

Post-Operative Complications after Simple Tooth Extraction in Diabetic Patients with and without Antibiotic Prophylaxis

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ABSTRACT

Objective: To compare early post-operative complications after simple tooth extraction in diabetic patients with and without antibiotic prophylaxis.

Material and Methods: This Randomized Control Trial study was conducted at department of Oral & Maxillofacial Surgery Liaquat University Hospital Hyderabad. The duration of study was from November 2020 to October 2021. A total of 190 patients diagnosed as diabetics were randomly allocated into two groups. Pain, bleeding, infection, fever and dry socket was assessed from 1st, 3rd and 7th post-operative days.

Results: The average age of the patients was 35.39±6.09 years. Rate of pain (28.4% vs. 12.6%; p=0.007), bleeding (25.3% vs. 11.6% p=0.015), infection (20% vs. 6.3% p=0.005) and dry socket (18.9% vs. 8.4% p=0.035) was significantly high in group B than group A while fever was not significant.

Conclusion: It is concluded that the prescription of prophylactic antibiotics in subjects who got extraction has low incidence of post-operative complications than extraction in diabetics without prophylaxis.

Keywords Tooth extraction, Periodontal disease, Prophylactic antibiotics

INTRODUCTION

Most of patient undergoes removal of teeth every year for variety of surgical indications like caries, pulpal necrosis, and periodontal disease. It is defined as "painless removal of tooth from alveolar socket."^{1,2,3}

Despite tooth extraction is done both as a treatment or as palliation in odontogenic infections and periodontitis, usually as an outpatient case, it carries in itself a morbidity ranging from Psychological disturbances to Nutritional impairment and from disturbed routine activities to surgical complications like pain, bleeding, trismus, facial swelling, bad odor, altered sensation of taste and dry sockets to systemic disturbances like fever, endocarditis and osteoarthritis specially when done in with patients diabetics who have high subspecialty to develop infections.^{4,5}

Through a variety of research done on cases of tooth extraction especially in diabetics conflicting evidence came in existence. Some reported that diabetics and non-diabetics have no significant difference in outcome and use of prophylactic antibiotics is not necessary in diabetics as in non-diabetics while performing tooth extraction.^{6,7,8} On the other hand some reported glycemic control to be controversial in dental socket infections while admitting the use of antibiotics to prevent local and systemic infections⁶ while penicillin's being the drug of choice.⁷

Two common techniques have been described for tooth extractions, namely, Simple Tooth Extraction and Surgical tooth extraction, the former being more commonly performed.^{10,11} Both these techniques have been studied thoroughly for their effectiveness and post-operative outcomes with no clarity and authenticated use of prophylactic antibiotics in diabetics. Depending on the expertise available dental surgeons adopt these techniques.^{9,10}

Different studies published from international journals states that diabetic patients are prone to develop 73.33% of any sort of dental infection but another study claims that use of prophylactic antibiotics among diabetics can decrease infection rate to 0.5%.^{12,15} and, on contrary some authorities claim 0.4% showed signs of active infection after undergoing extraction without prophylactic antibiotics among diabetics, other say should be no use of antibiotics for prophylaxis among diabetics as it can increase resistance among antibiotics, and is financial burden on patient.^{3,4,16} while others describe 3.2% and 15.4% for dry socket

with and without antibiotic prophylaxis respectively among general population.¹³

Simple tooth extractions in diabetics with and without use of prophylactic antibiotics were compared in very small number of studies and nothing was stated clearly¹⁵. Use of prophylactic antibiotics seems to have an extra advantage of periodontal infection prevention, decreased risk of disseminated infections and prevention of non-healing of dental sockets, bad odor and foul taste but is burden on patient and health care system if not justified. Besides, patients treated without prophylactic antibiotics showed the above mentioned complications in excess and were at a risk of ethical issue if complications develop. Negligible number of studies have evaluated the differences in commonest post-operative complications like pain, bleeding, infection, fever and dry sockets in both the scenarios i.e with and without use of prophylactic antibiotics and none have recommended a single technique as a procedure of choice. Whether or not to use prophylactic antibiotics in diabetics undergoing simple tooth extraction with clarity and confidence will help to reduce the post-operative complications and burden on hospitals and patients.

Taking into considerations afore mentioned facts, stage is set for comparison of the simple tooth extractions in diabetics with and without use of prophylactic antibiotics to select a better option in terms of early post-operative complications.

MATERIALS AND METHODS

This Randomized Control Trial (RCT) with non-probability Consecutive sampling technique was carried out in Department of Oral and Maxillofacial Surgery, Liaquat University hospital, Jamshoro/Hyderabad from November 2020 to October 2021. Sample size calculated With an expected proportions of 3.2% & 15.4% for dry socket with and without antibiotic prophylaxis¹³ respectively and at 5% level of significance and 80% power to detect the difference, the maximum sample size required for each group is 95, i.e 190 collectively.

