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Comparison of Efficacy of Prophylactic Antibiotics in Preventing Infection with no Antibiotics Given for Removal of Impacted Mandibular Third Molar Tooth

Alaf Khan, Shahid Khan*, Muhammad Jamal, Anam Javed***, Misbah Murtaza**, Manahil Rahat******

Department of Surgery, Bacha Khan Medical College, Mardan Pakistan, *Department of Surgery, Ayub Teaching Hospital, Abbottabad Pakistan, **Department of Surgery, Islamabad Medical and Dental College, Islamabad Pakistan, ***Department of Surgery, King Abdullah Teaching Hospital, Mansehra Pakistan, ****Department of Pathology, Armed Forces Institute of Pathology/National University of Medical Sciences (NUMS) Rawalpindi Pakistan

ABSTRACT

Objective: to compare pre-operative prophylactic antibiotics with no antibiotics for removing an impacted mandibular third molar tooth to avoid Infection.

Study Design: Quasi-experimental study

Place and Duration of Study: Ayyub Teaching Hospital Abbottabad, Pakistan from Jan 2018 to June 2018

Methodology: Two hundred four study participants were divided into two groups: those with their third mandibular molar teeth impacted and those without. One Group was given an antibiotic before surgery; the other received a placebo. Both groups were followed after surgery and were observed for the development of post-operative Infection.

Results: There were 204 participants in our study whose age group ranged from 17-30 years, (mean age 23.89±2.39 years). Of 204 individuals, 182(89.2%) were treated well, whereas 22 individuals were diagnosed with Infection (10.8%). 18 individuals (17.6%) developed Infection in the Placebo Group, whereas 4(3.9%) patients developed infection in the Antibiotic Group.

Conclusion: The frequency of post-operative infections is reduced in individuals with an impacted third mandibular molar tooth who are given antibiotics before surgery.

Keywords: Prophylaxis, Anti-bacterial agents, Antibiotic prophylaxis, Postoperative complications, Molar, Mandible, Tooth extraction

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INTRODUCTION

The third molar on the mandible is the most often impacted tooth. One of the most common oral and maxillofacial surgeries is the removal of mandibular third molars.[1] A bactericidal effect can only be achieved if the levels of antibiotics in circulation are high enough at the time of operation. Prophylactic antibiotic treatment is "any antimicrobial agent that prevents the development of illness. [2]

The antibiotic is normally given in a single dosage before the procedure. In healthy individuals, the risk of Infection after a tooth extraction is roughly 10%, rising to 25% when the host's immune system is compromised.[3] Most post-operative consequences include inflammation and Infection brought on by bacterial contamination, which is prevalent due to the nature and setting of the procedure.[4,5]

Edema, trismus, fever, pus, local Infection (e.g., alveolitis), and discomfort are all signs of Infection.[6] Drainage, irrigation, and medicines are used to treat the illness. Prophylactic administration of antibiotics appears to reduce the post-operative Infection in such patients.[7]

It is appropriate to prescribe antibiotics for post-operative difficulties since oral surgery is done in an environment that is possibly contaminated with a significant number of germs, which are the primary cause of the majority of post-operative issues. Using antibiotics during third molar surgery is not agreed upon because of the low risk of complications. Patients who undergo third molar surgery are often prescribed antibiotics even though this procedure is typically considered clean-contaminated and sometimes contaminated. The present study was conducted to compare pre-operative prophylactic antibiotics with no antibiotics for removing an impacted mandibular third molar tooth to avoid Infection.

METHODOLOGY

The quasi-experimental study was conducted at the Oral & Maxillofacial Surgery Department, Ayub Teaching Hospital Abbottabad, Pakistan from January to June 2018 after approval from the Ethics Committee (letter no F.17-TMO/2017/912). The sample size was calculated using the WHO sample size calculator, taking the reported prevalence of impacted

Correspondence: Dr Manahil Rahat, Department of Pathology, Armed Forces Institute of Pathology, Rawalpindi Pakistan
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mandibular third molar tooth as 16.7%.[8] The non-probability consecutive sampling technique was used.

Inclusion Criteria: Patients of either gender, aged 17 years and above, who have impacted third molar tooth at Level B and Class II according to Pell & Gregory classification were included.

Exclusion Criteria: Patients with local Infection around the impacted third molar tooth, Diabetic patients, those having

bleeding disorders, immunocompromised patients who have recently received radiotherapy for any indication and those who have already been taking antibiotics before presentation and inflammatory symptoms at the time of surgery were excluded.

Data was collected after informed consent was gained from subjects. Participants in the research were assigned to two groups using random number table (Figure).

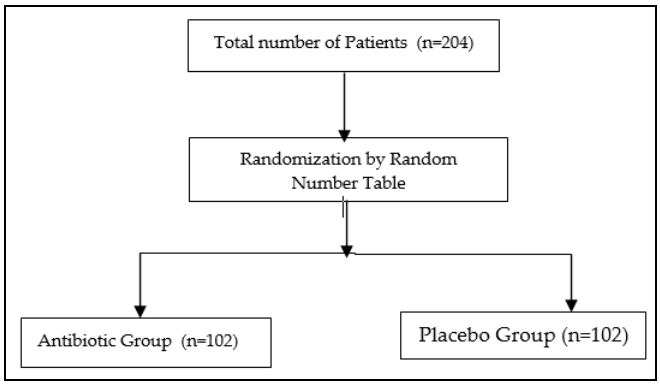

Figure: Patient Flow Diagram (n=204)

A single dosage of 2 gram of Amoxicillin/Clavulanate was given to the Antibiotic Group an hour before surgery, whereas the Placebo group was given no pre-operative antibiotics. In both groups, asymptomatic mandibular third molars were surgically removed using stringent aseptic methods, resulting in minimum tissue damage. To control the confounding factors, the same oral and maxillofacial surgeon operated on all the study participants using the same surgical technique under strict aseptic measures. The patients were allowed to take non-steroidal anti-inflammatory drugs and/or painkillers following the procedure. Infection was noted on the subsequent follow-up visits to the outpatient department on the third and seventh postoperative days and was duly recorded in a pre-designed proforma.

