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To evaluate the role of antibiotics following periodontal flap surgery: A relative clinical study

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***Abstract*---**Periodontitis is a multifactorial disease occurring as a result of complex interrelationship between infectious agents and host factors. Moderate to severe cases of chronic periodontitis may warrant periodontal surgical procedures. As postoperative infection can have a significant effect on the surgical outcome. In the study, an attempt has been planned to evaluate the role of antibiotics in periodontal flap surgeries in reducing postsurgical infections. 40 Patients (male and female) aged 25-50 yrs with moderate to severe chronic periodontitis were selected from the Department of Periodontics and Oral Implantology at Desh Bhagat Dental College and Hospital, Mandi Gobindgarh. Therapeutic group (20 patients) - Amoxicillin 250 mg + metronidazole 200 mg for 5 days after surgery. Control group (20 patients) - No antibiotics given postoperatively. Analgesics and antiseptic mouthwash were prescribed for both the group. Patients were evaluated for pain (measured on visual analog scale [VAS]), Modified gingival index, Wound healing index, Swelling, fever, ulceration, delayed wound healing were recorded on the 7 th day of suture removal. Visual analog scale [VAS] recorded in control group was 2.90 and in Therapeutic group was 2.10. Mean modified gingival index score recorded in control group was 0.92 and in Therapeutic group was 0.66.

***Keywords*---**antibiotics, periodontal surgery, postoperative infection.

Introduction

Periodontitis is multifactorial infectious disease of the supporting structures of the teeth, characterized by destruction of the bone and connective tissue[1]. Bacterial plaque accumulation on the tooth surface leads to marginal tissue inflammation, known as gingivitis. If left untreated, gingivitis may progress to periodontitis, which is characterized by loss of periodontal attachment support (clinical attachment loss, [CAL]) and bone resorption, eventually resulting in tooth mobility and loss[1]. Thus primary etiology of chronic periodontitis was bacterial plaque, which can initiate destruction of the gingival tissues and periodontal attachment apparatus[2]. It was therefore, pertinent for periodontal therapy to include plaque removal[3]. Periodontal therapy thus, was aimed primarily at reduction of etiologic factors to reduce or eliminate inflammation, thereby allowing gingival tissues to heal and appropriate supportive periodontal maintenance that includes personal and professional care is important in preventing reinitiation of inflammation. The treatment for periodontitis was to halt the progress of periodontal attachment loss by removing etiologic factors therapeutically and to restore structures destroyed by disease through various periodontal surgical procedure by doing regenerative procedures[4,5]. Essential to both treatment approaches was the inclusion of periodontal maintenance procedures 3,4.

Periodontal surgical procedures include flap surgeries, osseous correction, gingivectomy and periodontal plastic procedures, which play a vital role in the maintenance of entire dentition and restore the structures destroyed by periodontal diseases. However, there are certain factors which affect the outcome of the surgical therapy such as bleeding, pain, root hypersensitivity, swelling, trismus, bruising and taste changes that occur after periodontal surgery . Besides the above factors, infection is the significant factor that affects the periodontal therapy outcome and was major obstacle for periodontal health improvement. The sources of infection during surgery in oral cavity include: instruments, hands of surgeon and assistant, air of the operatory and patient's perioral skin, nostrils and saliva. In order to overcome that, antibiotics were used as prophylactic therapy to prevent distant site infection or to control postoperative sequalae or to treat an established infection in periodontal surgery. According to some authors, to obtain results with the antibiotic treatment, they must be administered preoperatively to act when the bacterial infection starts.

As postoperative infection can have a significant effect on the surgical outcome, preventive measures like strict aseptic protocol, anti-infective measures like proper sterilization, disinfection, barrier techniques and other measures should be taken. If such measures were taken, there was a very low rate of postoperative infection following periodontal surgery, thereby obviating the need for using antibiotics as a prophylactic measure. However, in present situation, it was difficult, if not impossible, for the practitioner to consistently recognize patients presenting with periodontal diseases who may require, or benefit from, the adjunctive use of an antibiotic. Even when the practitioner thinks that an antibiotic may be indicated in the control of disease, there was no ready guidance to help with the decision as to which antibiotic may be most beneficial. Well conducted studies has not supported the routine use of antibiotics after

periodontal surgery and concluded that antibiotics should be used only when there was a medical indication or in case of presence of infection.

