

Effectiveness of Antibiotics on Post-Operative Complication after Periodontal Surgery

Dr. Angel Fenol¹, Dr. Nidhi Chinnu Boban², Dr. P Jayachandran³,
Dr. Maya Rajan⁴

¹(Department of periodontics, Amrita school of dentistry, India)

²(Department of periodontics, Amrita school of dentistry, India)

³(Department of periodontics, Amrita school of dentistry, India)

⁴(Department of periodontics, Amrita school of dentistry, India)

*Corresponding Author: Dr. Angel Fenol

Abstract : *INTRODUCTION:* Antibiotic resistance is an increasingly serious public health problem all over the world. Resistance rates have more than doubled in the past 5 years. Periodontists are notorious in prescribing antibiotics after routine periodontal therapy that has led to the emergence of antibiotic resistant microorganisms. *OBJECTIVES:* The aim of the study is to evaluate the need of antibiotics in periodontal surgeries in countering postsurgical complication. *METHODOLOGY:* The patients who were undergoing periodontal surgery were included in the study and were randomly divided into two categories: Group A (antibiotic), and Group B (no antibiotics). Patients were followed up for 1 and 2 weeks after surgery and were evaluated for pain, swelling, infection, delayed wound healing. *RESULT:* Assessment of postoperative infections was done after 1 and 2 weeks following the periodontal surgical procedure. It was observed that there was no significant difference in the post-operative outcome in both the groups. *CONCLUSION:* The decision to administer antibiotic therapy following periodontal surgery must be case and patient specific.

Keywords - Antibiotics, Periodontitis

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I. Introduction

Antibiotic resistance has been called one of the world's most pressing public health problems. Antibiotic resistance is the ability of bacteria or other microbes to resist the effects of an antibiotic. Antibiotic resistance occurs when bacteria change in some way that reduces or eliminates the effectiveness of drugs, chemicals, or other agents designed to cure or prevent infections. Resistance arises through one of three ways: natural resistance in certain types of bacteria, genetic mutation, or by one species acquiring resistance from another.¹ Resistance can appear spontaneously because of random mutations; or more commonly following gradual build-up over time, and because of misuse of antibiotics or antimicrobials.² Microbes resistant to multiple antimicrobials are called multidrug resistant (MDR); or sometimes superbugs.³

Periodontitis is a multifactorial disease occurring as a result of complex interrelationship between infectious agents and host factors. Environmental, acquired and genetic risk factors modify the expression of disease.⁴ The hallmarks of periodontal disease are destruction of connective tissue and bone loss which, if left untreated, may eventually lead to tooth loss.

Moderate to severe cases of chronic periodontitis may warrant periodontal surgical procedures.⁵ Of the various factors that affect the outcome of periodontal surgical procedures, the most important aspect is prevention of infection following surgery. Various anti-infective measures have been advocated to improve clinical outcomes following postsurgical intervention.⁴ These measures include: Meticulous professional mechanical debridement, application of antiseptics in dressings or rinses and administration of systemic antibiotics.

Postoperative infection can have a significant effect on the surgical outcome hence preventive measures like strict aseptic protocol, anti-infective measures like proper sterilization, disinfection, barrier techniques and other measures should be taken. Such measures are taken, there is a very low rate of postoperative infection following periodontal surgery.⁶

Few studies support the concept of rapid healing and less discomfort when antibiotics are used.^{7, 8} On the other hand, many well-conducted studies have not supported the routine use of antibiotics after periodontal surgery and concluded that antibiotics should be used only when there is a medical indication or when the infection has already set in.^{5, 9, 10, 11, 12}

Presently, guidelines for the selection and administration of antibiotics as prophylaxis following surgery are lacking. Hence, this particular study was undertaken to assess the incidence of clinical infection and role of antibiotics in preventing infection in patients undergoing routine periodontal surgery and its influence on the surgical outcome.

II. Materials & Methods

2.1 Experimental design

A prospective randomized cross over clinical trial was carried out in 30 individuals selected from outpatient Department of the Department Of Periodontics, Amrita school of dentistry, Kochi for a period of 3 months from February 2016 to April 2016. The research protocol was approved by the Ethical Committee and Review Board of Amrita School of dentistry. Verbal and written informed consent was obtained from all the subjects participating in the study.

2.1.1 Study population

Patients requiring any periodontal surgery with no history of antibiotics in the 6 months preceding the start of the study were included. Patients with systemic diseases and with a full mouth plaque score <20% were excluded.

Following completion of Phase 1 therapy consisting of oral hygiene instructions and scaling and root planning, 30 patients were enrolled in the study. Participants were randomly assigned to any of the following two groups by coin toss method.

a) Group A-Antibiotic was prescribed post operatively. Amoxicillin 500 mg thrice daily for 5 days after surgery. Analgesics and antiseptic mouth wash were also prescribed. (15 patients)

b) Group B -No antibiotic was given postoperatively. Only analgesic and antiseptic mouth wash were prescribed. (15 patients).

