



Role of Pre, Intra and Post-Operative Antibiotics in Removal of Impacted Third Molar- A Review Article

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ABSTRACT

The extraction of impacted third molars, commonly referred to as wisdom teeth, is a frequently performed surgical procedure in dental practice, impacted third molars can lead to a host of complications, such as pain, swelling and infection, making their removal essential for maintaining oral health. In an effort to minimize the risk of post-operative infections and improve surgical outcomes, the use of antibiotics has been a subject of considerable debate and investigations. This abstract aims to explore the role of pre, intra and post-operative antibiotics in the context of impacted third molar extraction.

Keywords: Impacted third molar, pre-operative, intra-operative, post-operative antibiotics, oral surgery, prophylaxis.

INTRODUCTION

The extraction of impacted third molars, commonly referred to as wisdom teeth, is a prevalent oral surgical procedure aimed at alleviating pain, preventing complications, and improving oral health [1]. The antibiotic must be present in the systemic circulation at a high level during surgery and is usually given as a single dose [2]. Third molars are indicated for extraction either because of the recurrent infection/gross decay in the tooth or as a preventive measure to reduce the resorption of adjacent tooth or as a prophylactic measure [11]. Despite its routine nature, this surgical intervention is not without potential risks, including postoperative infections, pain and swelling. Over the years, the use of antibiotic prophylaxis has been a subject of considerable debate and investigation, as clinicians seek effective strategies to minimize these adverse outcomes.

MATERIALS AND METHODS

In the analyzed studies investigating the role of pre, intra and post operative antibiotics in impacted third molar surgery, a range of methodologies were employed. The majority of studies utilized randomized controlled trials (RCTs), involving patients scheduled for impacted third molar extraction. Antibiotic regimens varied, including, single-dose pre-operative, intra-operative and post-operative courses. Commonly used antibiotics were Amoxicillin, Amoxicillin + Clavulanic acid, clindamycin, ceftazidime and metronidazole. Surgical techniques encompassed only impacted third molar extractions, with varying levels of complexity. Post-operative outcomes evaluated included infection rates, pain scores and swelling assessments. Statistical methods, such as Fisher's exact test, chi-square test and AMSTAR2 tool were employed to analyze the data and assess the significance of differences between groups. Over all the reviewed articles present a mixed consensus on the role of pre, intra and post-operative antibiotics in impacted third molar surgery.

DISCUSSION

In this comprehensive review, we examined the diverse body of literature pertaining to the utilization of antibiotics at various stages of impacted third molar surgery. The findings revealed a nuanced perspective on the efficacy and implications of preoperative, intraoperative and post-operative antibiotic administration.

PRE-OPERATIVE ANTIBIOTICS

Our analysis strongly supports the consensus that pre-operative antibiotics play a vital role in reducing the risk of post-operative infections following impacted third molar surgery. Monaco *et al* [3] in their study reported when compared to the control group, a group of patients who received amoxicillin before surgical extraction experienced a significant reduction in post-operative discomfort, fever, and infection. The pooled data showcased a statistically significant decrease in infection rates among patients who received pre-operative antibiotic prophylaxis compared to those who did not. Siddiqi *et al* [4] in their study reported no statistical significance in prevention of post-operative infections or complications and therefore should not be routinely

administered when third molars are extracted in non-immunocompromised patients. Ren *et al* [5] on their paper on pre-operative administration of systemic antibiotics prior to surgery was effective in reducing the alveolar osteitis and wound infection after third molar surgery. This aligns with the established principles of infection control, where administering antibiotics prior to surgical intervention has been shown to effectively target potential pathogens and mitigate the risk of subsequent infections. Limeres *et al* [6] in their comparative work concludes that recovery after third molar surgery was shorter with moxifloxacin administration in comparison with amoxicillin and clavulanic acid. Amoxicillin has broad spectrum coverage, low toxicity, and rare and well-known side effects. [3]. While certain anaerobic bacteria medications like metronidazole are helpful for preventing dry-socket, it appears that amoxicillin more infection [7]. Broad antibacterial spectrum, the combination of amoxicillin and clavulanic acid constitutes a suitable prophylactic option for dentoalveolar surgery [8] and in particular for the extraction of third molars [9]. Numerous aerobic and anaerobic bacteria have been found to be extremely susceptible to amoxicillin and other penicillin derivatives in the oral cavity. They might serve as the first choice for antibiotic prophylaxis in impacted third molar surgery [10]. Consequently, the routine use of pre-operative antibiotics appears to be a prudent approach, particularly for patients at heightened risk of complications.

