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Oral & Maxillofacial Space Infections-A 10-Year Retrospective Study

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Case Report
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Abstract

Oral & Maxillofacial space infections have been recognized since the time of Galen in the second century. In spite of great advances in health care, these infections remain a major problem. Oral & Maxillofacial space infection ranges from periapical abscess to superficial and deep neck infections. The infections generally follow the path of least resistance through connective tissue and along fascial planes [1]. The infections spread to distant sites from the site of origin. Oral & Maxillofacial infections can be potentially lethal infections, at times. Various life-threatening complications associated with oral & maxillofacial infections are respiratory obstruction, necrotizing fasciitis, descending mediastinitis, pericarditis, brain abscess, and sepsis. The successful management of orofacial infection depends on the early recognition of orofacial infection. Appropriate and prompt therapy is mandatory for successful management. Thorough knowledge of anatomy is necessary to predict pathways of spread and to drain these spaces adequately. We present our experience in treating oral & maxillofacial space infection at our centre.

Keywords: Maxillofacial Infections; Odontogenic Infections; Complications; Surgical Drainage

Introduction

Oral & Maxillofacial space infections have been recognized since the time of Galen in the second century. In spite of great advances in health care, these infections remain a major problem. Oral & Maxillofacial space infection ranges from periapical abscess to superficial and deep neck infections. The infections generally follow the path of least resistance through connective tissue and along fascial planes [1-7]. The infections spread to distant sites from the site of origin. Oral & Maxillofacial infections can be potentially lethal infections, at times [2]. Various life-threatening complications associated with oral & maxillofacial infections are respiratory obstruction, [3] necrotizing fasciitis, [4-7] descending mediastinitis, [5] pericarditis, [5] brain abscess, [4] and sepsis [4]. The successful management of orofacial infection depends on the early recognition of orofacial infection. Appropriate and prompt therapy is mandatory for successful management. Thorough knowledge of anatomy is necessary to predict pathways of spread and to drain these spaces adequately. We present our experience in treating oral & maxillofacial

space infection at our centre.

Methods

The patients with oral & maxillofacial surgery infection who reported to our centre from Jan 2012 to Jan 2022 were included in the study. Only patients with any threat to the airway, fever greater than 38°C, need for general anaesthesia and need for control of a concomitant systemic disease were admitted. Rest all other patients were treated as outpatients.

Haematological and biochemical tests were done on all the admitted patient s. Empirical antibiotics orally or through an intravenous route were given as per the indications. In all patient incision and drainage was carried out under LA or GA depending on the patient's condition. Spaces were decompressed even in the patients in which pus was not formed. A drain was placed in every patient. The causative teeth were extracted. Patient was followed till the complete resolution of infection.

Data Collection

A retrospective medical finding of patients with a diagnosis of oral & maxillofacial surgical space infection was recorded. Clinical charts and investigation reports were reviewed. These variables were recorded systematically: demographic data (age, sex), etiopathogenesis (aetiology, number and location of teeth involved, spaces involved, associated systemic diseases), clinical presentation (presenting symptoms, time from onset of symptoms until presentation, the temperature at presentation), blood sugars, medical treatment (antibiotics used), surgical treatment (type of anaesthesia, intubation, incision, usage of drains), and outcome (complications, duration of stay).

Data Management and Analysis

Data were recorded on standardized collection forms. A database was constructed using Microsoft Excel (Microsoft, Redmond, WA, USA) and imported into Epi Info version 3.5.3 for statistical analysis. Descriptive statistics were computed for all variables. Univariate analysis was carried out to see if there is any link between certain variables and life-threatening problems. Odds ratios and p-values (based on the Chi-square test or Fisher's exact test) were calculated. A statistically significant p-value of 0.05 was used. Significant risk factors were further analysed using multivariate logistic regression analysis (Charts 1-5).

