

Research Journal of Pharmaceutical, Biological and Chemical Sciences

(ISSN: 0975-8585)

RESEARCH ARTICLE

Comparison Of The Effectiveness Of Antibiotic Prophylaxis In Oral Surgery Department.

Bukleta D¹, Rexhaj E², Nila A², Berisha M², and Selmani-Bukleta M^{3*}.

¹Department Of Oral Surgery. School Of Dental Medicine. College Of Rezonanca. Kosova.

²Dental Polyclinic Oral Surgery. Peje. Kosova.

³Department Of Prosthodontics. School Of Dental Medicine. College Of Rezonanca. Kosova.

ABSTRACT

Antibiotic prophylaxis means the administration of antibiotics before surgical procedures in those cases when there is a possibility of postoperative complications or the possibility of transient bacteraemia. The methods are based on electronic literature, scientific papers which are researched in MEDLINE, PUBMED, LIBGEN, SCI-HUB and Google search engine. These studies were selected based on 2009 to the present time, surgical intervention, type of therapy and antibiotic dose. Three surgical procedures such as the extraction of third molar, the placement of dental implant and infective endocarditis has been researched with similar studies where a comparison has been made between them and the prescribed antibiotic therapy to see which of the therapies is more effective. Almost all studies have recommended antibiotic prophylaxis in these surgical procedures. In all three surgical procedures antibiotic prophylaxis is recommended in order to reduce the chances of postoperative complications, provided that these patients have a higher risk of these complications.

Keywords: antibiotic prophylaxis, dental implant, third molar surgery, oral surgery, endocarditis.

<https://doi.org/10.33887/rjpbcs/2021.12.5.9>

**Corresponding author*

INTRODUCTION

The oral cavity contains a microflora with about 700 different microbial species.

The purpose of Antibiotic Prophylaxis in dentistry is to protect patients with a certain specific risk from local microbial contamination or systemic spread of oral bacteria during dental procedures which induce bleeding and a transient bacteraemia.

Dental procedures can cause a transient bacteraemia, with higher values in oral surgery (third molar extraction, periodontal surgery) (1). But is very important that the prescription of antibiotics should always be done after we have seen the general condition of the patient and see if there is an allergy to antibiotics (2).

Antibiotic prophylaxis to have effective results, we must adhere to antibiotic administration protocols such as determining the correct antibiotic and at the time of surgery, the dose of antibiotic should be present in the systemic circulation in order to prevent postoperative complications. The extraction of third molar is one of the most common surgical interventions requiring the need for antibiotic prophylaxis (3). The most common complications that may occur after third molar surgery are swelling, pain, trismus, infection etc. (4).

Dental implant placement is another surgical procedure that requires antibiotic prophylaxis to prevent postoperative infections and increase the success of implant longevity (5). Infective endocarditis (IE) also is a disease with high mortality. Most guidelines recommend giving antibiotics as prophylaxis to prevent IE in patients with specific predisposing cardiac conditions (6).

MATERIALS AND METHODS

The research method is the electronic bibliographic databases of the relevant scientific literature such as: MEDLINE, PUBMED, LIBGEN, SCI-HUB and Google search engine.

The first surgical procedure that we have been studied is the prophylaxis before and after surgical intervention related to the third molar. The research from Martin-Ares at al (7) has divided patients into two groups. One group of patients was administered 750 mg amoxicillin every 8 hours for 5 days after surgery and the second group placebo which means the administration of anti-inflammatory 50 mg diclofenac sodium every 8 hours for 4 days after surgery and analgesic 575 mg magnesium metamizol every 6-8 h in cases when pain occurs.

The research from Milani at al is related also with the third molar (8). Here the patients were divided into three groups, the first group used 1 g amoxicillin 1 h before surgery + 500 mg every 8 h for 7 days. The second group used 1 g amoxicillin 1 h before surgery plus placebo, every 8 h for 7 days, while the third group used placebo 1 h before surgery and 500 mg every 8 h for 7 days.

The second surgical procedure that we have been studied is for the prophylaxis before the surgical procedure of the placement of dental implant. In the both mentioned studies, patients were divided into two groups. In the research of Arduino et al (9) the comparison of preoperative and postoperative antibiotics is made to see which is more effective in dental implants. The first group of patients were administered 2g of amoxicillin orally 1h prior to implant placement and the second group were administered 2g of amoxicillin orally 1h prior to implant placement; 1g in the evening of the day of surgery and 1g twice a day for 2 days following surgery.

