ASSESSMENT OF THE EEFICACY OF THE ANTIBIOTICS IN THE THIRD MOLAR SURGERY: AN ORIGINAL STUDY

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ABSTRACT

Introduction: Although it wasn't a major issue just a few years ago, antibiotic resistance is now a severe one. Giving the surgeon unambiguous proof of the effectiveness of antibiotic use—or lack thereof—for a procedure as prevalent as mandibular third molar surgery is urgently required. The purpose of this study was to determine whether or not postoperative combination amoxicillin and clavulanic acid in mandibular third molar extraction is useful in reducing inflammatory problems.
Methodology: Fifty subjects with bilateral impactions were selected and for the same patient the antibiotic was given for one side and other side operated without antibiotic. One hour prior to surgery, each patient received 625 mg of combination amoxicillin and clavulanic acid. Third molars in Group I received medicines, TDS for 3 days, while third molars in Group II received placebo in identical-looking packs for the same amount of time. On the third and seventh postoperative days, the patients underwent evaluations for symptoms of clinical infection and to determine the microbial burden. Data was compared for significance.
Results: Based on microbial load, there was no statistically significant difference between the test group and the control group for erythema, dehiscence, swelling, discomfort, trismus, and infection. The prevalence of alveolar osteitis in the placebo group was statistically significant.
Conclusion: Only individuals having contaminated, prolonged surgery are advised to use postoperative antibiotics.

Key words: Randomized Controlled Trial, Mandibular Third Molars, Antibiotics, infection.
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INTRODUCTION

The most frequent postoperative consequences in impaction surgeries are inflammation and infection linked to bacterial contamination because of the type and setting of the surgery. Third molar extraction procedures are classified as Type II/clean-contaminated operations because oral surgery is always performed in an environment that is heavily polluted with bacteria and where infections and postoperative problems are frequently linked

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to bacterial contamination. As a result, it makes sense to recommend antibiotics to treat and lessen postoperative problems.There has been discussion on the topic of antibiotic prophylaxis in this kind of surgery.[2] Some researchers do not believe that antibiotics will be helpful and instead recommend the use of anti-inflammatory medicines since they believe that difficulties following surgery are caused by the trauma of the process itself rather than by infection occurrences.[3] In cases where these symptoms are caused by infection, some experts advise using antibiotic prophylaxis to significantly reduce postoperative sequelae like discomfort, trismus, slow wound healing, and swelling.

However, there is disagreement about whether or how antibiotics should be used in third molar surgery due to the low frequency of postoperative problems, which are often not life-threatening, and the evidence from several clinical trials with insufficient power.[5,6] The use of antibiotics during third molar surgery is still debatable, and the overall infection rate following dentoalveolar surgery is estimated at 15%.[7,8] Surprisingly, despite a more than 60-year history of antibiotic use, there is no agreement on whether systemic antibiotics should be used in conjunction with third molar surgery to prevent inflammatory postoperative sequelae. [9]

The goal of the current investigation was to ascertain if postoperative antibiotics are required to lower the risk of infection following mandibular third molar extraction. The relationship between the microbial load at the suture site and clinical indications of infection was also assessed.

MATERIAL AND METHODS

All healthy males and females, who presented to the private clinic, with bilaterally similar impacted mandibular third molars, were included in this study. The informed written permission from every patient was taken. The criteria for exclusion were:

- Local pathology includes generalized or localised periodontitis, cysts or tumours connected to third molars, such as acute periodontitis, and penicillin allergies.
- Immune system compromised
- Different systemic diseases
- Pregnancy
- The patient's refusal to take postoperative medication
- Refusal to give permission
- Failure to show up for the follow-up.

Research plan

Prior to surgery, all patients underwent standard radiographic exams and oral prophylaxis. The study included 50 patients with bilaterally identical impacted mandibular third molars. One hour prior to surgery, each patient received 625 mg of combination amoxicillin and clavulanic acid. They were randomly assigned to one of two treatment groups after extraction. Every patient acted as his or her own controller. This was done to boost statistical power and confirm that a patient's biologic reaction to the medicine and the placebo was comparable. The medications were hidden from the operator and the patients. The hospital pharmacist administered the drug and the placebo in identical-appearing packs labelled as drugs A and B. These were given once for each side.

