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Antibiotics to Prevent Complications Following Periodontal Surgery

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Abstract: The aim of present study was to evaluate the effect of prophylactic prescription of amoxicillin (Regimen B: 2 g, 1.5 h before surgery) compared with conventional dosage (Regimen A: 500 mg tid) on post surgical complications. A double blind randomized split mouth design study conducted on 21 patients with severe periodontitis who were referred to the periodontics department or the special clinic of Mashhad Faculty of Dentistry, Iran. All the patients must have at least two quadrants with equal disease severity in one dental arch which needed periodontal surgery. After surgery patients randomly received one of the two antibiotic regimens. Post-surgical complications like: pain, swelling and bleeding were recorded on a specified questionnaire. Fifteen patients after antibiotic therapy with regimen A and 17 patients after receiving regimen B had pain. There was not significant difference between two regimens. Occurrence of bleeding after surgery was similar in two regimens (3 of 21 patients in each group). The use of regimen B demonstrated a slightly higher rate of swelling and fever (42.9% and 28.6%, respectively) than regimen A (38.01% and 19% respectively). Despite these trends, no statistically significant relationship was found between post surgical swelling and fever and any of treatment modalities. With regard to the result of this study and considering the cost and hazards of consuming antibiotics, their routine use during or following periodontal surgery must be questioned. Further large scale, controlled clinical studies are warranted to determine the role of perioperative antibiotics in the prevention of periodontal post-surgical infections.

Key words: Antibiotic, periodontal surgery, complication, infection, swelling, fever

INTRODUCTION

Surgical therapy in its various forms is considered a mainstay in modern practice of periodontics. In addition to allowing access for debridement and resolution (through resection or regeneration) of advanced periodontal defects, surgery is often indicated for pre-prosthetic dental enhancement, dental implant placement and oral plastic and reconstructive therapy. Periodontal surgical procedures by their nature carry with them an attendant risk of developing complications, including infection, pain and delayed wound healing (Powell *et al.*, 2005). Infections that are identified post surgically are readily treated with local measures and often with the adjunctive use of systemic antibiotics. In a targeted effort at preventing postoperative infections, the prophylactic use of antibiotics is common for the prevention of bacterial endocarditis (Dajani *et al.*, 1997; Palmer *et al.*, 2000). Antibiotic prophylaxis in non-medically compromised patients remains a continuous area of clinical practice (Longman and Martin, 1991) but is an important area medico legally for medically

compromised patients (Pallasch and Slots, 1996; Martin *et al.*, 1997; Palmer *et al.*, 2000). It is also common for periodontal surgery in those with aggressive periodontitis (Palcamis, 1996; Slots *et al.*, 2004). However, the prevention of infections after periodontal surgery through the routine use of perioperative antibiotics appears for the most part to be based on empiricism and may be considered controversial. Although reports have advocated perioperative antibiotics to reduce pain and swelling and to improve wound healing and treatment outcomes following gingivectomy (Stahl *et al.*, 1969), osseous resorptive (Ariaudo, 1969; Kidd and Wade, 1974), regenerative (Cortellini and Bowers, 1995; Machtei and Shalhorn, 1995) and implant surgery (Dent *et al.*, 1997; Laskin *et al.*, 2000), but some other studies did not support this idea (Stahl, 1963; Demarco and Kluth, 1972; Callis *et al.*, 1996). As it is said periodontal literature is replete with studies (Stahl *et al.*, 1969; Ariaudo, 1969; Kidd and Wade, 1974; Pendrill and Reddy, 1980; Appleman *et al.*, 1982; Pack and Haber, 1983; Checchi *et al.*, 1992; Cortellini and Bowers, 1995; Machtei and Shalhorn, 1995; Dent *et al.*, 1997; Gynther *et al.*, 1998;

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Laskin *et al.*, 2000), where antibiotics are administered but there are no studies to compare different doses of antibiotics.

So the aim of present study was to evaluate the effect of prophylactic prescription of Amoxicillin (2 g, 1.5 h before surgery) compared with conventional dosage (500 mg tid) on post surgical complications.

MATERIALS AND METHODS

A double blind randomized split mouth design study conducted among 22 patients with severe periodontitis (6 males, 16 females, mean age: 29.7±5.26) who were referred to the special clinic or the Department of Periodontology, in Mashhad Faculty of Dentistry, Iran in 2003. All the patients were examined and selected by one periodontist. The following inclusion criteria had to be met:

- Free from any systemic disease.
- Not allergic to penicillin.
- All the patients must have at least two quadrants with equal disease severity in one Jaw which needed periodontal surgery.
- Had perfect oral hygiene.

All subjects were provided with verbal and written information concerning the study protocol and signed a consent form to participate.

At the base line, all the patients filled a questionnaire consisted demographic information then scaling, root planning and polishing were done. After two weeks all the patients were reevaluated.

In surgical phase, one quadrant was selected randomly and anesthetized using lidocain 2% with epinephrine 1:100,000 administered as block and infiltration then mucoperiosteal apically positioned flap and meticulous debridement were done. Osteoplasty and ostectomy were performed as needed. Suturing was completed in such method that no bone was exposed. Finally entire area was covered with Coe-pack. All of the operations were performed for other quadrants after 1-2 month. One periodontist performed all of the surgeries. There were two methods for antibiotic prescription as shown in Table 1.