Periodontal surgeries were carried out in 30 patients. Surgical procedures performed were open flap debridement. All the surgical procedures were carried out by trained clinicians in the department. Smokers were asked to at least refrain from smoking until the day of suture removal.

2.1.2 Surgical procedure

Local anaesthesia was administered to all patients before surgery. The flaps were sutured and in all cases the wound was protected with a surgical dressing which was removed after a week. CHX mouth rinses were given to all patients for 14 days postoperatively

All the examinations were done 1 and 2 weeks after surgery. The clinical parameters were recorded by an examiner who was masked to the treatment received, whereas another clinician carried out the surgery and provided the treatment to groups. Patients were evaluated for pain, (measured on visual analog scale [VAS]), swelling, wound healing, infection, ulcer and necrosis. Any adverse effects due to the drug administered and patient compliance for the drug was also noted. Subjects were instructed to report if any increased or progressive pain and swelling occurred 48-72 hours post-surgery.

III. Statistical Analysis

Statistical tests were performed using the software Statistical Package for Social Sciences (SPSS), version 20. Statistical analysis was performed using chi-square test. A p value of 0.05 was considered as statistically significant.

IV. Results

A total of 30 surgeries were carried out in 30 patients during the study. Males 10 and females 20 (GRAPH 1) who were in the age group 30 to 60 (GRAPH 2). There were two smokers each in Group A and B who participated in the study. Surgical procedures open flap debridement was carried out.

Parameters like pain (on the day of suture removal on VAS consisting of 0-10 scale), swelling, necrosis, healing, ulcer and postoperative infection were measured all on the day of suture removal and after 2 weeks. 20% patients in Group B and 13.3% patients in Group A reported pain at 1 week after surgery while only 7.7% in group B and 5.9% in group A reported pain after 2 weeks [TABLE 1]. Two patients in Group A and 3 patients in Group B reported mild inflammation after 1 week.

93.3% patients in Group B showed good healing after 1 week whereas 100% patients in group A showed good healing after 1 week. [TABLE 2] after 2 weeks both groups have showed good healing. No Infection, ulcer and necrosis was reported in any of the sites. At both 1 and 2 weeks in both the groups.

V. Discussion

Oral cavity, which harbours billions of microorganisms as their natural habitat, is also influenced by a multitude of external factors, leading to its susceptibility for infection. Though in actual practice, only a minority of surgical procedures performed in the oral cavity result in any significant post-surgical infection, they could result in needless complications, discomfort to the patient, delay in healing, and can influence the final outcome as well.

However, there are neither guidelines nor incontrovertible evidence to support this practice; also, there is no uniform system prevailing in different parts of the world to guide periodontists regarding the type of drug, its dosage, duration, etc. Systemic antibiotics are used as an adjunct to periodontal surgery in specific disease profiles (aggressive/refractory/smokers) for more aggressive treatment, in anticipation and prevention of postsurgical infections, and in periodontal surgery aiming for regeneration. Literature support for routine antibiotic prescription is lacking and few studies carried out to address this matter have provided different conclusions.

The rationale of using antibiotics with periodontal procedures is to increase the predictability of results by controlling the subgingival microflora in order to reduce the risk of postoperative infection. Studies conducted by Demolon *et al.*,¹³ Loos *et al.*,¹⁵ have concluded that use of antibiotics may have helped to control initial inflammation, but had no direct effects of clinical significance on bone regeneration or soft tissue attachment at 12 months.

This study, therefore, investigated to evaluate the effects of antimicrobial therapy on all the parameters of healing following periodontal surgery as compared to no drug therapy. The patients recruited were all systemically healthy, belonged to a comparable age range, and were compliant. Patients who did not maintain adequate oral hygiene and who were noncompliant were not included in the study.

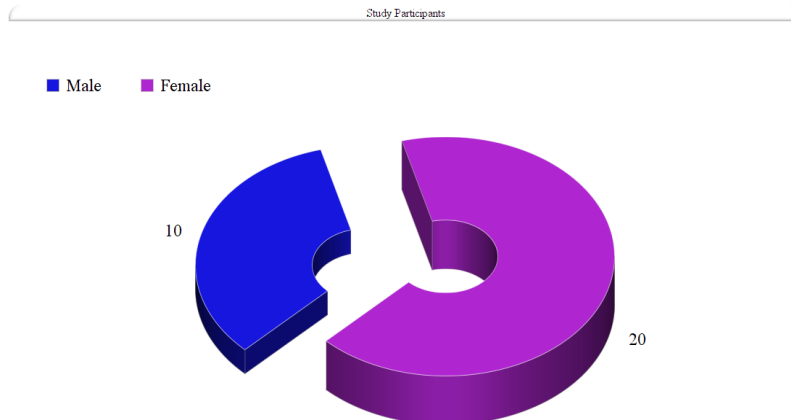
Results of the study clearly showed that properly performed periodontal surgery does not result in post-surgical infection or any complications. None of the patients had any noticeable systemic effect following surgery. These results correspond with the reported results of the studies done earlier,^{5, 9, 10, 11}.