Variable	Frequency	Percentage
Gender		
Male	340	69
Female	152	31
Age		
Above 65 years	52	10.5
Below 65 years	440	89.5
Diabetes		
Present	126	25.6
Absent	366	74.4
Other illness		
Present	48	9.7
Absent	444	90.3
Site		
Maxilla	154	31.3
Mandible	338	68.7
Fever		
Present	196	39.8
Absent	296	60.2
Admission		
Inpatient	140	28.4
Outpatient	352	71.6
Anaesthesia		
GA	240	48.7
LA	252	51.3
Intra-operative drainage of pus		
Present	293	59.5
Absent	199	30.5
Duration of stay		
More than 06 days	42	35
Less than 06 days	78	65
Number of spaces involved		
Multiple	312	63.4
Single	180	26.6

Table 1: Patient characteristic.

Case	Age	Sex	Spaces	Origin of infection	Comorbidities	Complications	Treatment	Out come
1	23	F	Submandibular, Submental, Buccal	Pulpal	Nil	Inadequate drainage	Re exploration	Good
2	25	M	Ludwig's angina	Extraction site	Nil	Necrotizing fasciitis	Drainage, skin graft	Good
3	68	M	Ludwig's angina	Pulpal	Diabetes, drug addiction	Airway obstruction	Intubation, drainage	Good
4	69	M	Submandibular, buccal	Periodontal	Diabetes, hypertension	Airway obstruction	Tracheostomy, drainage	Good
5	65	F	Ludwig's angina	Pulpal	Diabetes, renal failure	Renal failure	Tracheostomy, drainage, dialysis	Death
6	40	F	Ludwig's angina	Periodontal	Diabetes	Airway obstruction	Intubation, drainage	Good
7	23	F	Submandibular, buccal, submental	Pulpal	Nil	Necrotizing fasciitis	Drainage, skin graft	Good
8	30	M	Submandibular, buccal, submental, pterygomandibular	Pulpal	Nil	Airway obstruction, re-exploration	Tracheostomy, drainage	Good
9	22	M	Ludwig's angina	Pulpal	Nil	Airway obstruction	Intubation, drainage	Good
10	68	M	Ludwig's angina	Pulpal	Diabetes	Airway obstruction	Intubation, drainage	Good
11	30	M	Submandibular, submental, sublingual, Submassetric	Pulpal	Diabetes	Airway obstruction	Tracheostomy, drainage	Good
12	45	M	Ludwig's angina, Parapharyngeal	Periodontal	Diabetes, renal failure	Renal failure, cardiac failure	Drainage, dialysis	Death
13	17	M	Ludwig's angina	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
14	45	F	Ludwig's angina, Buccal	Pulpal	Diabetes	Trismus	Tracheostomy, drainage, mouth opening exercise	Good
15	45	M	Ludwig's angina	Periodontal	Nil	Airway obstruction	Intubation, drainage	Good
16	30	M	Ludwig's angina	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
17	42	F	Ludwig's angina	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
18	40	M	Submandibular	Periodontal	Nil	Re-exploration	Drainage	Good
19	68	M	Submandibular, buccal	Pulpal	Diabetes	Necrotizing fasciitis	Drainage, skin graft	Good
20	35	M	Ludwig's angina, submasseteric, temporal, pterygomandibular	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
21	32	M	Submandibular, submental, Sublingual	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good