Inclusion Criteria:

- All patients of either sex between the ages of 15-50 years who are planned to undergo simple tooth extraction having un-restorable tooth or not willing for restoration of tooth.
- All such patients diagnosed as diabetics at least a year ago either type-I or type-II managed on oral hypoglycemics or insulin and having random blood sugar levels between 90 mg/dl to 200

mg/dl on gluco-meter prior to surgery.

Exclusion Criteria:

- Patients having some associated chronic disease like Tuberculosis, Malignancy, Ulcerative colitis and Crohn's disease labeled through history and clinical examination.
- Patients suffering from hypertension, immune suppression other than diabetes, HIV, hepatitis B & C, labeled through history and clinical examination.
- Patients having any history of previous malignancy of head and neck region and chemo-radiotherapy to head and neck region.
- Patients suffering from psychological disorders of any origin labeled through history and clinical examination.
- Patients suffering from bleeding disorders of any origin labeled through history and clinical examination.
- Patients allergic to penicillin (drug of choice for prophylaxis) labeled through history.

Data Collection Procedure: After getting approval of synopsis from CPSP, patients who meet the inclusion criteria were included in my study. With their willing, a written and informed consent was taken. Translated versions of the consent form in the patient's preferred language, were presented to the patients.

Patients was divided into 2 groups by slip picking method namely group A and B. Group A = with prophylactic antibiotics and group B = without prophylactic antibiotics. Patients enrolled in Group A were given capsule amoxicillin 2 grams/orally 1 hour prior to extraction. Informed consent was taken and questionnaire based interview was conducted. Patient was given right to withdraw from study at any point in time. Pain, bleeding, infection, fever and dry socket was assessed from 1st, 3rd and 7th post-operative days. All this data was collected on a pre-formed pro-forma and variables recorded. On the follow up days variables present once or twice was labeled as "YES" once. After 7 days variables found absent was labeled "NO" and pro-forma was separated for final evaluation which was done after completing the number of sample size. As this is a comparative study so the final outcome of the two groups was measured and not the patients individually i.e. results was presented in tabulated form with comparison of all variables in both groups. Potential bias associated with this study include, information bias that the patient may report altered status of pain, bleeding or fake history of fever. Researcher was put maximum efforts to take this into account by building good repo with participants so that accurate information can be collected. Other possible bias is surveillance bias that the researcher might introduce. This was controlled by involving another person to assess the presence or absence of complications.

RESULTS

A total of 190 patients diagnosed as diabetics at least a year ago either type-I or type-II managed on oral hypoglycemics or insulin and having random blood sugar levels between 90 mg/dl to 200 mg/dl on gluco-meter prior to surgery that were planned to undergo simple tooth extraction having un-restorable tooth or not willing for restoration of tooth. Total 95 patients in group A were given antibiotics while group B was set as controlled. Age distribution of the patients is shown in figure 1. The average age was 35.39±6.09 years. Mean age, glycemic control with respect to groups are reported in table 1. There were 85(44.7%) male and 105(55.3%) female. Gender distribution with respect to groups is also presented in figure 2. Quadrant distribution of the patients is presented in figure 3. Regarding reason of tooth extraction, Carries was 50(26.3%), periodontal disease 52(27.4%), tooth fracture 52(26.3%) and orthodontic Purpose 38(20%) as shown in figure 4.

Comparison of rate of complications between groups is shown in table 2. Rate of pain (28.4% vs. 12.6%; p=0.007), bleeding (25.3% vs. 11.6% p=0.015), infection (20% vs. 6.3% p=0.005) and dry socket (18.9% vs. 8.4% p=0.035) was significantly high in group B than group A while rate of fever was not statistically significant.

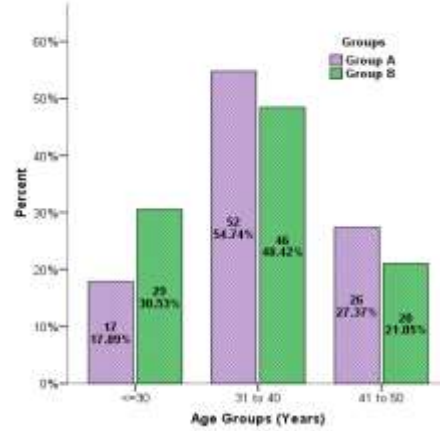


Figure 1: Age Distribution Of The Patients With Respect To Groups N=190

Table 1: Descriptive Statistics By Groups

Statistics	Age (Years)		Glycemic Level		
	Group A	Group B	Group A	Group B	
Mean	36.34	34.45	131.04	127.80	
Std. Deviation	5.98	6.09	27.83	19.84	
95% Confidence Interval for Mean	Lower Bound	35.12	33.21	125.37	123.76
	Upper Bound	37.56	35.69	136.71	131.84

