

Original Research

Use of prophylaxis antibiotics in oral and maxillofacial surgery in treatment of surgical extraction-A prospective study

¹Dr. Deepak Sharma, ²Dr. Ashish Maheshwari, ³Dr. Tarun Nagpal, ⁴Dr. Kanishka Guru

^{1,3}MDS Oral and Maxillofacial Surgery, India

²Assistant Professor, ⁴Associate Professor, Department of Dentistry, GRMC Gwalior, MP, India

Corresponding Author

Dr. Kanishka Guru

Associate Professor, Department of Dentistry, GRMC Gwalior, MP, India

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ABSTRACT

Aim:The aim of this study was to investigate the impact of antibiotic prophylaxis on preventing postoperative infections subsequent to impacted mandibular third molar extractions. **Materials and Methods:** The study included patients aged 18 to 40 with no comorbidities and at least one impacted mandibular third molar. 120 patients were randomized into two study groups; Study group (prophylactic antibiotic group) and control group (Placebo group). **Results:** A total of 120 patients were enrolled and randomly assigned to two groups. Baseline characteristics of participants were assessed, and no significant differences were observed between the two groups. Incidence of postoperative complications was 4 patients and 6 patients among study group and control group respectively. On comparing, non-significant results were obtained. **Conclusion:** The administration of 250mg amoxicillin one hour prior to surgery did not demonstrate significant effectiveness in reducing the risk of postoperative infections following impacted mandibular third molar extraction.

Key Words: Amoxicillin, infections, analgesia

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INTRODUCTION

Extraction of third molars, often impacted, is a routine procedure in dental practice. While generally considered safe, there are potential complications during or after surgery. According to a prior cross-sectional study, the post-surgery complication rate stands at 6.8%, encompassing issues such as alveolitis, infection, and paresthesia of the inferior alveolar nerve¹. A recent review provides further insight into these complications, including alveolitis, infection, postoperative bleeding, and both transient and permanent dysfunction of the inferior alveolar nerve². These complications can result in patient discomfort, compromise oral and systemic health, and diminish quality of life³. Hence, it's imperative to prioritize the prevention and effective management of complications arising from third molar extraction. Third molars typically don't fully erupt, which adds complexity to the surgical procedure and heightens the risk of infection at the surgery site. Prophylactic therapy has been employed to mitigate the risk of infection following third molar extraction. Dentists commonly prescribe systemic antibiotics for this purpose. However, a systematic review indicates that 19 individuals must receive antibiotic treatment to

prevent a single infection after impacted third molar extraction⁴. It's crucial to acknowledge that inappropriate antibiotic use carries the potential for adverse reactions and contributes to antibiotic resistance⁵. Thus, there's a need for judicious antibiotic prescribing practices in such cases.

The primary aim of this study was to assess the efficacy of antibiotic prophylaxis, as opposed to a placebo, in lowering the incidence of postoperative infections among individuals undergoing impacted mandibular third molar extraction

MATERIALS& METHODS

The study included 120 patients aged 18 to 40 with no comorbidities and at least one impacted mandibular third molar. Patients meeting the criteria were randomly assigned to receive either 250 mg of amoxicillin or a placebo one hour before third molar extraction. Postoperative care included prescribed anti-inflammatory and analgesic medications, with rescue analgesia provided if necessary. Postoperative assessments were scheduled at 5, 7, and 15 days after surgery. Outcome measured was the requirement for rescue analgesia, defined as the need for additional analgesics to manage persistent pain, without

replacing or delaying the next prescribed dose. 500 mg paracetamol tablets were used as the rescue medication. Adverse reactions related to amoxicillin use were also evaluated, including allergic reactions, anaphylaxis, and gastrointestinal reactions. Assessment of adverse reactions was conducted through anamnesis during clinical examinations. All the results were recorded in Microsoft excel sheet followed by statistical analysis using SPSS software.

RESULTS

A total of 120 patients were enrolled and randomly assigned to two groups. Baseline characteristics of

participants were assessed, and no significant differences were observed between the two groups. Mean age of the patients of study group and control group was 22.5 years and 24.1 years respectively. Majority proportion of patients of both the study group and control group were males. Mean operative time among patients of study group and control group was 12 min 18 secs and 12 mins 52 secs respectively. Incidence of postoperative complications was 4 patients and 6 patients among study group and control group respectively. On comparing, non-significant results were obtained.