22	25	M	Ludwig's angina	Extraction site	Nil	Necrotizing fasciitis	Drainage, skin graft	Good
23	36	M	Ludwig's angina	Pulpal	Diabetes, drug addiction	Airway obstruction	Intubation, drainage	Good
24	50	M	Submandibular, buccal	Periodontal	Diabetes, hypertension	Airway obstruction	Tracheostomy, drainage	Good
25	66	F	Canine space,	Pulpal	Diabetes, renal failure	Renal failure	Tracheostomy, drainage, dialysis	Death
			Cavernous sinus thrombosis					
26	40	F	Ludwig's angina	Periodontal	Diabetes	Airway obstruction	Intubation, drainage	Good
27	23	F	Submandibular, buccal, submental	Pulpal	Nil	Necrotizing fasciitis	Drainage, skin graft	Good
28	30	M	Submandibular, buccal, submental, pterygomandibular	Pulpal	Nil	Airway obstruction, re-exploration	Tracheostomy, drainage	Good
29	22	M	Ludwig's angina	Pulpal	Nil	Airway obstruction	Intubation, drainage	Good
30	65	M	Ludwig's angina, Submassetric	Pulpal	Diabetes	Airway obstruction	Intubation, drainage	Good
31	30	M	Submandibular, submental, sublingual	Pulpal	Diabetes	Airway obstruction	Tracheostomy, drainage	Good
32	56	M	Ludwig's angina	Periodontal	Diabetes, renal failure	Renal failure, cardiac failure	Drainage, dialysis	Death
33	17	M	Ludwig's angina	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
34	45	F	Ludwig's angina, Buccal	Pulpal	Diabetes	Trismus	Tracheostomy, drainage, mouth opening exercises	Good
35	45	M	Ludwig's angina	Periodontal	Nil	Airway obstruction	Intubation, drainage	Good
36	30	M	Ludwig's angina	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
37	42	F	Ludwig's angina	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
38	68	M	Submandibular, buccal	Periodontal	Nil	Re-exploration	Drainage	Good
39	65	M	Submandibular, Submental, Ptergomandibular	Pulpal	Diabetes	Necrotizing fasciitis	Drainage, skin graft	Good
40	35	M	Ludwig's angina, submasseteric,	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
41	32	M	Submandibular, submental, sublingual	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
42	25	M	Ludwig's angina	Extraction site	Nil	Necrotizing fasciitis	Drainage, skin graft	Good

43	36	M	Ludwig's angina	Pulpal	Diabetes, drug addiction	Airway obstruction	Intubation, drainage	Good
44	66	M	Submandibular, buccal	Periodontal	Diabetes, hypertension	Airway obstruction	Tracheostomy, drainage	Good
45	46	F	Ludwig's angina	Pulpal	Diabetes, renal failure	Renal failure	Tracheostomy, drainage, dialysis	Death
46	40	F	Ludwig's angina	Periodontal	Diabetes	Airway obstruction	Intubation, drainage	Good
47	23	F	Submandibular, buccal, submental	Pulpal	Nil	Necrotizing fasciitis	Drainage, skin graft	Good
48	30	M	Submandibular, buccal,	Pulpal	Nil	Airway obstruction,	Tracheostomy, drainage	Good
			submental, pterygomandibular			re-exploration		
49	22	M	Ludwig's angina	Pulpal	Nil	Airway obstruction	Intubation, drainage	Good
50	67	M	Ludwig's angina	Pulpal	Diabetes	Airway obstruction	Intubation, drainage	Good
51	30	M	Submandibular, submental, sublingual	Pulpal	Diabetes	Airway obstruction	Tracheostomy, drainage	Good
52	67	M	Ludwig's angina	Periodontal	Diabetes, renal failure	Renal failure, cardiac failure	Drainage, dialysis	Death
53	17	M	Ludwig's angina	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
54	45	F	Ludwig's angina, Buccal	Pulpal	Diabetes	Trismus	Tracheostomy, drainage, mouth opening exercises	Good
55	45	M	Ludwig's angina	Periodontal	Nil	Airway obstruction	Intubation, drainage	Good
56	30	F	Ludwig's angina	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
57	42	F	Ludwig's angina	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
58	68	F	Submandibular, buccal	Periodontal	Nil	Re-exploration	Drainage	Good
59	62	F	Submandibular	Pulpal	Diabetes	Necrotizing fasciitis	Drainage, skin graft	Good
60	35	F	Ludwig's angina, submasseteric,	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
61	45	F	Ludwig's angina	Periodontal	Nil	Airway obstruction	Intubation, drainage	Good
62	30	F	Ludwig's angina	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
63	42	F	Ludwig's angina	Pulpal	Nil	Airway obstruction	Tracheostomy, drainage	Good
64	35	F	Submandibular, buccal	Periodontal	Nil	Re-exploration	Drainage	Good

Table 2: Data of patients with complications.