INTRA-OPERATIVE ANTIBIOTICS

While the evidence surrounding intra-operative antibiotic administration is more equivocal, certain studies indicate a potential benefit in terms of reducing post-operative infections. Absence of clear consensus regarding the prescription of antibiotics during impacted third molar surgery, risk of development of antibiotic resistance and adverse drug reactions are major concerns in patients [12]. The observations from Blatt S *et al* [13] claims that the peri-operative antibiotic therapy was not indicated in healthy individuals and can be recommended in patients who have a higher risk of infection because the data was of high quality. Gill A S *et al* [14] concluded that there is insufficient evidence to support routine prophylactic use of antibiotics in young patients due to the potential for microbial resistance and adverse reactions (allergic or toxic). However, in situations of prolonged surgery with bone removal pre-emptive antibiotics were recommended. Ramos *et al* [15] reported, the use of prophylactic antibiotics reduces infection risk by 57%. Ren Y F *et al* [5] study found that prescribing antibiotics during 3rd molar procedures decrease the risk of developing 3rd molar osteitis by a factor of 2.2 and wound infection by a factor of 1.8. Lodi G *et al* [16] reported that prophylactic antibiotics reduce the risk of infection by 70%. Atreagoitia M I *et al* [17] observed that considering the low rate of serious infections, complications, risk of adverse reactions and antibiotic resistance the routine use of antibiotics was not recommended. Oomens M A *et al* [18] found that a large number of antibiotics have not been shown to be effective in third molar surgery and therefore concluded that the current guideline should not be used for prophylaxis of antibiotics unless clinical risk factors suggest otherwise. Hedstorm L *et al* [19] reported tetracycline was found to be effective in preventing dry-socket following 3rd molar surgery. Schwartz A B *et al* [20] found that there is little evidence for the use of antibiotic prophylaxis in healthy patients undergoing third molar surgery. As such, further research is warranted to establish clear guidelines for intra-operative antibiotic use to elucidate the specific contexts in which such interventions are most beneficial.

POST-OPERATIVE ANTIBIOTICS

In contrast to the more pronounced impact of pre-operative antibiotics the role of post-operative antibiotics remains less evident. While a subset of studies suggested a potential reduction in infection rates with post-operative antibiotics the overall trend was less consistent. The antibiotic agent used for effective prophylaxis should be widely distributed in the body fluids, must have good bone penetrance, as well as be active against the microorganisms [21]. Amoxicillin has been found to be highly efficacious against Gram-positive streptococcus and staphylococcus species, as well as against several Gram-negative bacteria, which are common oral infection isolates [22]. Routine prescription and the use of pre-operative or post-operative antibiotics during extraction of the third molars fail to show any advantage [23]. The use of antibiotics in the prophylactic therapy against potential infections has been a conventional practice in third molar surgery [24]. The topic of using antibiotics prophylactically during the third molar surgery has repeatedly been debated. Ness and Peterson [25] recommended that a high enough dosage must be administered at the most appropriate time, with the shortest exposure. The decision to administer post-operative antibiotics should be weighed against the potential risks, including the development of antibiotic resistance and the associated implications for patient care. As such, a cautious and selective approach to post-operative antibiotics use is recommended, particularly in light of the broader concerns surrounding antibiotic protection.

CLINICAL IMPLICATIONS

The insights gleaned from this review hold significant clinical implications for practitioners engaged in impacted third molar surgery. Pre-operative antibiotics emerge as a cornerstone of infection prevention, exhibiting consistent efficacy and justifying routine implementation. Intra-operative antibiotics, while showing promise, require further investigation and should be tailored to specific patient profiles and surgical contexts. The use of post-operative antibiotics necessitates a careful consideration of risk and benefit, with emphasis placed on minimizing unnecessary antibiotic exposure.

CONCLUSION

The role of pre, intra and post operative antibiotics for the removal of impacted third molars is a topic of ongoing discussion among dental professionals. Ultimately, dental professionals should tailor antibiotic usage based on individual patient factors, the complexity of the extraction and the presence of infections. The development of evidence-based guidelines and protocols can further optimize patient care and enhance outcomes. Overall, a balanced and well-informed approach to antibiotic administration will contribute to improved patient outcomes and enhanced oral health in individuals undergoing impacted third molar extraction.

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