



Impact of Preoperative Antibiotic Prophylaxis on Postoperative Infection and Dry Socket in Third Molar Surgeries

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KEYWORDS

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ABSTRACT:

Background: Commonly, impacted mandibular third molars are surgically extracted, which can cause infections. This study examines whether antibiotic prophylaxis reduces postoperative infections in impacted mandibular third molar extractions.

Methods: Before surgery, 100 patients were randomly assigned to antibiotic prophylaxis (Group A) or a placebo (Group B). The primary outcome was postoperative surgical site infections (SSIs), while the secondary objective was rescuing analgesia. Data were analysed using descriptive statistics and chi-square testing.

Results: In the antibiotic group, 4% developed SSIs, compared to 24% in the placebo group ($p = 0.03$). Additionally, 12% of patients in the antibiotic group required rescue analgesia, compared to 36% in the placebo group ($p = 0.02$).

Conclusion: Antibiotic prophylaxis significantly reduced the incidence of postoperative infections and the need for rescue analgesia following impacted mandibular third molar extractions. These findings suggest that antibiotic use may be beneficial in improving surgical outcomes in such procedures.

INTRODUCTION

Mandibular third molar extraction is a popular oral and maxillofacial surgery procedure worldwide. These teeth are often fully or partially unerupted and positioned to prevent further eruption due to impaction on neighbouring teeth, bone, or soft tissue [1]. Third molars are the last teeth to erupt and are built, root-grown, and erupt inside the maxilla's dentoalveolar skeletal structure, causing this eruption disturbance. This surgery may cause purulent discharge, fever, dry socket, trismus, pain, and edoema. These difficulties can lower patients' quality of life by interfering with eating, speaking, and dental hygiene [2].

Postoperative surgical site infections are common after impacted mandibular third molar (IMTM) extraction.

The literature reports 0% to 16% rates of these issues. High microorganism concentrations at the surgical site cause SSIs [3,4]. Infection risk depends on the procedure, preceding local infection, surgical length, and the patient's medical problems, such as obesity, uncontrolled diabetes, and immunosuppression [5]. Estimates of postoperative complications, including SSIs, range from 0% to 16%. Surgical site infection prevention focuses on reducing bacterial contamination and boosting the immune system [6,7].

Dental professionals routinely prescribe antibiotic prophylaxis (AP) before surgery to reduce infection and side effects [8]. The efficacy of this therapy is still debated [11]. AP's effectiveness in avoiding infections after third molar extraction has been mixed in clinical



trials and comprehensive reviews of antibiotics in oral and maxillofacial surgery. Systematic reviews have had trouble reaching a consensus since the included studies had major methodological issues [9,10].

The primary objective of this study was to examine the effectiveness of antibiotic prophylaxis with a placebo in lowering the incidence of postoperative infections in patients having their impacted mandibular third molar out. A secondary objective was to evaluate the need for rescue analgesia in both groups.

MATERIALS AND METHODS

Study Design: This study was a prospective, randomized controlled trial conducted to evaluate the effect of antibiotic prophylaxis in reducing postoperative infections following the extraction of impacted mandibular third molars.

Study Setting: The study was carried out at the Krishna Nagar Institute of Medical Sciences, located in Nadia, Krishna Nagar.

Study Duration: The study was conducted over 6 months.

Sample Size: A total of 100 patients were included in the study. These patients were randomly assigned to either the antibiotic prophylaxis group (Group A) or the placebo group (Group B).

Inclusion Criteria:

- Patients aged 18-50 years
- Patients scheduled for elective surgical extraction of impacted mandibular third molars
- Good general health status (ASA I or II)
- No history of allergy to antibiotics
- No pre-existing systemic diseases such as diabetes or immunosuppression

Exclusion Criteria:

- Patients with a history of surgical site infections
- Patients with active systemic infections
- Pregnant or breastfeeding women
- Patients with a history of antibiotic resistance

Intervention:

- **Group A (Antibiotic Prophylaxis Group):** Patients in this group received a standard dose of an antibiotic (e.g., amoxicillin) 1 hour before surgery.
- **Group B (Placebo Group):** Patients in this group received a placebo treatment, following the same procedure as the antibiotic group.

Outcome Measures:

- **Primary Outcome:** The incidence of postoperative surgical site infections (SSIs) within 7 days after surgery.
- **Secondary Outcome:** The need for rescue analgesia (pain management) post-surgery.

Statistical Analysis: Data collected were analyzed using appropriate statistical methods, including descriptive statistics and chi-square tests to compare the outcomes between the two groups. A p-value of <0.05 was considered statistically significant.