Variables	Categories	With complications	Without complications	p-value
Age, years	Above 65	10	42	0.5308
	Below 65	54	288	
Gender	Male	40	300	0.2201
	Female	24	128	
Diabetes	Present	31	95	0.0001
	Absent	33	333	
Site	Maxilla	14	140	0.813
	Mandible	50	288	
Fever	Present	38	158	0.0006
	Absent	26	270	
Number of spaces involved	Multiple	63	273	0.0001
	Single	1	155	
Anaesthesia	GA	40	300	0.2201
	LA	24	128	

Table 3: Patient characteristics and complications.

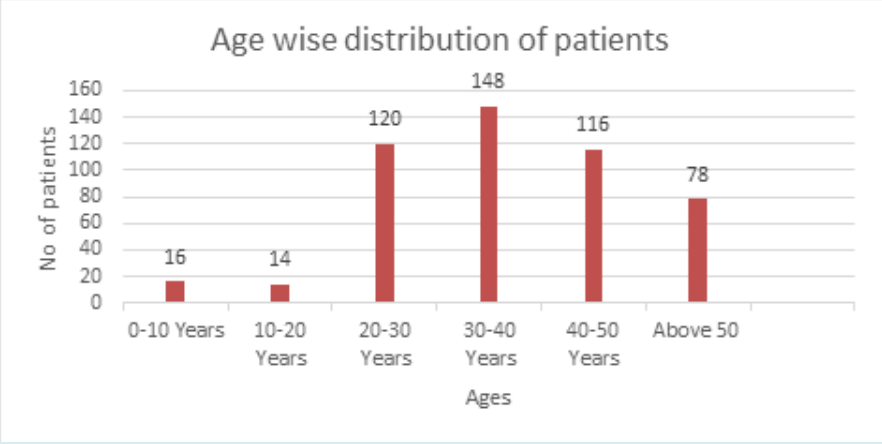

Chart 1: Age-wise distribution of patients.

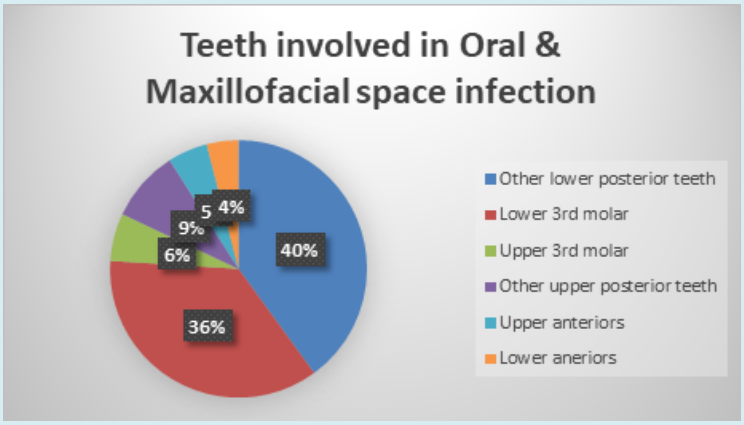

Chart 2: Teeth involved in Oral & Maxillofacial space infection.

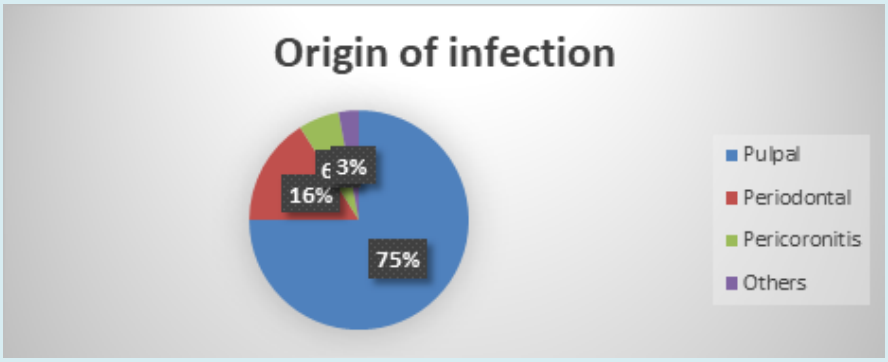

Chart 3: Origin of infection.