On the other hand, mechanical debridement alone cannot effectively eliminate A. actinomycetemcomitans, P. gingivalis, P. intermedia, B. forsythus, P. micros, enterobacteria and some other bacterial species, because they have the ability to invade gingival epithelial cells and subepithelial connective tissue and they tend to recolonise the tooth surfaces from the tongue, tonsil and buccal mucosa which act as reservoirs. Targeted antimicrobial therapy could perhaps, suppress or eliminate residual periodontal pathogens and thus serve as an adjunct to conventional mechanical therapy[10] and also a few studies supported the concept of rapid healing and less discomfort when antibiotics are used and also antibiotic prophylaxis to be effective in reducing post operative complications[11]. In India, dentists have been known to prescribe antibiotics more than any other medical personnel, which were based totally on empiricism without any protocol or rationale. Improper use of antibiotics also causes side effects like gastrointestinal tract problem, antibiotic resistance, drugs interaction, hypersensitivity and increased cost of treatment[12]. Antibiotics in vogue, in periodontal field over time have been penicillins, tetracyclines, ciprofloxacin, azithromycin, clindamycin, and metronidazole. Amongst them, various studies have so far evaluated doxycycline, amoxicillin, metronidazole and the combination of amox+metro in preventing post operative complications and their efficacy in maintaining the periodontal health[4] . Presently, guidelines for the selection and administration of antibiotics after surgery were inadequate. Hence, this present study was undertaken to evaluate the role of antibiotics especially Amoxicillin 250 mg + metronidazole 200 mg in patients undergoing routine periodontal surgery and their influence on the surgical outcome.

Material and Methods

This study was conducted on 40 patients in the Department of Periodontology and Oral Implantology at Desh Bhagat Dental College & Hospital, Mandi Gobingarh. A Proforma was prepared for the study, to note down all details of the study. Further, clinical examinations were done with the help of Williams periodontal probe. Periodontal evaluation was carried out. After having motivated and educating the patients, oral hygiene instructions were given. Antibiotic prophylaxis Amoxicillin 250 mg + metronidazole 200 mg for group I and Placebo tablet for group 2 were given 1 h prior to surgery. Thereafter, Scaling and Root Planing followed by periodontal surgery was carried out for all subjects. Later medications were given for each subject as per the group protocol. They were given appointments to return at 1, 4, 8 weeks interval and the clinical parameters were assessed at each interval.

These are the clinical parameters that were assessed, Plaque index (Turesky-Gilmore-Glickman modification of the Quigley-Hein), Loe and Sillness Gingival Index, Probing Periodontal Depth, Clinical Attachment Level , Gingival Recession , Tooth Mobility . Patients aged between 25-55 years with moderate to severe chronic periodontitis were recruited for study. All patients were Systemically healthy patient and have not undergone periodontal therapy during the past 3 months . Smokers and alcoholic were excluded from study. Patients who are

allergic to drug , under medication of any type & Pregnant and lactating females were excluded from study.

Antibiotic protocol

- Group-1: It consisted of 20 individuals who were prescribed Amoxicillin (250 mg) and Metronidazole (200 mg) twice a day for 5 days.
- Group-2: It consisted of 20 individuals as control group who will not be prescribed any antibiotics.

Periodontal Surgical protocol and infection control measures: All the periodontal surgical procedures were carried out in a surgical room with restricted entry and proper drainage and water supply system in place. Presurgical procedures which included autoclaved surgical gowns, head caps, masks and separate in-house footwear were followed. Dental operatory tools, including dental chair, were cleaned daily with a disinfectant. Exposed areas were covered with aluminum foils. Disposable glasses and autoclaved disposable suction tips were used along with distilled water as water source. High-volume evacuation suctions were used for decreasing the aerosol production. Spittoon and tumbler water lines were flushed for at least 5 min before and after the surgical procedure. All instruments to be used were pre-cleaned, segregated and packed in autoclavable sealed pouches and then autoclaved. Presurgical scrub with a germicidal soap was done before the surgery. Patient preparation was done with povidone-iodine presurgical facial scrub and 10 mL of 0.2% chlorhexidine mouth rinse was done before the surgery. Proper barrier methods were used.

Surgical procedure: Surgical procedure was performed under local anesthesia with 2% lignocaine containing adrenaline (1:80,000). Buccal and lingual (palatal) surgical incisions were made and mucoperiosteal flaps were elevated. Complete debridement of the surgical site and scaling and root planing were done with ultrasonic device and hand curettes. Flaps were approximated with 21 silk sutures. Periodontal dressing was placed and postoperative instructions were given. Application of cold pack was not advised for patients belonging to any of the groups post surgically. Postoperative care and evaluation: Test and control group patients were instructed to continue the medication and were asked to abstain from brushing on the surgical site for at least 2 weeks. Here was advised 0.2% chlorhexidine gluconate for 1 month. Periodontal dressing and sutures were removed 1 week postoperatively and the operated area was evaluated.

Results

A total of 22 male patients and 18 female patients participated in the study and gender distribution was made equally the age of the patients ranged between 25 and 50 years, with a mean age of 35.87 years.

Comparison between Control and Therapeutic groups in VAS, MGI and WHI. (Table 1)

Mean visual analog scale [VAS] recorded in control group was 2.90 and mean visual analog scale [VAS] recorded in Therapeutic group was 2.10 . There was no

statistically significant difference in the visual analog scale [VAS] scores between the groups. Mean modified gingival index score recorded in control group was 0.92 and mean modified gingival index score recorded in Therapeutic group was 0.66. There was no statistically significant difference in the modified gingival index scores between the groups. Mean Wound healing index score recorded in control group was 3.60 and mean Wound healing index score recorded in Therapeutic group was 3.87. There was no statistically significant difference in the Wound healing index scores between the groups.