In the research from El-Kholey (10) antibiotics were administered before and after surgery and a comparison was made to see as to which group of therapy was most effective. The first group of patients were administered 1g of amoxicillin preoperatively and in the second group were administered 1g of amoxicillin preoperatively and the antibiotic continued after surgery for three days.

The third surgical procedure that we have studied is the prevention of infective endocarditis before surgical intervention by prescribing antibiotics as prophylaxis. Articles are from American Heart Association and European Society of Cardiology (11, 12).

Both researches that we have been studied related with infective endocarditis, point that only a small number of cases of infective endocarditis might be prevented by antibiotic prophylaxis. Recent studies suggest prescribing of antibiotics only for patients with the highest risk for infective endocarditis. In both studies the preferred dose was 2 g amoxicillin 30-60 min before the procedure.

RESULTS

In this study, three surgical cases were researched and compared with similar studies. These studies were selected based on 2009 to the present time, then based on the surgical procedure, type and dose of antibiotics.

In table 1 were presented two cases with surgical intervention in the third molars. Here is a comparison between similar studies to determine which type of therapy is most effective in preventing the occurrence of infection after surgery in the third molars.

In the first case the patients were divided into three groups in which different therapies are given in order to compare which type of therapy is most effective in the case of third molar surgery. In the second case the patients are divided into three groups with different therapies and the comparison is made to determine which of the therapies is more effective.

In table 2 were presented two cases for surgical interventions of dental implants placement. Here is a comparison of these two studies with relevant therapy in order to prevent postoperative complications.

In the first case patients are divided into two groups and the comparison of preoperative and postoperative antibiotics is made, which is more effective to prevent infections during the procedure of dental implants placement. In the second case patients were divided into two groups and antibiotics were administered before and after surgery and a comparison was made to see which group of therapy was most effective.

Table 3 presents two researches on infective endocarditis with doses of antibiotics for prophylaxis.

The first case is from the organization of the American Heart Association while the second case is from the organization of the European Society of Cardiology.

These researches show the recommendations for antibiotic prophylaxis.

Transient bacteremia appears while working with teeth and periodontal tissues, and there is a wide variation in reported frequencies of bacteremia in patients resulting from dental procedures: tooth extraction (10% to 100%), periodontal surgery (36% to 88%), teeth cleaning (up to 40%), rubber dam matrix/wedge placement (9% to 32%), endodontic procedures (up to 20%), scaling and root planning (8% to 80%) (11).

DISCUSSION

The purpose of this study is to show efficiency of antibiotic prophylaxis in dental procedures, more precisely in three dental procedures which are: the extraction of the third molar, the placement of dental implants and infective endocarditis. In each of these surgical procedures a comparison was made with similar researches but having different therapies for antibiotic prophylaxis.

After detailed study related with antibiotic prophylaxis before and after surgical intervention related to the third molar, it has been confirmed that the group of patients who have used antibiotic therapy have shown higher efficacy in avoiding complications such as pain, inflammation etc. In other way it recommends that antibiotics should not be used for a long time because they can cause serious problems (7). However, they recommend that the use of antibiotics should not be done in cases when patients are healthy and adhere to strict antiseptic rules with good oral hygiene. Because the patient's defense mechanisms are sufficient and effective in preventing the occurrence of postoperative complications.

The use of antibiotics is indicated in patients with general immunosuppressive diseases such as uncontrolled diabetes, in patients who do not adhere to the strike rules of good oral hygiene (8). Based on the research related for prophylaxis before the placement of dental implants, can be concluded that it is sufficient to prescribe antibiotic preoperatively than to prescribe postoperatively (9, 10).

In other way prevention of infective endocarditis during oral surgery procedure it is very important. The ability of antibiotic therapy to prevent bacteremia associated with a dental procedure is controversial. Some studies reported that antibiotics administered before a dental procedure reduced the frequency, nature, and duration of bacteremia where as others did not (11).

Amoxicillin is the preferred choice for oral therapy because it is well absorbed in the gastrointestinal tract and reaches high serum levels. For individuals who are allergic to penicillins or amoxicillin, the use of cephalexin, clindamycin, azithromycin, or clarithromycin is recommended (11).