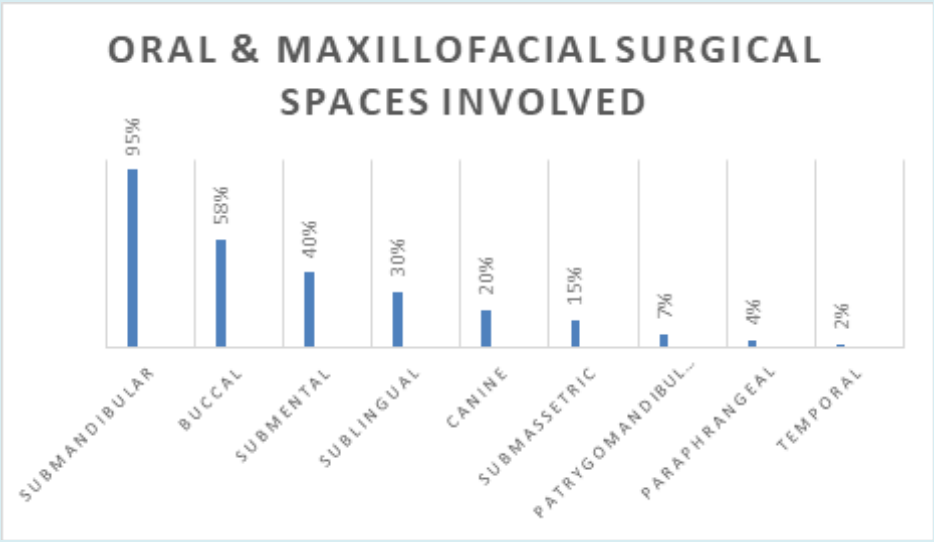

Chart 4: Oral & Maxillofacial surgical spaces involved.

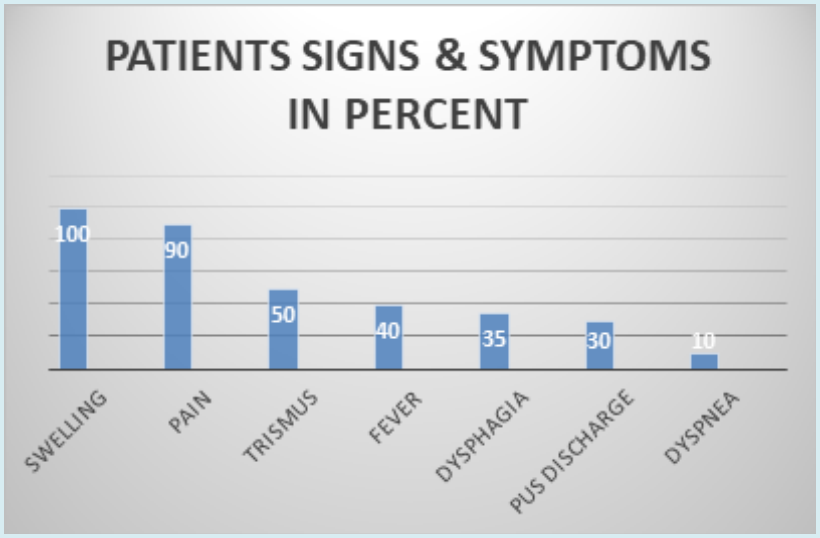

Chart 5: Patient signs & symptoms in percent.

Case Report

36 years old male reported to our centre referred from the peripheral centre for swelling of the face and difficulty in breathing (Figures 1& 2).

Figure 1: Frontal profile of patient.

Figure 2: Close view of neck swelling.

Figure 3: Close view showing raised and protruded tongue.

48 was the offending tooth and it was removed hours back but no decompression was carried out. The patient was given oral antibiotics without removal of the primary cause. The patient was in airway distress. There was elevation and protrusion of the tongue (Figure 3).

The mouth opening was limited. He was not able to speak properly. Decompression of Submental, Sublingual and Submandibular (Figures 4 & 5).

Figure 4: Drainage of Lt Submandibular space.

Figure 5: Placement of corrugated rubber drain.