Comparison of incidence of fever, swelling, Delay wound healing and Ulceration symptoms between Control and Therapeutic groups

One patient in each group complained of fever and swelling postoperatively, 4 patients in Control group had delayed wound healing. No ulceration was seen in any group. Overall, there was no statistical significance between the groups in any of the parameters listed above. There was no statistical significant difference in the incidence of infection following flap surgery with or without grafting in both the groups. In the same patient, there was no statistical significant variation in the frequency of infection whether or not bone graft was placed or osseous surgery was performed.

Table

Mean comparison between Control and Therapeutic groups in Vas, MGI andWHI

Clinical Variables	Group	MIN	MAX	MEAN	SD	MEAN±SD	P value
VAS	Control	2.00	6.00	2.90	1.44	0.47±0.89	0.254
	Therapeutic	2.00	4.00	2.10	0.55		NS
MGI	Control	0.12	1.50	0.92	0.45	0.27±0.06	0.087
	Therapeutic	0.12	1.50	0.66	0.37		NS
WHI	Control	3.00	4.00	3.60	0.34	0.17±0.24	0.109
	Therapeutic	3.50	4.00	3.87	0.12		NS

Statistical analysis

Independent sample t test. Statistically significant if $P<0.05$

Discussion

This study aimed to investigate the use of systemic antibiotics in the postoperative period of periodontal flaps and its relevance to the infection after surgeries. To also evaluate the role of antibiotics in periodontal flap surgeries in reducing post operative inflammation and to determine the actual rates of postsurgical infection and factors, which affect infection rates. Following completion of Phase I therapy consisting of oral hygiene instructions and scaling and root planing. Three weeks following Phase I therapy, a periodontal evaluation will be performed to confirm the suitability of sites for periodontal flap surgery. Strict aseptic protocol and infection control measures will be carried out in all

periodontal flap surgical procedures. Participants will be randomly assigned to any of the following two groups, Therapeutic group (20 patients) therapeutic antibiotics were prescribed. Amoxicillin 250 mg + metronidazole 200 mg for 5 days after surgery. Analgesics and antiseptic mouthwash were also prescribed. Control group (20 patients) no antibiotics given postoperatively. Only analgesics and antiseptic mouthwash were prescribed.

Patients were evaluated for pain, both immediate and progressive (measured on visual analog scale [VAS]), Modified gingival index by Lobene et al (1986), Wound healing index by Landry et al (1988), Swelling, fever, ulceration, delayed wound healing both immediate and progressively. The duration of this study was of 9 months. All the examinations and clinical parameters were recorded 1 week after surgery on the day of suture removal. Patients will be monitored for one month after surgery. Results of the study evidently showed that properly performed periodontal surgery does not cause post-surgical infection or any complications. Clinical infection in the present study was defined as increasing and progressive soft tissue swelling with the presence of suppuration. Fever or lymphadenopathy was not absolute needs for classification as an infection. None of the patients had any evident systemic effect following surgery. These results were similar with the reported results of the studies done earlier.[5,8,13]

In the present study, Pain was evaluated by VAS, measurement of pain and swelling tends to be subjective. Longer duration of surgery and bone exposure resulting in excessive postoperative inflammatory response may be the two reasons that increase postoperative pain and discomfort in these surgeries. Furthermore when intergroup comparisons were made, the pain was similar in both Groups but subjects experienced less pain when antibiotics were given. All the other inflammatory parameters (swelling and fever) compared in both group were similar. Delayed healing was reported in 4 patients that is 20% being in control group and was statistically insignificant. Different patient variables like ulceration or necrosis, adverse systemic effects were not seen in both the groups. These findings are in agreement with those of earlier studies [8,14,15]. There was no statistically significant difference in the modified gingival index scores and Wound healing index scores between the groups. In the same patient, there was no statistical significant difference in the rate of infection whether or not bone graft was placed or osseous surgery was performed. Similar results were seen in studies conducted by Mohan. et al.[2] and Oswal, et al.[1]

Conclusion

Within the limits of the study there was no infection reported in all the 30 cases operated in our study. The prevalence of postoperative infections following periodontal surgery is very low and does not justify the use of systemic antimicrobials just to prevent infections. The results of this study confirm the findings suggested in previous studies that the modern practice of periodontics includes an array of surgical procedures that bear a low risk of developing postoperative infections. Although it appears from the literature that it is the norm within the current practice of periodontics to routinely perform certain regenerative and implant surgical procedures with the adjunctive use of perioperative antibiotics, data from this and other studies suggest that there may

be no benefit in using antibiotics for the sole purpose of preventing postsurgical infections. Therefore, we suggest that largescale, controlled clinical trials to be conducted to further support the role of antibiotics in the prevention of post-surgical infections and outcomes in general.

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