For each surgery one of the above regimens was selected randomly and prescribed for the patient. After surgery all patients used acetaminophen codeine as

analgesic. They measured their body temperature every 8 h with thermometer 12 h after operation and recorded it in a questionnaire. Progressive pain, bleeding, intra and extra oral swelling and post operative infection, hematoma and echymosis were recorded as well. The evaluation of pain was subjective.

All patients were examined for lesions such as Herpes labialis or Aphthous stomatitis and asked about mouth odor and tooth hypersensitivity after surgery. All the examinations were done during the week after surgery. Findings were recorded on a specified questionnaire.

Questionnaire
Complications after periodontal surgeries in patients with aggressive periodontitis after antibiotic therapy with A and B regimens

Patient's Name	Sex	Age	Antibiotic regimen A	B
Pain	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Mild <input type="checkbox"/>	Moderate <input type="checkbox"/>
Bleeding	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
Swelling	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
Infection	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
Oral lesions like				
Aphthous	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
Halitosis	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
Hematoma	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
Tooth hypersensitivity	Yes <input type="checkbox"/>	No <input type="checkbox"/>		
Fever	Yes <input type="checkbox"/>	No <input type="checkbox"/>		

Statistical analysis: The Chi-square test was used to detect any difference in the incidence of post surgical complications.

RESULTS

Fifteen patients after antibiotic therapy with regimen A and 17 patients after receiving regimen B had pain. There was not significant difference between two regimens. Occurrence of bleeding after surgery was similar in two regimens (3 of 21 patients in each group). The use of regimen B demonstrated a slightly higher rate of swelling and fever (42.9 and 28.6%, respectively) than regimen A (38.01 and 19%, respectively). Despite these trends, no statistically significant relationship was found between post surgical swelling and fever and any of treatment modalities.

As it is shown in the Table 2 there was not any significant difference between the two antibiotic regimens in the incidence of other post surgical complications.

DISCUSSION

Antibiotic therapy after periodontal surgery is questionable and there is no agreement among periodontists to recommend antibiotics routinely. On the other hand infection is a potential complication following periodontal surgery and is characterized by delayed

Table 1: Two regimens for antibiotic prescription
A: Amoxicillin 500 mg 21 capsules, tid
B: Amoxicillin 500 mg 4 capsules 1.5 h before surgery

Table 2: Incidence of post surgical complications after antibiotic therapy with two regimens

	Regimen A		Regimen B		p-value
	(%)	No.	(%)	No.	
Pain	71.4	15/21	81	17/21	0.62*
Bleeding	14.3	3/21	14.3	3/21	1**
Swelling	38.01	8/21	42.9	9/21	0.75*
Halitosis	28.6	6/21	19.0	4/21	0.46**
Aphthous	0	0/21	14.3	3/21	0.23**
Hematoma	0.5	2/21	9.5	2/21	1**
Tooth hypersensitivity	38.01	8/21	28.6	6/21	0.51*
Fever	19	4/21	28.6	6/21	0.46**

*Pearson's Chi-square test, **Fisher's exact test. Equal value reported when one or more cells has expected count less than five

onset, pain, swelling, suppuration and delayed wound healing. While several authors (Holroyed, 1971; Ruben *et al.*, 1972) have suggested that the incidence of postoperative infection is low, it is often assumed that the risk of this complication, especially after osseous surgery, is high enough to warrant prophylactic antibiotic therapy (Pack and Haber, 1983).

The aim of this study was to compare the effects of two antibiotic regimens (prophylactic versus poly dosage) after periodontal surgery on postoperative complications. The results showed that usual poly dosage antibiotic regimen (A) reduced pain and swelling more than prophylactic one (B) but the differences were not significant. One limitation in our study was that the evaluation of pain was subjective and this reduces the accuracy of the results in some degree. The incidence of post surgical infection and bleeding were similar between two groups. Our findings about the effects of antibiotic on infection and swelling were in agreement with Pendrill and Reddy (1980). According to their findings prophylactic use of antibiotic reduced pain significantly, but our findings did not confirm this. Strahan and Glen Wright (1967), Delpra and Strahan (1972) and Kidd and Wade (1974) stated that the main effect of prophylactic antibiotic is pain reduction after periodontal surgery but they couldn't find significant difference in swelling between penicillin and placebo. Ariaudo (1969) evaluated the effect of antibiotic prescription with usual dosage on complications after periodontal surgery. He began antibiotic therapy two days before surgery and concluded that this method reduced post surgical complications.

In our study 28.6% of patients after receiving usual poly dosage antibiotic regimen reported halitosis but 19% of them complained from this symptom after prophylactic antibiotic therapy but the difference was not significant.

Fewer patients after regimen A had fever but there was not significant difference between two regimens. However, it must be considered that patients recorded their fever by themselves and the accuracy of their recordings is doubtful.

According to the results of this study we can not make a definite comment which antibiotic regimen is superior.

Although poly dosage regimen had a little better results but the differences were not significant. Increase in the number of the patients might improve the results.

CONCLUSIONS

The overall result indicates that the risks of postoperative complications and pain after periodontal surgery are minimal. So with regard to the result of this study and considering the cost and hazards of consuming antibiotics, their routine use during or following periodontal surgery must be questioned. However, prophylactic antibiotic therapy, as recommended by the American heart Association, is mandatory for patients with specific medical problems such as immunodeficiency, metabolic diseases, irradiated in the head and neck area, those at high and moderate risk for endocarditis and for extensive or prolonged surgery (Esposito *et al.*, 2003).

Further large, controlled clinical studies are warranted to determine the role of preoperative antibiotics in the prevention of periodontal post-surgical complications.

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