



ANALYSIS OF MAXILLOFACIAL AND NECK SPACES INFECTION IN DIABETIC AND NON-DIABETIC PATIENTS

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ABSTRACT **Introduction:** Dental infection has plagued humankind for as long as our civilization has been a fight against microorganisms by man dates back to ancient civilization. The discoveries of antibiotics are encouraging trends towards conquest of the microbial infection. The microbiology of odontogenic infections in diabetic and nondiabetic individuals has been found to be variable. In light of this, a study was conducted to compare the odontogenic spaces involved, antibiotic susceptibility of microorganisms, length of hospital stay, and the outcome of treatment in diabetic versus nondiabetic individuals

Material & Methods: The study was carried out in the department of Medicine and Dental of GCRG, Lucknow . A total 100 patients were included in the study who presented to our unit. Patients were divided into two groups based on their diabetic status; group I. Diabetic (50) and group II (50) Non–Diabetic. Written consent was obtained from patients that participated in the study.

Result : A total of 100 patients were included in the study; 73 patients (73.0%) were men and 27 patients (27.0%) were women. Group I included 50 patients and group II had 50 patients. The mean age in group I was 47 years and 51 years in group II.(Table 1).Of the organisms isolated, *Klebsiella spp* and *streptococcus spp.* was the most common bacteria in group I (5.5%) and group II was Gram-positive the most common organism in group. (table 2).

Discussion: The hospitalization period in the diabetic group is longer than a non-diabetic group. This is mostly because the diabetic group had more complications; more spaces were involved and more time was required to control blood sugar. diabetic groups complication was more than non-diabetic.

Conclusion : In conclusion, this study highlights diabetes mellitus as a leading risk factor for facial space infection, despite the availability of effective antibiotics and in spite of developing diagnostic tools. In our study, the diabetic patient underwent extended hospitalization.

KEYWORDS : Diabetic , Non- diabetic, Antibiotic, Infection.

INTRODUCTION:

Dental infection has plagued humankind for as long as our civilization has been a fight against microorganisms by man dates back to ancient civilization. The discoveries of antibiotics are encouraging trends towards conquest of the microbial infection¹. Facial space infection has been recognized and described since the time of Galen in the second century. A fight against microorganisms by man dates back to ancient civilization. Ancient Indians used chaulmoogra oil to cure leprosy . Despite all these, even after centuries and endless research, mankind has not been successful in eradicating microbial infections in total . The discoveries of sulfonamides by Domgk and Penicillin by Alexander Fleming are encouraging trends towards conquest of the microbial infection. Oro-facial infection can be spread by direct contact through tissue, lymphatic system or by blood stream. Various factors contribute to the spread of infection which can be divided into general and local factors. The general factors include (host resistance, virulence of the micro-organism and compromised host defenses. The local factors depend on a balance between host resistance and bacterial pathogenicity² . The most common primary sources of oro-facial infection are dentition, tonsils, salivary glands and retained foreign bodies³⁻⁵. A patient with poorly controlled Diabetes mellitus (DM) faces the likelihood of virulent bacterial and fungal infections⁶⁻⁹. According to “Diabetes mellitus related to degenerative complications comprise of micro angiopathy, macroangiopathy, and Neuropathy¹⁰ . Lower production of interleukins in response to infection; reduces chemotaxis and phagocytic activity, immobilization of polymorphonuclear leukocytes and dysfunction in neutrophil bactericidal function, cellular immunity, and complement activation. For this reason, diabetic patients tend to have a higher incidence and increased severity of infections than non-diabetic patients¹¹. The microbiology of odontogenic infections in diabetic and nondiabetic individuals has been found to be variable. In light of this, a study was conducted to compare the odontogenic spaces involved, antibiotic susceptibility of microorganisms, length of hospital stay, and the outcome of treatment in diabetic versus nondiabetic individuals.

MATERIAL & METHODS:

The study was carried out in the department of Medicine and Dental of GCRG, Lucknow . A total 100 patients were included in the study who presented to our unit. Patients were divided into two groups based on

their diabetic status; group I. Diabetic (50) and group II (50) Non–Diabetic. Written consent was obtained from patients that participated in the study. Specimens were obtained from 100 patients either as swabs or by means of aspiration. Kirby-Bauer disc diffusion method were used for antibiotic sensitivity testing. The sample was cultured on blood or MacConkey's agar and inoculated at 37 degrees for 24 to 48 hours.. The susceptibility tests were performed as per Clinical and Laboratory Standards Institute (CLSI) guidelines. The results were statistically analyzed using SPSS.

RESULTS :

A total of 100 patients were included in the study; 73 patients (73.0%) were men and 27 patients (27.0%) were women. Group I included 50 patients and group II had 50 patients. The mean age in group I was 47 years and 51 years in group II.(Table 1)

Table 1. Showing the status of Age, Sex in both group I & II.