After the patients were divided into two groups, Group I received 625 mg of combination amoxicillin and clavulanic acid for 3 days, whereas Group II received placebo in identical-looking packs for the same amount of time. The patients, statistician, investigator, and operating surgeon were all kept in the dark regarding which patients received which medications. Surgery was performed as per the routine protocols.

A follow-up assessment

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The development of local infection and the evolution of the inflammatory parameters throughout the course of the trial were the main efficacy variables, which were assessed in a blinded manner by a single-blinded investigator on the third and seventh postoperative days. "*Erythema, dehiscence, edoema, discomfort, trismus, alveolar osteitis, and infection*" based on microbial load were among the indications of infection that were watched for. One millilitre of sterile saline solution was injected into the soft tissue incision site and aspirated back using a needle and syringe to capture the suture site aspirate. The goal was to determine whether local microbial load correlates with clinical outcome by assessing local microbial load in both groups on the third and seventh postoperative days.

Statistic evaluation

"*Age, gender, oral hygiene level, type of impaction, receipt of postoperative antibiotics, symptoms of infection, and presence or absence of microbial load in the postoperative period*" were all factors that were recorded for each patient. Data were tabulated in "Microsoft Excel (Microsoft, Redmond, WA, USA)", and using Stata version 8's two-tailed Fisher's exact test with a 95% confidence interval, the researchers looked for statistical differences between the two groups.

RESULTS

Fifty patients with bilaterally identical impacted mandibular third molars were included in the study. The patients were 25.6± 1.2 years of age. The range of ages was 18 to 40. 33of the 50 cases were men and 17 were women. Pederson's difficulty index was used to calculate the difficulty ratings of the teeth in each group. Regarding any patient attribute, there was no statistically significant difference between the two groups (Table 1).

In the study, Group I experienced postoperative complications (erythema and dehiscence) at a rate of 6.24% compared to Group II at 16.66%. The incidence of infection was the same in both groups (P = 0.2), which is not statistically significant. Swelling and pain were present, although their presence was not statistically significant (P values, 0.14 and 0.65, respectively). This demonstrates that there was no discernible difference between Group I and Group II patients in the frequency of edoema and pain. In both groups, local discomfort was followed by swelling as the most prevalent complaint. With a P value of 0.3, statistical analysis determined that the relationship between trismus and postoperative antibiotic use was not statistically significant. Alveolar osteitis was not observed at any location in the group receiving a brief course of antibiotics (Group I), whereas it was observed at eight sites (14.6%) in the group receiving a placebo (Group II). In Group II, 28.6% of distoangular impactions and 20% of horizontal impactions had alveolar osteitis. There was a difference in the distribution of alveolar osteitis between Group I and Group II patients, and the data were statistically significant with a P value of 0.012 [Table 2].

On the third and seventh days, there was no statistically significant difference in the microbial load distribution between the two groups. There was also no difference in terms of the suture site or the presence of clinical infection [Table 3]. From culture, no Gram-negative bacteria were identified. Pseudomonas and enterobacteria, which are Gram-negative bacteria, made up the majority of the organisms (Citrobacter, E. coli).