Amoxicillin was chosen for the experimental groups, mainly because most of the dental practitioners prefer Amoxicillin effect against periodontal pathogens due to convenience of its usage, which thereby improves patient compliance. Metronidazole was not considered, as patient compliance has been found to be poor due to its side effects.¹⁶

Different patient variables (ulceration or necrosis, signs of delayed healing etc.) indicated that there was no difference between any of the groups. These findings are in agreement with those of earlier studies.^{5, 16, 17} The role of antimicrobials in improving periodontal variables following surgery is controversial.¹⁸

Studies in which randomized controlled trials (RCTs) were conducted reported that selective antimicrobial agents when used as adjunctive to periodontal surgical procedures improved the periodontal parameters,^{19, 20, 21} whereas meta-analysis studies reported that adjunctively used systemic antimicrobials did not show statistically significant results.^{21, 22, 23, 24} Hence, this study has clearly demonstrated that routine periodontal surgery when properly performed does not result in post-surgical infection and produces beneficial outcome regardless of whether therapeutic antimicrobials have been prescribed or not. In this era where antimicrobials are being prescribed without any basis, it often leads to abuse and misuse of them. The development of various resistant strains of microorganisms has frequently resulted in serious unmanageable infections.²⁵ Hence, the outcome of this study is very significant, particularly in a country like India where there is no antibiotic policy prescribed by the regulatory bodies. But it should be understood that this study was carried out in a hospital setting with a strong surgical protocol. Whether the same result can be obtained in an ordinary clinical setting, especially in a dental clinic setup, is questionable. Further studies are required to be done in less than ideal settings before it can be unequivocally recommended to discontinue the use of prophylactic antimicrobial drug following periodontal surgical procedure.

VI. Figures and Tables
GRAPH 1- Gender Distribution



GRAPH 2-Age Group of Study Participants

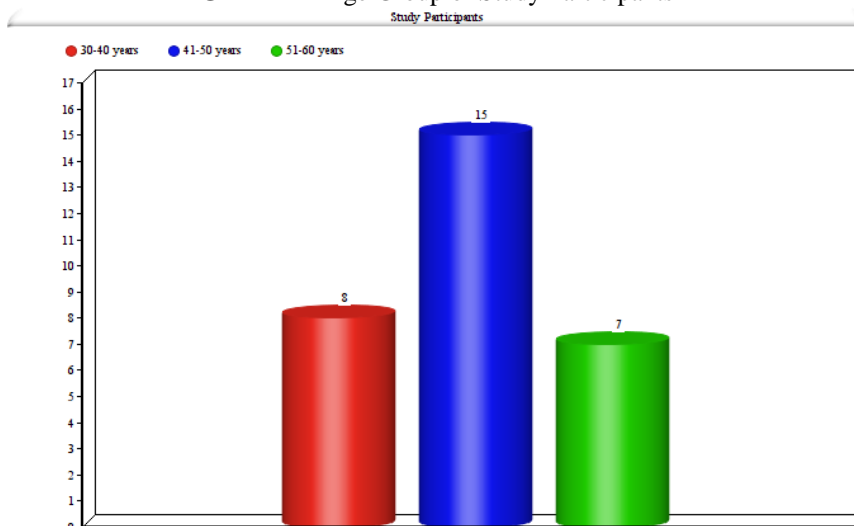


Table 1-Comparison of Pain at 1 Week and 2 Weeks between Groups

VARIABLE	PAIN			
	1 WEEK		2 WEEK	
	NO	YES	NO	YES
GROUP A	86.7%	13.3%	94.1%	5.9%
GROUP B	80%	20%	92.3%	7.7%
p VALUE	0.5		0.6	

Table 2-Comparison of Healing At 1 Week and 2 Weeks between Groups

VARIABLE	HEALING			
	1 WEEK		2 WEEK	
	NO	YES	NO	YES
GROUP A	0	100%	0	100%
GROUP B	6.7%	93.3%	0	100%
p VALUE	0.5		-	

VI. Conclusion

Antimicrobials are powerful agents when used in well-focused ways. They should be held in reserve for treatment of certain forms of advanced periodontal diseases (refractory, aggressive), in systemically compromised individuals with a reduced host response and in treatment of postsurgical infections. Various other factors are more important in protecting the patient from postoperative infections. They include aseptic protocol, skill and experience of surgeon, tissue manipulation and surgical technique, duration of surgery and control of systemic and local risk factors with increased susceptibility to infections. Hence, use of antibiotics should be based on procedural outcomes and should not be generalized or used blindly just to be extra cautious in preventing infection.

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