

Comparison of rate of Infection between Antibiotic and Non-Antibiotic Groups in Patients Undergoing Non-Surgical Exodontia

Sana Babar¹, Omer Sefvan Janjua², Hamza Nazir Chohan³, Ayesha Moughal⁴, Saad Hameed⁵, Malik Muhammad Usama⁶

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ABSTRACT

Objective: To compare the infection rate between antibiotic and non-antibiotic groups in patients undergoing non-surgical exodontia.

Materials and Methods: After meeting the inclusion and exclusion criteria, 1760 patients (880 in each group) requiring non-surgical exodontia were enrolled. Informed consent and demographic details were taken. The distribution of patients was done into two groups: A and B with the help of the chance method. Patients in the A group were given no antibiotics and only analgesics (Tab. Ibuprofen 400mg) every eight hours for 3 days postoperatively and the patients in the B group were given antibiotic (Tab. Amoxicillin 500 mg with Clavulanic acid 125mg) 8 hourly and analgesics (Tab. Ibuprofen 400mg) 8 hourly for 3 days postoperatively. The recall visit was planned for the 3rd postoperative day. On the follow-up visit, infection signs' evaluation in terms of the presence or absence of purulent discharge was done.

Results: Mean age of the patients in the antibiotic group came out to be 27.85 ± 7.48 years, while the mean age calculated for the patients included in the non-antibiotic group remained 27.50 ± 7.27 years. The ratio between male and female patients was 0.9:1. In the antibiotic group the purulent discharge was found in 3 (0.34%) patients, whereas in patients without antibiotic group the purulent discharge was present in 5 (0.57%) patients (p -value=0.726).

Conclusion: This study concludes that there appears not much difference between the antibiotics and that of the non-antibiotic group in terms of developing an infection after routine exodontia therefore antibiotics are not warranted after non-surgical exodontia.

Keywords: Antibiotics, Exodontia, Infection, Pain, Pus Discharge

^{1,4}FCPS-II Resident, ²Associate Professor & Head, ³Dental Surgeon, ⁶Demonstrator, Department of Oral and Maxillofacial Surgery, Dental Section, Punjab Medical College, Faisalabad Medical University, Allied Hospital, Faisalabad, Pakistan

³FCPS-II Resident, Department of Orthodontics, Children's Hospital & Institute of Child Health Lahore, Pakistan

Corresponding author:

Omer Sefvan Janjua, House no 10, Lane No. 1, Askari 12, Airport Road, Chaklala, Rawalpindi, Pakistan,
Email: dromerjanjua@outlook.com, Mobile: +923214075045

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INTRODUCTION

Exodontia can be defined as the removal of a tooth and/or its root with a lesser insult to surrounding hard and soft tissues in such a way that the wound healing occurs without any issue and any prosthetic problem during the postoperative phase.¹ Exodontia is a routine dental procedure performed in public as well as in private dental operatories. Extraction of posterior teeth predominates anterior teeth extraction². According to a survey conducted in the United States, more than 20 million tooth extractions are done per annum in America. The most frequent age group undergoing non-surgical exodontia is 21-30 years.² The most common indication of exodontia is dental caries followed by periodontal disease and orthodontic problems.³

Antibiotics are the antimicrobial drugs that are prescribed by medical and dental professionals for the prevention and treatment of bacterial infections.⁴ As the oral cavity is inhabited by a diverse microbial flora which is associated with dental caries and periodontal diseases, so it is a common practice of dental practitioners to advise antibiotics to patients undergoing exodontia to prevent post-extraction infection.⁵ According to some studies, about 7-9% of total antibacterial prescriptions fall under the category of dental prescriptions in primary healthcare settings.⁶

The need to prescribe antibiotics following non-surgical exodontia has been a debatable topic among dental professionals and not much effort has been done to figure out its correlation between the need of antibiotics for perioperative management of healthy patients undergoing routine exodontia.⁶

However, effectiveness, easy access and misuse of antibiotics have led to the development of bacterial resistance that is an urgent threat to public health.⁷ Moreover, inappropriate and excessive use of antibiotics puts a heavy burden on the economic status of developing countries.⁸ It is therefore the responsibility of medical as well as dental practitioners to advise antibiotics judiciously. Therefore, this study aims at ascertaining the role as well as the effectiveness shown by antibiotics in healthy individuals following simple exodontia.