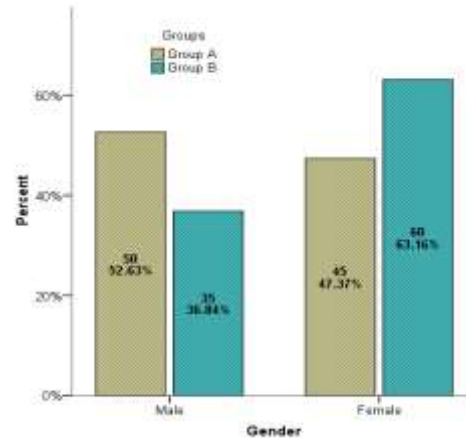


Figure 2: Gender Distribution Of The Patients With Respect To Groups N=190

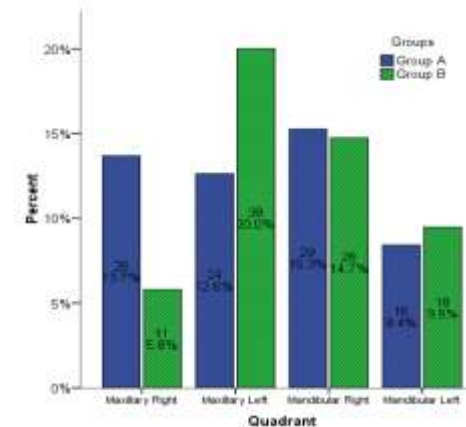


Figure 3: Quadrant Distribution Of The Patients With Respect To Groups n=190

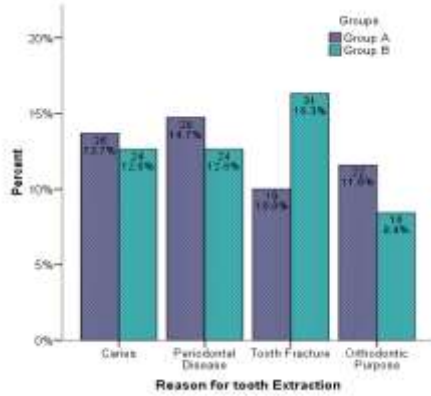


Figure 4: Reasons Of Tooth Extraction With Respect To Groups N=190

Table 2: Compare Early Post-Operative Complications After Simple Tooth Extraction In Diabetic Patients With And Without Antibiotic Prophylaxis

Complications	Group A n=95	Group B n=95	P-Value
Pain	12(12.6%)	27(28.4%)	0.007
Bleeding	11(11.6%)	24(25.3%)	0.015
Infection	6(6.3%)	19(20%)	0.005
Fever	5(5.3%)	85(10.5%)	0.179
Dry Socket	8(8.4%)	18(18.9%)	0.035

Chi-Square test applied for each complication

DISCUSSION

Diabetes mellitus (DM) is one of the very common diseases seen by dentists. Its clinical significance is from the possibility of acute consequences, the intensity of which might pose an instant threat to the diabetic patient's life and necessitate quick identification and treatment¹⁶. Many studies have documented the association of diabetes with occurrence of complications after dental surgery procedures^{17,18}.

The bulk of the participants in this research are between the ages of 31 and 40, with a mean age of 35.39±6.09 years. Our observation regarding gender distribution showing there were 44.7% males and 55.3% females displaying female prevalence. In contrast to prior research, Shera et al⁴ evaluated the prevalence of type 2 diabetes mellitus in Baluchistan, Pakistan's metropolitan and metropolitan zones. They enlisted the help of 1404 men and women. In both urban and rural areas, the total prevalence was 13.46 percent, with 14.71 percent of men and 12.89 percent of females. The prevalence of diabetes was 16.2 % (9.0 percent known, 7.2 % recently diagnosed) in males and 11.7 % (6.3 % known, 5.3 % newly detected) in females in a previous research performed by the same writer in Sindh province⁵.

The necessity for antibiotic prophylaxis in individuals having this sort of surgery has been hotly discussed in recent years, with cost/benefit analyses being conducted. Topical disinfection of the operative field is frequently conducted during the procedure, in addition to systemic antibiotic prophylaxis, and topical home remedies are typically provided to be used thereafter¹⁹. However, there is constantly the possibility of bacterial infection in the operative area. Prophylaxis has traditionally been defined as the use of an antibiotic before to or during surgery to minimize a local or systemic infection problem and its associated clinical effects. Diabetes has been linked to a longer duration of admission in the hospital after surgery, and patients with odontogenic infection have a greater likelihood of deep neck extension.^{8,9,20} An animal model of diabetes in which bone repair after tooth extractions was hindered provided more indirect confirmation of an elevated danger of post oral surgical infections.¹⁰

CONCLUSION

The Diabetes worsen the prognosis hence we have used prophylactic antibiotics to decrease the risk for infection prior to simple extraction. Hence supporting the Hypothesis that the use of prophylaxis reduces the risks in diabetic patients undergoing tooth extraction has low incidence of post-operative complications than extraction in diabetics without prophylaxis.

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