Table 1. Third molar case intervention and compared with similar researches

Authors	Year	Intervention	Dosage of antibiotics	Conclusions
Martin-Ares at al ⁷	2017	Third molar	Group 1- 750 mg amoxicillin p.o every 8 h for 5 days postoperative Group 2- Placebo	The first group has shown higher efficiency in presenting pain and inflammation that reduces the need for analgesics
Milani at al ⁸	2015	Third molar	Group 1- 1 g amoxicillin 1 h before surgery + 500 mg every 8 h for 7 days Group 2- 1 g amoxicillin 1 h before surgery plus placebo, every 8 h for 7 days Group 3- Placebo 1 h before surgery and 500 mg every 8 h for 7 days	No difference which group of antibiotics is better than the other in treatment

Table 2. Dental implant case intervention and compared with similar researches

Authors	Year	Intervention	Dosage of antibiotics	Conclusions
Arduino et al ⁹	2015	Dental implant	Group 1- 2 g of amoxicillin administred orally 1h prior to implant placement Group 2- 2 g of amoxicillin administred orally 1h prior to implant placement, 1 g the evening of the day of surgery and 1 g twice a day for 2 days following surgery	There are no statistical differences between the two groups but based on this study it is sufficient to prescribe 2 g of antibiotic preoperatively than to prescribe postoperatively
El-Kholey ¹⁰	2014	Dental implant	Group1 – 1 g amoxicillin preoperatively Group 2- 1 g amoxicillin preoperatively and the antibiotic continued after surgery for 3 days	No statistical differences between the two groups but based on this study 1 g amoxicillin preoperatively is sufficient

CONCLUSION

Based on the elaborations on this study, we can conclude that all three surgical procedures antibiotic prophylaxis is recommended in order to reduce the chances of postoperative complications, provided that these patients have a higher risk of these complications.

REFERENCES

[1] Nicoletta Termine, Vera Panzarella, Domenico Ciavarella, Lorenzo Lo Muzio, Matteo D’Angelo, Andrea Sardella, Domenico Compilato and Giuseppina Campisi. International Dental Journal 2009;59:263-270.

- [2] Gabriele Cervino, Marco Cicciu, Antonio Biondi, Salvatore Bocchieri, Alan Scott Herford, Luigi Laino, Luca Fiorillo. *Antibiotics (Basel)* 2019;8(2):53.
- [3] M V Martin, A N Kanatas, P Hardy. *Br Dent J* 2005 ;198(6):327-30.
- [4] Fernando Iglesias-Martín, Alberto García-Perla-García, Rosa Yañez-Vico, Elena Aced-Jiménez, Esther Arjona-Gerveno, Juan-David González-Padilla, Jose-Luis Gutierrez-Pérez, Daniel Torres-Lagares. *Med Oral Patol Oral Cir Bucal* 2014;19(6):e612-5.
- [5] Hemchand Surapaneni, Pallavi Samatha Yalamanchili, Md. Hafeez Basha, Sushma Potluri, Nirupa Elisetti, and M. V. Kiran Kumar. *J Pharm Bioallied Sci* 2016; 8(Suppl 1): S28–S31.
- [6] S Hafner M Albittar, E Abdel-Kahaar, O Zolk., *Int J Oral Maxillofac Surg* 2020;49(4):522-528.
- [7] Maria Martin-Ares, Cristina Barona-Dorado, Natalia Martinez-Rodriguez, Jorge Cortes-Breton-Brinkmann, Javier Sanz-Alonso, and Jose-Maria Martinez-Gonzalez. *J Clin Exp Dent* 2017; 9(8): e1015–e1022.
- [8] Milani BA, Bauer HC, Sampaio-Filho H, Horliana ACRT, Perez FEG, Tortamano IP, & Jorge WA. *Oral and Maxillofacial Surgery* 2015;19(4), 341–346.
- [9] Paolo G Arduino, Federico Tirone, Emanuele Schiorlin, Marco Esposito. *Eur J Oral Implantol* 2015;8(2):143-9.
- [10] K. E. El-Kholey. *Int J Oral Maxillofac Surg* 2014; 43: 487–490.
- [11] Wilson W, Taubert KA, Gewitz M. *Circulation* 2007;116:1736–54.
- [12] Habib G, Hoen B, Tornos P et al. *Eur Heart J* 2009;30:2369–413.