MATERIALS AND METHODS

This prospective cohort study was conducted at the Oral and Maxillofacial Surgery Department of Allied

Hospital, Faisalabad from June 2019 to May 2020. After getting approval from hospital's ethical review committee (Ref. No. IRB0006912/885/2019), all healthy subjects between the age group of 15-40 years, irrespective of their gender who required simple exodontia in either mandibular or maxillary arch and who gave informed consent to contribute to this research had been enrolled in the study. Individuals having co-morbid conditions such as diabetes, hypertension, cardiovascular disorders, liver disorders, pregnancy etc., patients requiring surgical extraction of impacted teeth, patients with already established periapical or facial space infection, patients already taking antibiotics preoperatively and patients with deciduous dentition were excluded from the study. The sampling was done using consecutive non-probability sampling and the sample size was calculated using the WHO calculator for two proportions where $P_1=0\%$ ⁶ and $P_2=0.7\%$ ⁶ power of study is 80% and the level of significance=5%. It came out to be 1760 (880 in each group) Patients were explained about the study and informed consent was taken. the Distribution of patients was done into two groups: A and B with the help of the chance method. Patients in the Group A were given no antibiotics and only analgesics (Tab. Ibuprofen 400mg) every eight hours for 3 days postoperatively, and the patients in Group B were given antibiotic (Tab. Amoxicillin 500 mg with Clavulanic acid 125mg) 8 hourly and analgesics (Tab. Ibuprofen 400mg) 8 hourly for 3 days postoperatively. Recall visit was planned for the 3rd postoperative day. On the follow-up visit, infection signs' evaluation in terms of the presence or absence of purulent discharge from the extraction socket was done. The data was entered in a proforma, which was designed for this purpose.

Version 22 of Statistical Package for Social Sciences (SPSS) was used to analyse the data. Calculation of mean and standard deviation was done for quantitative variables such as age, and frequency. The percentage was calculated for qualitative variables such as gender, mandibular/maxillary tooth and infection between two groups. A comparison of infection rate amongst the two groups was done with the help of the Chi-square test. Stratification was used to control effect modifiers such as age, gender, and tooth extracted. p -value ≤ 0.05 was considered significant.

RESULTS

A total of 1760 individuals was enrolled in the study. The mean age of the patients in the antibiotic group came out to be 27.85±7.48 years, while the mean age calculated for the patients included in the non-antibiotic group remained 27.50±7.27 years. The antibiotic group had 426 (48.4%) males and 454 (51.6%) females, while in without antibiotic group 434 (49.3%) were male and 446 (50.7%) were females. The overall Male to Female

ratio was 0.9:1.

The study results showed that purulent discharge was present in both the groups. In the antibiotic group, the purulent discharge was found in 3 (0.34%) patients, whereas in patients without the antibiotic group the purulent discharge was present in 5 (0.57%) patients. This difference was statistically insignificant, and the *p*-value was 0.726 as shown in Table 1.

Table 1: Comparison of purulent discharge between study groups

		Study Groups		Total	<i>p</i> -value
		With Antibiotic	Without Antibiotics		
Purulent discharge	Present	3	5	8	0.726
		0.34%	0.57%	0.9%	
	Absent	877	875	1752	
		99.6%	99.4%	99.1%	
Total		880	880	1760	
		100.0%	100.0%	100.0%	