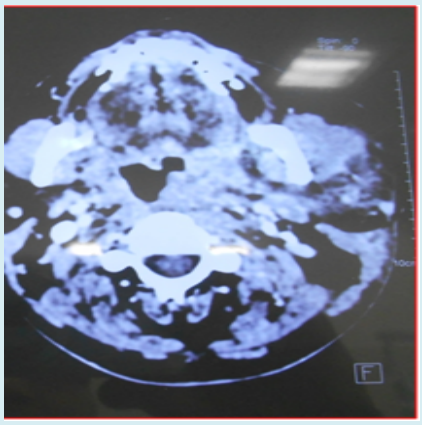

Figure 6: Axial view of CT scan showing involvement of multiple spaces.

Was done on both sides under LA. The patient was kept under follow-up. Patient was still having difficulty in breathing. So, Maxillofacial CT with Neck was done. CT scan neck (Figure 6).

Showed involvement of bilateral submental, sublingual, submandibular and Lt lateral pharyngeal space. In view of involvement of lateral pharyngeal space and to secure airway tracheostomy was planned for this patient. Tracheostomy was carried out for this patient. Decompression was carried out. Patient was given ICU care. Patient healed well and was discharged after closure of tracheostomy wound (Figures 7 & 8).

Figure 7: Closure of Tracheostomy wound.

Figure 8: Post operative frontal profile.

Results

Patient characteristics - 08 patients were excluded from study because of incomplete records. Total 492 patients were included in study (Table 1). The maximum patient was in the age group 30-40 measuring 148, (Figure 1). The most commonly involved teeth were mandibular posterior teeth (Figure 2). The pattern of sign and symptoms are shown in (Figure 5). Out of 492 patients, 25 % of the patients were Diabetic and 9 % of patients had other systemic illnesses like hypertension, renal disease, and CAD, etc. The origin of the infection is depicted in figure 3. Submandibular space was the most commonly affected space. The involvement of spaces is shown in (Figure 4). 26.6% patients had single space involvement; 73.7 patients had multiple space involvement. 38% patients had two spaces involved, 19% patients had three spaces involved. Rest patients were having involvement of more than three spaces. Treatment – 142 patients (28.8%) were admitted for management. 350 patients (71.2%) were managed as outpatients. At the time of admission 23 patients had dyspnoea. For 8 patients' tracheostomy was required. 390 patients were given Amoxicillin and clavulanic acid combination. Metronidazole was given for anaerobic cover. All other patients received third generation cephalosporin along with metronidazole. Amikacin or clindamycin was added in 50 patients.

Surgical drainage was done under LA in 252 patients (51.3%) and under GA in 240 patients (48.7%). Out of the patient who received GA, in 160 patients (66.6%) oral intubation was done, in 72 patients (30%) nasal intubation was done. A fibreoptic intubation was done where it was indicated.

In 250 patients (50.8%) extra oral incision was given. In 150 patients (30.4%) intra oral incision was sufficient for drainage. In 52 patients (10.5%), only extraction of causative teeth was sufficient for removal of infection. In 40 patients (8.1%), both extra oral and intra oral drainage was done. In 350 patients (71.1%), pus was drained during surgery. In 142 patients (28.9%) serosanguinous discharge was drained. In 440 patients (89.4%) drains were placed.

Discussion

The present study on Indian population with 492 patients and time period of 10 years is one of the few investigations on odontogenic oral & maxillofacial infection. Previously a study was done by CMC Ludhiana using 05 years of time period and 137 number of patients as parameters concluded that patients with Oral & Maxillofacial space infection who present with multiple space involvement, those with diabetes and a high leukocyte count are at higher risk of developing life-threatening consequences and must be continuously watched [8]. Odontogenic infections contribute to Oral & Maxillofacial space infection in the range of 50–89% in reports from different parts of the world. V. Yuvaraj studied 2140 patients in 02 years' time period and found that mandibular third molars were offending tooth

