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Clinical evaluation of adjunctive topical therapy of tetracycline HCL 25 mg in surgical periodontal flap

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ABSTRACT

Introduction: HCl tetracycline has been used as adjunctive therapy in surgical flap for chronic periodontitis. The aim of this study was to investigate the effect of tetracycline HCl 25 mg as an adjunctive therapy in surgical flap to reduce pocket depth and gingival inflammation. **Method:** Subjects were divided into 2 groups, surgical flap group with tetracycline HCl 25 mg and surgical flap only. Measurements of pocket depth and gingival inflammation were taken in first condition and 1 month after treatment. **Result:** Flap surgical treatment with a tetracycline Hcl 25 mg was given topically provides better results for pocket depth and gingival inflammation in patients with chronic periodontitis. Pocket measurements and gingival inflammation 1 month after surgery compared with early conditions showed significant differences (p=0.00 and p=0.00). **Conclusion:** Based on our study it was found that the use of tetracycline HCl 25 mg topically has a better influence in reducing pocket depth and gingival inflammation in chronic periodontitis.

Keywords: Chronic periodontitis, surgical flap, Tetracycline HCl 25 mg, topical

INTRODUCTION

Periodontal disease is a dental and oral health problem that has a high prevalence in the community with prevalence of periodontal disease in all age groups in Indonesia is 96.58%.[1] Chronic periodontitis is one of the slow damage types of disease, described as a result of the interaction between genetic, environmental, bacterial, and host factors. There are several factors that contribute to the increased risk of periodontal disease, including local factors of plaque accumulation in the teeth and gingiva which is the main etiology of chronic periodontitis. Clinical signs of periodontitis include gingival inflammation, interdental papilla swelling, gingival marginal damage, periodontal pocket formation, gingival recession, and radiological features indicated substantial alveolar bone damage. Clinical examination showed an increase in probing depth, bleeding on probing, redness (color between pale red to magenta), and gingival swelling. There is usually no pain.[2]

Scalling and root planing are conventional treatment but the scaling and root planing can not eliminate pathogenic bacteria thoroughly because the location of the bacteria is in the gingival tissue or in the alveolar bone that can not be accessed

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by the scaller and root planing tools so surgical procedures of flap periodontal is needed. Surgical periodontal flap is the most commonly used procedure of all periodontal surgical techniques. Reflection of soft tissue is a method of gaining access to deeper periodontal structures directly and eliminating necrotic tissue.[3] Sbordoen *et al*, suggesting pathogen recolonisation in the subgingiva region often occurs after treatment that can lead to recurrence of the disease. To avoid conventional treatment failure, antibiotics are required as adjunctive therapy.[3]

Tetracycline is a broad-spectrum polypeptide antibiotic produced by the genus Streptomyces of Actinobacteria that is indicated for bacterial infection. Tetracycline is a protein synthesis inhibitor that can inhibit protein synthesis in bacterial development. These antibiotics are known to inhibit calcification in bone formation. Tetracycline is known to inhibit protein synthesis in both prokaryotic and eukaryotic cells.[5,6]

Antibiotics began to be used as adjunctive therapy to help the limitation of conventional treatment and prevent early recolonization of bacteria in order to provide good results in clinical improvement. Antibiotics can enter the periodontal pocket either systemically or locally.[3] Provision of antibiotic drugs locally will have a direct effect on bacteria.[7,8,9] After knowing the benefits of topical antibiotics, then researchers want to know the effect of topical antibiotics tetracycline Hcl 25 mg as adjunctive therapy in clinical surgical flap on better healing of pocket depth and gingival inflammation in chronic periodontitis

METHODS

Twelve patients consisting of 9 men and 3 women who had fulfilled the inclusion criteria were divided into 2 groups, the surgical flap group with the tetracycline HCl 25 mg and the surgical flap only. This type of research is experimental with before and after surgical flap research designs. Clinical parameters examined included examination of pocket depth (Fig. 1) and gingival inflammation (Fig. 2) at the beginning and 1 month after surgery. All the samples that have fulfill the inclusion criteria and agreed to be the subject of the research subsequently signed the inform concent.

Preliminary measurements of pocket depth and inflammatory gingiva are further asepsis of the area of operation and anesthesia is performed in the area of operation. All groups were treated with surgical flap (Fig. 3) while in the experimental group a topical antibiotic of tetracycline HCl 25 mg was dissolved with 0.1 ml NaCl solution by applying a microbrush on the root surface for 15 seconds while in the control group was not. Perform suturing and fixing of periodontal pack and removed 1 week later. 1 month after surgical flap, the pocket depth measurement was done by using probe and measurement of gingival inflammation in every research location. Results from measurements of pocket depth and gingival inflammation at the beginning and 1 month after surgery were statistically tested by comparing

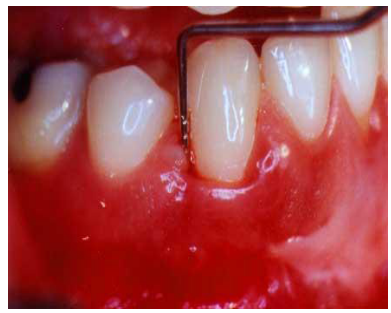

Figure 1. Examination pocket depth.[3]

Figure 2. Gingival inflammation.