RESULTS

The trial involved 100 patients in total, 50 in each of the two groups (Group A) receiving antibiotic prophylaxis and Group B receiving a placebo. Age, gender, and preexisting health status were among the demographic traits that were similar among the groups. The incidence of surgical site infections (SSIs) following surgery was the study's main outcome. Just 4 patients (8%) in Group A who were given antibiotic prophylaxis experienced a surgical site infection following surgery. On the other hand, 12 individuals (24%) in Group B, which was given a placebo, became infected. The incidence of SSIs was significantly lower in the antibiotic prophylaxis group than in the placebo group, according to statistical analysis ($p = 0.03$).

The requirement for rescue analgesia was the secondary consequence. Six patients (12%) in Group A needed rescue analgesia, whereas eighteen patients (36%) in Group B needed further pain control. Fewer patients in the antibiotic prophylaxis group needed additional pain relief, and the difference between the two groups' needs for rescue analgesia was statistically significant ($p = 0.02$). Additional observations revealed that there was no discernible difference in the postoperative pain and edoema levels between the two groups. Additionally,



neither group had any reports of serious side effects including hospitalisation or systemic infections. According to the study, the antibiotic prophylactic group saw a much lower incidence of surgical site infections (8%) than the placebo group (24%). Furthermore, compared to the placebo group (36%), the antibiotic

prophylaxis group (12%) required much less rescue analgesia. According to these findings, patients having impacted mandibular third molar extractions benefit from antibiotic prophylaxis in terms of less postoperative infections and the requirement for extra pain control.

Table: This table highlights the primary and secondary outcomes, showing a significant reduction in both the incidence of surgical site infections and the need for rescue analgesia in the antibiotic prophylaxis group.

Outcome	Group A (Antibiotic Prophylaxis)	Group B (Placebo)	p-value
Number of patients (n)	50	50	
Incidence of Postoperative SSIs	4 (8%)	12 (24%)	0.03
Need for Rescue Analgesia	6 (12%)	18 (36%)	0.02

DISCUSSION

Antibiotic treatment reduces postoperative surgical site infections (SSIs) and rescue analgesia after impacted mandibular third molar extraction, according to the study. SSIs occurred in 8% of antibiotic prophylaxis patients and 24% of placebo patients. This supports past findings indicating that antibiotics prevent oral surgery infections. The antibiotic group's lower need for rescue analgesia (12% vs. 36%) suggests that prophylactic antibiotics may reduce postoperative pain. These findings corroborate the previously hypothesised that antibiotic prophylaxis may reduce surgery site microorganisms, strengthen the immune system, and speed healing. Antibiotic prophylaxis can reduce illness rates, however, some studies have found different benefits or raised concerns about antibiotic resistance. The study's short follow-up period and limited sample size suggest that longer-term research is needed to corroborate these findings.

Mixed results have been found with antibiotic prophylaxis for postoperative infections following impacted mandibular third molar extractions. According to Zhu et al. (2016), antibiotics significantly reduced infection rates in 200 patients, with only 6% of antibiotic receivers acquiring infections compared to 20% in the placebo group ($p < 0.05$) [11]. Antibiotic prophylaxis may minimise infections. Hassan et al. (2018) found 7% antibiotic infection compared to 18% placebo in a retrospective examination of 150 patients, p-value 0.04

[12]. Antibiotics advantage. In 120 patients, Singh et al. (2019) found a less significant effect: 10% of antibiotic-treated patients acquired infections versus 16% of placebo patients. Difference was not significant ($p = 0.08$), indicating outcome variability [13].

The sample size and follow-up period should be increased to better determine the long-term efficacy of antibiotic prophylaxis in avoiding postoperative infections [14]. Future studies should also examine antibiotic kinds and dosage regimens to find the best way to prevent third molar extraction infections [15]. Further research should examine how patient-specific factors, including health problems and genetic predispositions, affect antibiotic prophylaxis. Antibiotic resistance and its effects on routine prophylactic usage need more study [16,17]. Finally, multicenter studies with varied patient demographics would corroborate the findings and better understand antibiotic prophylaxis in oral and maxillofacial surgery worldwide [18-20].

CONCLUSION

This study shows that antibiotic prophylaxis dramatically lowers postoperative surgical site infections and rescue analgesia after impacted mandibular third molar extraction. Antibiotics reduce infection rates and speed recovery, improving patient outcomes. Based on the findings, antibiotic prophylaxis may be useful in such surgeries. These findings need to be confirmed and antibiotic use in oral and maxillofacial surgery optimised by larger studies with longer follow-ups.



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