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Table 1: Demographic details of study sample

	Mean+SD
Age (years)	25.6± 1.2
Gender (%)	
Male	33
Female	17
Angulation of teeth (%)	
Mesioangular	42
Distoangular	11
Horizontal	14
Vertical	33

Table 2: Distribution of patients' characteristics according to alveolar osteitis in Group- I and Group- II

Variable	Alveolar osteitis		Total	*P* value
	Absent	Present		
Group I	50	0	50	**0.012**
Group II	42	8	50	

Table 3: Distribution of the 3rd and 7th day microbial load according to groups and presence of clinical infection

Variable		Microbial load	*P* value		Microbial load	*P* value
	%	3rd day (%)		7th day (%)		
	Positive	Negative		Positive	Negative	
Groups						
I	13	88	0.3	6	94	0.6
II	7	94		6	94	
Clinical infection						
Present	8	6	0.4	5	8	0.6
Absent	9	83		5	883	

DISCUSSION

At the moment, infections carry the greatest burden of disease worldwide. Today, antibiotic resistance is a significant issue, but this was not the case fifty years ago. [10- 12] As a result, we have made the decision to carry out the study to compare postoperative infection in patients receiving postoperative antibiotics or placebo after extraction of the third molar in the mandible. Local discomfort and swelling were the two symptoms that both groups experienced the most frequently. This agrees with the conclusions of other investigations. [13,14] As there was no discharge or unpleasant odour connected with the swelling in the research, it can be attributed to surgical trauma.

Finding any substantial correlation between the microbial load at the operated site and clinical infection (erythema, dehiscence, edoema, discomfort, and trismus) was a key goal of our investigation. The microbial load and clinical indications of infection were not significantly correlated, according to our research. It was observed that some patients exhibited early clinical signs of infection but

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had a negative microbial load, while other patients had no clinical evidence of infection but had a positive microbial load. Pseudomonas and enterobacteria were the most common Gram-negative bacteria recovered from the suture site aspirates (Citrobacter, E. coli). The usage of combination amoxicillin and clavulanic acid, which mostly affects Gram-positive bacteria, may have contaminated the sample during collection or contributed to the presence of Gram-negative bacteria. The existence of these bacteria in the absence of a clinical infection may point to less virulent strains of bacteria or suggest that there weren't enough bacteria present to infect the host and overcome host resistance. It is interesting that none of the cases in the research required incision and drainage due to active pus discharge or abscess formation. The results are nevertheless relevant since the same criteria were applied to determine surgical site infection in both groups even though tenderness and dehiscence are not recognised indications of surgical site infection. All of the erythema and wound dehiscence instances that were recorded as infections could have been caused by simple surgical stress or edoema.

The most frequently documented sequela, alveolar osteitis or dry socket, may affect 25–30% of patients having their impacted mandibular third molars extracted.[15,16] Age, gender, and surgical trauma are all known risk factors for alveolar osteitis and associated postoperative problems. [17] In the study, alveolar osteitis was observed in seven locations (14.58%), compared to 0 sites in the antibiotic group, which is consistent with the findings from studies.[16,17] A P value of 0.012 indicates that the data are statistically significant. Alveolar osteitis was discovered in 28.57% of distoangular impactions and in 20% of mesioangularimpactations in Group II, where more bone cutting and a longer duration of surgery were necessary compared to other types of molar impactions. In these circumstances, it is advised to take a postoperative antibiotic for three days to reduce the risk of alveolar osteitis, as was the case in our study.

But there are several restrictions on our study that must be addressed. First of all, the limited sample size prevents us from drawing any significant conclusions. Second, the diagnostic tests for infections and inflammation were not quantified. Despite these drawbacks, the study does standardize the two groups' impaction types using Pederson's difficulty score and the same surgeon and treatment strategy. The dosage, duration, method, and type of antibiotics used were all the same for the antibiotic treatment. To avoid bias and result distortion, the right methodology for randomization was followed.

CONCLUSION

The most frequent findings in our study were swelling and discomfort following third molar surgery. Both don't match up with the postoperative antibiotic schedule. To reduce the incidence of alveolar osteitis, surgeries lasting longer than 30 minutes all require postoperative antibiotics for 3 days. The choice of postoperative antibiotic regimen should be based on the position of the tooth, the bone surrounding the tooth, the presence or absence of pathology, and the anticipated length of the operation.Although the present study does not fully address whether postoperative antibiotics are necessary for the removal of mandibular third molars, it does give compelling evidence to complement the existing literature.

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