in majority of cases, penicillin was drug used in most of cases and pterygomandibular space was most commonly involved space [9]. Ekta S. Keshwani et al in a 5-year retrospective study found maxillofacial space infection should be rendered prompt and aggressive treatment and hospitalisation should be recommended wherever required [10]. Huang, et al. [11] reported 50% odontogenic infections in 185 cases of deep neck infections in Taiwan. Zhang, et al. [12] reported 56.1% odontogenic infections among 212 cases of oral & maxillofacial infection in China. Bross-Soriano, et al. [13] reported 89% odontogenic origin infections in their 121 cases of Ludwig's angina in Mexico. An increasing proportion of odontogenic causes among deep neck abscesses over the years has been reported by Parhiscar and Har-El from the USA [14]. These data indicate that the prevention and treatment of odontogenic infections have not been on a par with the control of other causes of Maxillofacial space infection like tonsillopharyngitis and lymphadenitis. Odontogenic infections cannot be treated only with antibiotic treatment; antibiotics are only used as a supplement to ultimate treatment. Patient's self-medication and the primary practitioner's failure to provide decisive therapy puts the patient at considerable danger of infection progression.

Similar to previous studies done by various investigators, the present study also confirms the finding that oral & maxillofacial infections in children are less common than adults [15-16]. The reason for more infections in adults is more population of adults as compared to children, neglect of oral hygiene and more systemic compromised adult patients. This study was conducted at a defence tertiary care centre where serving person and their dependents were treated. Person deployed at difficult duty area reported to our centre with a delay of 48 hours to 72 hours. Most of these patients were without any systemic condition. Inspite of delay, majority of these responded well to treatment and recovered without any significant complications. Most of Oral & Maxillofacial infections are odontogenic in origin. These infections occur as an outcome of a prolonged disease process. The majority of patients had recurring symptoms long before they developed a space infection. The most prevalent presenting ailment participants in our study was swelling associated with pain. Bridgeman, et al. [17] observed that despite the presence of intermittent pain in the past, 98% of the patients presented for care only when there was a sudden onset of swelling. They had not sought therapy for the symptom of odontogenic pain or had received poor treatment. In our study, 50% of the patients had reached the stage of trismus, indicating that the infection had involved the masticatory spaces and could disturb the upper airway abruptly. Among these patients 10% also had dyspnoea suggesting that airway obstruction had already set in. Trismus is frequently misunderstood by dentists and patients who attribute it to other reasons. Trismus in patients with an odontogenic infection is a warning sign that necessitates a thorough evaluation for symptoms and indicator of upper airway compromise, such as tongue elevation.

In this study around 26 % of the patients were having DM. DM indicate a higher risk for Oral & Maxillofacial infections among diabetics. According to Ramachandran A et al the prevalence of diabetes among the urban population in India has been found to be 12.1% [18]. However, the percentage of diabetic patient is smaller than Huang et al. stated (88.9%) [11], and Parhiscar and Har-El (50%) [14]. Immunological research has demonstrated several defects in the host immune mechanisms of diabetic subjects. Polymorphonuclear leukocytes exhibit impaired migration, phagocytosis, intracellular killing, and chemotaxis [19]. In addition to widespread immune system deficiency, several non-immunologic variables contribute to higher risk of infection. Vascular abnormalities like microangiopathy and macroangiopathy favour infection by compromising local circulation, leading to a delayed response to infection [20].

The most common origin of the Oral & Maxillofacial infections in our study was from a pulpal focus, our finding was similar to G.C. Mathew, et al. [8]. The root canals are colonized by a broad mix of anaerobic bacteria once the intact pulp chamber is breached. Abscess formation occurs when these bacteria and their toxic products enter the peri-apical tissue via the apical foramen and induce acute inflammation and pus formation [21]. This pus spreads to the maxillofacial regions in close proximity to teeth's root. This is supported by our finding that submandibular space is most commonly involved space and teeth 38 and 48 (lower wisdom teeth) are most commonly involved. Among the mandibular spaces, the submandibular space has been reported to be the most commonly involved [1,11,22,23]. The mandibular buccal [15], the lateral pharyngeal [11] and the pterygomandibular spaces [16], have been reported to be the most common in some studies. Pericoronitis leading to severe infection had a low prevalence in our study (6%), probably because pericoronitis occurs in younger individuals and is often treated immediately due to its severe symptoms. The latency in presentation to the treatment facility is the probable reason behind the higher proportion of multiple space infections compared to single space infections in our study. Other studies have also reported a preponderance of multiple space infections compared to single space infections in patients with head and neck infections of odontogenic origin [23,24].

