiotic class's resistance, though. Metronidazole works very well and only affects anaerobic organisms[24]. The most often utilised antibiotics were cefalexin, amoxicillin, and metronidazole. Metronidazole has always been combined with other antibiotics such as amoxicillin, cephalexin, or others. Clindamycin is a helpful broad-spectrum antibiotic that penetrates bone, periodontium, necrotic tissue, and

pus and has a reduced adverse reaction to odontogenic infections[25].

CONCLUSION

1 The primary cause of jaw infections was odontogenic infections.
2 The majority of infected individuals were under the age of 35, and gender had no significant impact on susceptibility.
3 The buccal and submandibular spaces are the main effected facial spaces.
4 The most frequently prescribed antibiotic was penicillin proven to be successful in treating infections of the jaw. Despite being an old antibiotic, penicillin was one of the first choice used to treat odontogenic infections.
5 Only a small number of general dentists are capable of treating abscesses, despite the fact that incision and drainage is the treatment of choice in this stage.
6 The eruption of mandibular molars, particularly the third molars, is primarily linked to odontogenic abscesses and taking good care of these teeth is crucial to avoid odontogenic abscess.

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