Sno.	Group I (%)	Group II (%)
Age	73 (%)	27 (%)
Men	35	32
Women	15	18

Table 2. showing the result of isolated organisms from Diabetic and Non-Diabetic Subjects.

S.No.	Organism (Isolated)	Group I (n= 50)	Group II (n=50)	Total (n=100)
1	No growth/Gram-positive	9 (4.5)	14 (7)	23 (23)
2	Pseudomonas	1 (0.5)	2 (1)	3(3)
3	Escherichia coli	4 (2)	0 (0)	4(4)
4	Enterococcus	5 (2.5)	7 (3.5)	12(12)
5	Mycobacterium	0 (0)	1 (.5)	1(1)
6	Citrobacter diversus	9 (4.5)	7 (3.5)	16(16)
7	Streptococcus spp	11 (5.5)	10 (5)	21(21)
8	Klebsiella pneumoniae	11 (5.5)	9 (4.5)	20 (20)

Of the organisms isolated, *Klebsiella spp* and *streptococcus spp.* was the most common bacteria in group I (5.5%) and group II was Gram-positive the most common organism in group. (table 2). All patients

were started on intravenous empirical therapy consisting of amoxicillin, clavulanic acid, and metronidazole at the time of presentation. The diabetic patients received insulin therapy on a sliding scale or as a fixed dose following consultation with the physician.

DISCUSSION:

Origin of maxillofacial infection could be from a periapical lesion, periodontal condition, pericoronal problem, post surgical infection or direct trauma resulting in epithelial breach. Of these odontogenic ones are most commonly encountered¹²⁻¹⁶. Mostly an ignored or ill-treated decayed tooth becomes the root cause of a serious and life threatening infection. In a country like India where healthcare providers are inadequate in number and facilities are less, ignorance to a dental problem adds to the worsening condition. Complications such as retropharyngeal spread and intracranial extension or mediastinal spread and airway obstruction indicate the potentially serious nature of these infections.

Diabetic patients are not only at high risk for developing infectious diseases, but they also respond poorly to infections once they occur, particularly in the context of suboptimal glucose control. Systemic hyperglycemia results in derangement of the immune system, including neutrophil function, cellular immunity, and complement function¹⁷⁻¹⁸.

The sources of maxillofacial space infections were 90% due to odontogenic causes in both groups; the second cause was lymphatic organ. This result is similar to many previous studies. However, this study does not have cases with unknown sources which disagree with other studies. Caries was the most reported cause for deep neck and facial spaces infections while Marioni et al. reported that periapical infection was often causing facial spaces infections. In this study, the periapical lesion was found to be principal cause. Recently, odontogenic origin has been considered to be the most common cause which results from poor oral hygiene, patient indifference, high-cost dental treatment, which is not covered by insurance. Also, a patient with dental problem always depends on self-medication or a doctor to relieve only the pain and not for treating the cause. So he/she comes for treatment advanced stages of the disease.

Multiple spaces involvement was more in diabetic patients group than in non-diabetic patients. Streptococcus species organisms were the common bacteria isolated from facial spaces infection in both groups in this study, where is this result concerns with many previously reported studies. But Juncar et al.) reported that Staphylococcus aureus was the most prevalent microorganism, followed by Streptococcus pyogenes.

The hospitalization period in the diabetic group is longer than a non-diabetic group. This is mostly because the diabetic group had more complications; more spaces were involved and more time was required to control blood sugar. Diabetic groups complication was more than non-diabetic.

According to the nature of the complication and multiple areas of facial spaces infection involved in diabetic patients makes them less suitable to conventional treatment. Therefore, a diabetic group with multiple spaces infection of the oral maxillofacial region should get more attention, good diagnosis and more aggressive treatment than the other groups. Controlling of blood sugar at a normal level is essential for treating maxillofacial spaces infection to activate or stimulate the immune response; some patients may need to consult with a specialist. It has been documented that diabetic patients were affected with more pyretic than non-diabetic patients¹⁹ whereas our study showed that patient presented to us very late had no Pyrexia because they were given prescribed medical treatment. In comparison with non-diabetic group in our study, a diabetic patient underwent surgery more than non-diabetic.

CONCLUSION:

In conclusion, this study highlights diabetes mellitus as a leading risk factor for facial space infection, despite the availability of effective antibiotics and in spite of developing diagnostic tools. In our study, the diabetic patient underwent extended hospitalization. The more multiple spaces infections, the more complication and seriously in older patients. Neglecting to treat a toothache at the first incidence of infection leads to complication. This clearly emphasizes the

importance of proper oral hygiene and regular checkups for dental infections. The diabetic patient is more exposed to complication and so, doctors should give more attention to treat these cases. Four points are significant for treatment, namely,

- control the airway,
- use efficiently antibiotic,
- surgical drainage and
- involved tooth treatment as soon as possible.

This study added empirical data to support clinical imitation and to afford serve as a database for future prospective study.

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