Figure 3. Surgical flap

Table 1. Mean value of pocket depth (PPD) and gingival conditions (GI) in surgical flap group with tetracycline HCl 25 mg and surgical flap only, before and after treatment

	Before			After 1 month		
Variables	Flap+Tetra n=12	Flap only n=12	P value	Flap+Tetra n=12	Flap only n=12	P value
PPD						
mean	6.66	6.66	1.00(NS)	3,16	4,66	0.00(S)
(SD)(mm)	(0.88)	(1.07)		(0.93)	(1.23)	
GI						
mean	2.83	2.75	0.78(NS)	0.50	2.08	0.00(S)
(SD)	(0.57)	(0.86)		(0.67)	(0.99)	

Table 2. Average difference of pocket depth (PPD) and gingival conditions (GI) in surgical flap with tetracycline HCl 25 mg and surgical flap only, before and after treatment

Variables	Flap+Tetrasiklin n=12	Flap only n=12	P value
PPD			
mean (SD) (mm)	3.50(1.30)	2.00(0.85)	0.00(S)
GI			
Mean (SD)	2.33(077)	0.66(0,77)	0.00(S)

the mean difference of pocket depth and gingival inflammation.

RESULT

The mean pocket depth and gingival index at the beginning were found to have no significant difference between the surgical flap with tetracycline HCl 25 mg group and the flap group only (p value>0.05) but had a significant difference at 1 month after treatment pocket depth and gingival index (p value<0.05) and this means that surgical treatment of flap with tetracycline HCl 25 mg topically yields better results than surgical flap only on pocket depth reduction and reduction or improvement of gingival inflammation (Table 1).

The depth of post-surgical pocket of flap with tetracycline HCl 25 mg was decreased 3.50 mm while in surgical flap only reduction was 2.00 mm and gingival index on surgical flap with tetracycline HCl 25 mg reduction or improvement gingiva inflammation is greater than 2.33 compared to surgical flap only 0.66. Based on the statistical test there was a significant difference between surgical flap with tetracycline HCl 25 mg with surgical flap only against pocket depth reduction and gingival index. Tetracycline adjunctive therapy HCl 25 mg topically in surgical flap periodontal has a better effect on pocket depth reduction and gingival inflammation (Table 2).

DISCUSSION

The results of this study indicate that flap surgical treatment with a tetracycline HCl 25 mg given topically provides better results against pocket depth reduction and gingival inflammation in patients with chronic periodontitis. The results of pocket measurements and 1 month postoperative gingival inflammation compared with early conditions showed significant differences (p=0.00 and p=0.00). This is in line with several studies that have demonstrated the superior use of tetracycline topically as an adjunctive therapy in surgical flap. Topical antibiotics effective because this drugs reaches the base of the periodontal pocket and can last for a long time.

Tetracycline is one of the antibiotic for chronic periodontitis. The results of this study also indicate that treatment of chronic periodontitis with surgical flap can result in reduced pocket depth and gingival inflammation but with adjuvant tetracycline HCL 25 mg treatment topically may provide better results compared to surgical flap only because of the use of locally antibiotic drugs can minimize bleeding, stabilize attachment level and reduce probing depth. This can lead to better control in the treatment of periodontal disease. The use of antibiotic drugs locally has

provided therapy such as long-term retention of locally applied antibiotic drugs into this periodontal tissue resulting in a more constant concentration of drugs in damaged periodontal tissues. Treatment with local antibiotic drug delivery has provided excellent benefits. Local antibiotic drugs are systems designed to provide local antibiotic agents into the periodontal pocket with mechanisms in order to maintain a long-term therapeutic effect.[13]

The use of adjuvant therapy of tetracycline HCl 25 mg in surgical flap give results in a increasing pocket depth reduction and gingival inflammation.[11,12] Local drug tetracycline HCl 25 mg with surgical flap are very effective with removing local irritation, reducing gingival inflammation, reducing pocket depth, improves clinical attachment, can control local infection, and prevent the formation of new lesions.[15,16] The tetracycline group exhibits broad spectrum antibacterial effects including both gram-negative and aerobic and anaerobic bacteria. The tetracycline group includes antibiotics that are bacteriostatic, with low pH and anticholagenase activity can increase antibacterial ability so as to increase gingival attachment.[15,16]

Tetracycline HCl 25 mg locally inserted into the periodontal pocket has been carefully studied which may stimulate serratiopeptidase enzymes and proteolytic enzymes that have anti-inflammatory activity widely used in dental care. Serratiopeptidase enzymes improve microcirculation and reduce pain by blocking pain and stimulating the release of amines from inflamed tissues. Topical use is also evidenced by the increased concentration of antibiotics in wounds and decreased rates of infection. Therefore, the use of antibiotics locally may provide better results in periodontal fist surgery.[7]

The use of antibiotic drugs locally may minimize bleeding, stabilize attachment level and reduce probing depth in chronic periodontitis.[13] Drugs excreted through gingival sulcus fluid may provide an advantage in periodontal therapy because the concentration of tetracycline in gingival sulcus fluid is higher than in serum.[19.20]

In this study, the clinical parameters of measurement were the pocket depth and gingival inflammation before and 1 month after treatment in which the results of this study showed a clinical improvement for pocket depth and gingival inflammation in that it was in accordance with the results of previous studies which explained similarly that there was improvement pocket depth and inflammation after first surgery accompanied by adjunctive therapy of tetracycline HCl 25 mg. Treatment with local antibiotic treatment has provided an excellent advantage in pocket depth and gingival inflammation. The local use of the drug will have a direct effect on the bacteria so it is useful for the reduction of pocket depth and gingival inflammation of the flap surgical treatment in chronic periodontitis.[7-9]

CONCLUSION

The use of tetracycline HCl 25 mg as a adjunctive treatment of topical surgical flap has a better effect in reducing pocket depth and gingival inflammation in the treatment of chronic peridontitis.

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