DISCUSSION

A combination of antibiotics and nonsteroidal anti-inflammatory drugs is commonly prescribed by dental surgeons. Antibiotics are medications that have saved countless lives by treating bacterial infections like acute ulcerative gingivitis, and prevention of systemic infections like bacterial endocarditis.^{9,10} However, inappropriate antibiotic use contributes to bacterial resistance development by hastening the establishment and spread of resistant microbes and influencing treatment outcomes and has been declared a global concern by the World Health Organization.¹¹ A research published recently stated that infection because of antibiotic-resistant bacteria may cause 10 million deaths each year until 2050.¹² Moreover, a study which monitored *Staphylococcus aureus* in saliva samples collected from 122 participants showed that 88.6% of the strains showed resistance to two or more antibiotics.¹³

In this study purulent discharge was present in both groups. In patients from the antibiotic group, purulent discharge was found in 3 (0.34%) patients, whereas in patients from without antibiotic group the purulent

discharge was present in 5 (0.57%) patients (*p*-value=>0.05). Arteagoitia et al¹⁴, López-Cedrún et al¹⁵ and Monaco et al¹⁶ conducted studies to evaluate the frequency of dry socket in post-extraction cases with and without antibiotics and found no statistically significant difference in both groups. On the contrary, a study conducted by van Eeden and Bütow¹⁷ showed zero cases of dry socket in individuals who were prescribed antibiotics, whereas 15.8% of those who were not prescribed antibiotics reported with the dry socket.

Many practicing dentists in our region routinely prescribe antibiotics to avoid postoperative pain and infection. Van Eeden, Bütow¹⁸ and Agrawal et al¹⁹ conducted a study, which showed no significant connection between antibiotics use and postoperative pain. Kaziro's study reported that prophylactic antibiotics prescribed during the postoperative period after a 'clean-contaminated' surgery showed no additional benefit to the patient.²⁰

A lot of evidence suggests antibiotics for the prevention of infection after performing a third molar surgery.²¹ Some articles do not particularly show infection rates, but they support the use of antibiotics based on

decreased complications in the postoperative period. Parameters such as trismus reduction, decrease in pain intensity and swelling with improved healing have been used to assess the success of antibiotics.²²

Several researchers recommend the prescription of prophylactic antibiotics for non-surgical and surgical extractions, including third molar surgery, only when active infection is observed perioperatively.^{21,22}

Findings of this study are different from those observed by Arteagoitia et al¹⁴ who reported a marked increase in the rate of infection and related complications in patients who were not given antibiotics (up to 12.9%). However, it is worth mentioning that the above-mentioned study was done on impacted molars entirely; therefore, it may have less impact on this study.

The chances of developing post-extraction infection and acute osteomyelitis are increased in smokers and medically compromised patients.²³ In this study, patients with co-morbid conditions were excluded and this can be a potential reason for a low incidence of post-op infection. Large multi-center trials with long term follow-up should be conducted across Pakistan so that robust guidelines can be developed on a national level on this subject matter. This is the need of the hour if we wish to decrease the incidence of rapidly developing antibiotic resistance in our population. This study showed that there was no difference in the post-extraction incidence of infection in both study groups. Therefore, regular use of antibiotics after simple extraction is not recommended.

CONCLUSION

This study concluded that there is no difference between an antibiotic and non-antibiotic group in terms of infection rate after non-surgical exodontia. Dental practitioners should be urged not to prescribe antibiotics after routine exodontia to decrease the rising incidence of antibiotic resistance.

DISCLAIMER

None to declare.

CONFLICT OF INTEREST

There is no conflict of interest among the authors.

ETHICAL STATEMENT

The ethical approval was provided by the Institutional Ethical Review Committee at Faisalabad Medical

University, Faisalabad (Ref. No. IRB0006912/885/2019).

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AUTHORS CONTRIBUTION

Conception and design of the study: O.S. Janjua, M.M. Usama

Acquisition of data: S. Babar, S. Hameed

Analysis and interpretation of data: H.N. Chohan, A. Moughal

Drafting of the manuscript: S. Babar, A. Moughal, H.N. Chohan

Critical review of the manuscript: O.S. Janjua, M.M. Usama, S. Hameed

Approval of the final version of the manuscript to be published: S. Babar, O.S. Janjua, H.N. Chohan, A. Moughal, S. Hameed, M.M. Usama

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