Table 1: Demographic data

Variable	Study group	Control group	p-value
N	60	60	-
FEMALE	48	46	0.12
MALE	12	14	
AGE	22.5	24.1	0.84
LEFT 3 RD MOLAR	38	41	0.61
RIGHT 3 RD MOLAR	22	19	
OPERATIVE TIME	12 min 18 sec	12 min 52 sec	0.18
OSTEOTMY	46	48	0.29

Table 2: Incidence of postoperative complications

Postoperative complications	Study group	Control group
Present	4	6
Absent	56	54
p-value	0.45	

DISCUSSION

In this current trial, individuals undergoing impacted mandibular third molar extraction who received antibiotic prophylaxis didn't seem to exhibit a reduction in postoperative complications compared to those in the control group. However, there was a notable decrease in the need for rescue medication to alleviate postoperative pain among participants receiving antibiotic prophylaxis.

Two studies have highlighted significant benefits of various antibiotics in preventing site infections after third molar extractions^{6,7}. These findings align with a prior Cochrane systematic review, which indicated that antibiotic prophylaxis following third molar extractions could potentially decrease the rate of postsurgical infectious complications by 66% and lower the risks of dry socket by 34%. Notably, the review indicates that treating 19 and 46 patients with antibiotics could prevent one infection and one dry socket, respectively. Despite these benefits, it's crucial to acknowledge the potential adverse events associated with antibiotic use. The risk of post-surgery infection is influenced by factors such as the impaction degree and anatomical position of the third molar, patient oral and systemic health, surgeon's expertise, and hemostasis management during surgery^{8,9}. Therefore, clinicians should thoroughly assess patient conditions and infection risks before considering antibiotic prescription.

A total of 120 patients were enrolled and randomly assigned to two groups. Baseline characteristics of participants were assessed, and no significant differences were observed between the two groups. Incidence of postoperative complications was 4 patients and 6 patients among study group and control group respectively. On comparing, non-significant results were obtained. Amoxicillin, either alone or in combination with clavulanic acid, is widely utilized as a prophylactic antibiotic¹⁰. While two studies have reported significant benefits of amoxicillin clavulanic acid¹¹, the effectiveness of amoxicillin alone was not found to be significant (10). However, it's essential to interpret these results cautiously due to the limited sample size and very low confidence in the outcomes. Moreover, the adverse events associated with amoxicillin and amoxicillin clavulanic acid should be carefully considered. Another study demonstrated that a single preoperative oral dose of 2 g of amoxicillin significantly reduces the risk of surgical site infection¹². Notably, this study found no evidence of antibiotic resistance development following the application of a single prophylactic dosage. The variations in results across different studies may be attributed to differences in third molar impaction degree, surgical techniques, antibiotic dosages, and control groups (placebo or other antibiotic types).

A non-randomized clinical trial by Grossi et al. in 2007 revealed that patients who did not receive

antibiotics faced twice the risk of complications related to postoperative pain¹³. Conversely, several reports have found no correlation between the use of antibiotic prophylaxis and a reduction in postoperative pain, swelling, or difficulty in mouth opening (trismus)¹⁴. The potential link between antibiotic use and improvement in postoperative symptoms might stem from a reduction in bacterial contamination at the surgical site. This could subsequently lead to a decrease in inflammatory mediators, thereby alleviating postoperative pain without necessarily impacting the incidence of postoperative infections¹⁵. The connection between antibiotic use and the amelioration of postoperative symptoms might be attributed to a reduction in bacterial contamination within the surgical wound. Consequently, this reduction could lead to a decrease in inflammatory mediators, thereby mitigating postoperative pain, without necessarily influencing the occurrence of postoperative infections¹⁶. Paracetamol was administered as rescue analgesia, as it can be taken as an additional dose for persistent pain management without altering the initially prescribed analgesic regimen. Paracetamol is a commonly used medication with ample evidence supporting its efficacy in managing postoperative pain and edema following third molar extraction. However, it's important to note that the assessment of postoperative edema was not among the objectives of this clinical trial.

CONCLUSION

The administration of 250mg amoxicillin one hour prior to surgery did not demonstrate significant effectiveness in reducing the risk of postoperative infections following impacted mandibular third molar extraction when compared to placebo. However, antibiotic prophylaxis was linked to a decreased requirement for rescue analgesia.

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