Sato, et al. [15] reported 2.85% cases with Ludwig's angina in 210 cases of maxillofacial infections in Brazil; Uluibau, et al. [25] reported 6.25% in 48 cases of severe odontogenic infection in Australia, and Huang, et al. [11]

reported 12.4% in a sample of 185 cases of deep neck infection in Taiwan. A 4-year prospective study at a tertiary care centre in South India has reported 20 cases (18%) of Ludwig's angina among 111 patients in a span of 4 years. We preferred tracheostomy over endotracheal intubation for airway maintenance in individuals with airway blockage [26]. A study by Potter, et al. [27] has shown that patients with deep neck infections who undergo tracheostomy for airway management spend less time in intensive care, have lower rates of complications, and when compared to patients who require endotracheal intubation, the expenditures are lower. In our study patients who had tracheostomy for airway management had an uneventful recovery. Out of all the complications, we had 41 patients presenting with Ludwig's angina. Out of these all patients were successfully managed except 05 cases with medically compromised condition who died.

Surgical drainage was performed in all patients, regardless of whether or not pus was present. The issue of cellulitis being managed differently is a carryover from a pre -antibiotic era, during which time there was a risk that surgical intervention could make the condition worse [25,28]. In every case we attribute our greater treatment success rate to our active intervention. The only 07 deaths that occurred in the study sample were of patients with diabetes and chronic renal failure, where the systemic condition led to death. Out of these 01 patient developed cavernous sinus thrombosis as complication and 06 patients developed Ludwig angina. Currently there is an evolving consensus that the difference between cellulitis and abscess is no longer clinically relevant and that both need to be drained [25].

In our study, we did not perform pus culture as in India there is a high rate of self-prescription and over-the-counter medication among patients. Patients with oral infections see a variety of dentist and seek symptomatic alleviation rather than receiving thorough treatment. Most patients have been on several courses of antibiotics before they present to a tertiary centre with a severe infection [29]. The bacteriology of severe odontogenic infections, though subtly different from that of the acute dental abscess, is still a complex mixture of strict anaerobes and facultative anaerobes, the culture of which can prove challenging for a non-specialist microbiology laboratory [22,30].

All our patients had a good response to the antibiotics and metronidazole, as well as surgical drainage. Beta-lactam antibiotics have long been used to treat odontogenic infections because they are highly efficient against the bacteria that cause them, are inexpensive, and have little side effects. The increasing rate of beta-lactam resistance due to the emergence of beta-lactamase-producing organisms has led to concerns regarding the effectiveness of beta-lactam antibiotics [30]. There hasn't any agreement on a standard antibiotic protocol, owing to a lack of data in the form of well-designed clinical trials to support one regimen over another [31]. We have treated all patients with serious Oral & Maxillofacial surgery with a standard regimen of beta-lactamase stable beta-lactam antibiotic and metronidazole, as in these patients with impending airway obstruction, any delay in instituting an effective treatment can lead to death, and the local rates of beta-lactam resistance are very high. The combination of these antibiotics provides an antibiotic spectrum against the viridans streptococci and the strict anaerobes that are predominant in odontogenic infections [29]. Few studies have looked at patient characteristics associated with complications in Oral & Maxillofacial surgery. Diabetes [12,23] and multiple space involvement [23] have already been noted to be significantly associated with life-threatening complications. We have identified that patients with diabetes, multiple space involvement, or a total leukocyte count more than 15000 per cubic mm on admission tend to develop complications during treatment. Other studies have also noted that well-managed diabetes can lead to a prognosis similar to that of a non-diabetic with similar severity of infection [26,32]. Good control of blood sugars and aggressive management of the diabetic patient with multiple space infection and a high leukocyte count can ensure a reduction in complications during the course of treatment.

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