Statistical Package for Social Sciences (SPSS) version 24.0 was used for the data analysis. Quantitative variables were expressed as Mean±SD and qualitative variables were expressed as frequency and percentages. Chi-square test was applied to explore the inferential statistics. The *p*-value of ≤0.05 was set as the cut-off value for significance.

RESULTS

Our study included 204 participants aged 17 to 30 years, (mean age 23.89 ± 2.39 years). Of these 204 individuals, 182 (89.2%) were treated well, whereas 22 (10.8%) were still diagnosed with Infection, as shown in Table-I.

Table-I: Efficacy in terms of Absence of Infection in Study Participants (n=204)

Efficacy (Absence o Infection)	n(%)
Yes	182(89.2%)
No	22(10.8%)

There were 18 individuals (17.6%) who developed Infection, in the Placebo Group, whereas 4(3.9%) patients having developed Infection in the Antibiotic Group, as displayed below in Table-II.

Table II: Frequency of Infection in Placebo and Antibiotic Groups (n=204)

Treatment modality	Absence of Infection		*p*-value
	Yes	No	
Placebo Group	84(82.4%)	18(17.6%)	
Antibiotic Group	98(96.1%)	4(3.9%)	0.001

DISCUSSION

The frequency of post-operative Infection was reduced in this research due to the use of prophylactic antibiotics, with the benefits being more apparent in the younger patient group. In other studies, researchers have drawn similar conclusions.9 Regarding reducing the risk of post-operative infections and inflammatory issues after third molar extraction, Arteagoitia and colleagues discovered that administering Amoxicillin/clavulanic acid lowered the risk.

Patients who received pre-operative amoxicillin were shown to have a statistically significant difference in the incidence of postoperative pain, fever, and wound Infection compared to those who did not get pre-operative amoxicillin.[10]

A recent study found no benefit to using antibiotics as a preventative measure before having a third molar out. Randomized, placebo-controlled

clinical research was carried out on 50 participants in that study.[11] As many as two instances of alveolar osteitis (4 per cent) and three cases of PC were detected (6 per cent). No significant differences existed between the therapy groups in PC, trismus, pain, or oedema formation frequencies. When antibiotics were administered to treat PC, there was an absolute risk reduction (ARR) of 3.52 per cent and a number necessary to treat (NNT) of 29. According to the another study, M3 procedures were unaffected by using prophylactic antibiotics and corticoids in a single dosing regimen.[12]

In order to avoid SSIs, antibiotics are used in noninfected areas in clean or clean-contaminated settings. As a result of their possibly dangerous side effects, antibiotics are not suggested for use in this surgery.[13]

Amoxicillin (clindamycin) is ineffective in the prevention or mitigation of post-operative inflammation in individuals who have had their third mandibular molar removed. In one study, there was no difference in the incidence of inflammatory problems between the two groups. Only 2% of the patients in the therapy group suffered from alveolar osteitis, and this was followed by 1% for wound infections and 14% for gastrointestinal problems.[14]

Researchers recommend pre-operative Amoxicillin/clavulanic acid administration to prevent post-operative Infection and alveolar osteitis after the third molar extraction. Individuals with a penicillin allergy may be given levofloxacin as a preventative measure after removing mandibular third molars.[6] Pre-operative oral metronidazole and amoxicillin were shown to be ineffective in preventing dry sockets in a DOW University Karachi research. Dry sockets were more common in individuals using amoxicillin and metronidazole than in the control group.[15]

According to another study, antibiotic prescribing procedures were not significantly different from those in other hospitals. Pre-operative antibiotic prophylaxis is unnecessary for regular third molar surgery in healthy individuals, according to the findings of this study, which also provides a financial benefit.[16] According to Isiordia-Espinoza *et al*. Amoxicillin given before or after the surgical extraction of third molars in healthy patients did not reduce infection risk compared to the placebo or untreated group.[17]

In the study conducted at the de' Montmorency College of Dentistry, the infection rate was 28% when no pre-operative antibiotics were provided. In comparison, the infection rate was 6.7% when pre-operative antibiotics were given. A substantial correlation was found between the incidence of Infection and the antibiotic regime employed during the extraction of impacted third molars in the mandibular third molars, as demonstrated by the results of this study.[18]

From this literature search, it is clear that conflicting results have been reported regarding the effectiveness of prophylactic antibiotic administration in impacted third-molar surgeries.

CONCLUSION

The administration of prophylactic antibiotics prior to surgery is associated with a significantly lower incidence of post-operative Infection in patients undergoing extraction of impacted third mandibular molar teeth.

Conflict of Interest: None.

Authors Contribution

Following authors have made substantial contributions to the manuscript as under:

AK & SK: Conception, study design, drafting the manuscript, approval of the final version to be published.

MJ & AJ: Data acquisition, data analysis, data interpretation, critical review, approval of the final version to be published.

MM & MR: Conception, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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