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ORIGINAL ARTICLE

Comparison of Clinical Attachment Level Gain Using Scaling Root Planing Versus Adjunctive Azithromycin on Chronic Periodontitis

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ABSTRACT

Objective: The objective of the study was to compare the mean clinical attachment gain in patients of chronic periodontitis after scaling and root alone versus Azithromycin as an adjunct to scaling and root.

Study Design Comparative study

Place and Duration: Conducted at Operative Dentistry Department, Azra Naheed Dental College, Lahore for a duration of 4 months from December 2019 to March 2020.

Methodology: Total Sixty patients fulfilling the selection criteria were randomly allocated to SRP and SRP+Az groups. In both groups, conventional scaling and root planing was done. In the SRP group placebo capsules were prescribed, while in the SRP+Az group, Azithromycin (500mg) once daily was prescribed for 3 days. Clinical attachment level (CAL) was measured initially and after 5 weeks. Data was analyzed in SPSS version 19.0 using independent sample t-test.

Results: Both groups showed gain in CAL compared to baseline. However, SRP+Az group showed significantly more gain in CAL in comparison to SRP group (*P* value < 0.05).

Conclusion: Use of Azithromycin adjunctive to SRP is an effective treatment modality in chronic periodontitis patients.

Keywords: Anti-Bacterial Agents, Azithromycin, Chronic periodontitis, Clinical attachment level, Periodontal Debridement, Scaling and root planing,

INTRODUCTION

Chronic periodontitis is a common periodontal disease initiated by bacterial plaque.[1] If left untreated it may lead to loss of the supporting bone and eventually tooth loss.[2] Periodontal health affects oral function, aesthetics as well as systemic health.[3, 4] It also influences an individual's oral health related quality-of-life.[5]

Chronic periodontitis is characterized by periodontal pockets, gingival inflammation and decrease in clinical attachment level (CAL).[6] Changes in CAL are more objective measure of the degree of periodontal destruction or gain as a result of therapy.[7]

In most chronic periodontitis patients, Scaling and root planning (SRP) significantly reduces inflammation of gingiva, decreases pocket depth and gains the CAL.[8, 9] However, a small proportion do not respond adequately to mechanical therapy.[10] Several factors, such as deep pockets, furcation involevment, and bacterial penetration in to dentinal tubules or gingival tissues have been suggested to limit the effectiveness of conventional SRP therapy.[11] Adjunctive administration of antibiotics has been suggested to lead to better results compared to SRP alone.[12] They can be delivered through local and systemic routes, with orally administered systemic antibiotics being more convenient for patients. Systemic antibiotics reduce bacterial counts on all mucosal surfaces, helping to delay the re-colonization of subgingival sites.[12, 13] Tetracycline and a combination of amoxicillin and metronidazole are commonly used adjuvant antibiotics.[13] The recommended regime is 3-4 doses per day for 7-14 days and they have been associated with bacterial resistance and several side effects which reduces their compliance.[14]

Azithromycin a macrolide antibiotic, has less resistance, fewer adverse effects, and is administered once daily which promotes patient compliance.[15] It accumulates effectively in phagocytes and has good periodontal tissue penetration thus being delivered in high concentrations to sites of infection where it remains detectable for 14 days.[15] Azithromycin has additional therapeutic benefit through its immunomodulatory effect.[15] adjunctive use of azithromycin in a single dose of 500mg over three days has shown significant gain in CAL of chronic periodontitis patients.[16] In a study conducted by Gomi et al, the mean CAL gain with scaling and root planning alone was 1.86+0.49mm, compared to 2.76+0.84mm with the adjunctive use of azithromycin, P<0.001.[17] However Sampaio et al, found no additional benefits of adjunctive Azithromycin compared to conventional periodontal therapy alone. Mean CAL gain in conventional therapy group was 1.05+0.06mm compared to 1.07+0.17mm in Azithromycin group P>0.05.[18]

This study was conducted with the rationale that there was no consensus in the literature whether antibiotic use is beneficial or unnecessary in these cases. Moreover, there was no similar local or national study to our knowledge. This study can have an impact on clinical care since if antibiotics are beneficial they should be considered more often for better periodontal healing, while if they are not

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then they should be avoided to minimise over prescription of antibiotics. The present study's objective was to compare the mean increase in CAL using scaling and root planing alone compared with adjunctive use of azithromycin in chronic periodontitis patients.

METHODOLOGY

It was a Comparative Study conducted at Operative Dentistry Department, Azra Naheed Dental College, Lahore from December 2019 to March 2020. Ethical approval was obtained from institutional review board. Patients with chronic periodontitis and CAL ≥ 3mm on atleast 3 Ramfjord's teeth (FDI # 16,21,24,36,41,44) were included in the study. Patients having received antibiotics or periodontal therapy within the past 3 months, allergy to Azithromycin, systemic diseases (hypertension, diabetes mellitus), smokers, pregnant and lactating women were excluded. Sample size was calculated using WHO sample size calculator with confidence interval at 95%, Power 80%, reference prevalence of 2.76 ± 0.84 for study group and 1.86 ± 0.49 for control group.[17] Non-probability consecutive sampling technique was used and in each group 30 patients aged 30-50 years of both genders were included. Consent was obtained after explaining the purpose of the study to the patients. Patients were randomized to SRP group or SRP+Az group using lottery method. Patients were not revealed which group they were allotted to. CAL was calculated preoperatively as the apical distance of the pocket base from the cementoenamel junction (CEJ) using a UNC 15 probe. In both groups, SRP was performed on same day by using ultrasonic scaler and hand curettes by a single, trained operator in a standardized manner. In SRP group, patients were prescribed a placebo once daily for 3 days, while in SRP+Az group they were given 500 mg Azithromycin once a day for 3 days. CAL was noted again at 5 weeks post-operative recall.

Data Analysis: Data was analyzed using SPSS 19.0. Independent sample t-test was used to compare mean CAL gain in the two groups. *P* value ≤ 0.05 was considered as significant. Data was stratified for age and gender. Post-stratification t-test was applied with *P* value of ≤ 0.05 as significant.

RESULTS

A total of 60 subjects were included in the study. Table-I shows the demographic data of the studied population.

Table-I: Demographics: Comparison of gender (number of subjects) and age of patients (years)

	Gender (n)			Age (years)
	Male	Female	Total (%)	Mean ± S.D.
SRP	18 (30%)	12 (20%)	30 (50%)	39.50±6.99
SRP+Az	15 (25%)	15 (25%)	30 (50%)	41.53±4.86
Total	33 (55%)	27 (45%)	60 (100%)	40.52±6.01

Table II: Frequency and percentage of an increase in clinical attachment levels in both groups

Gain in CAL	SRP Group (n = 30)	SRP+Az group (n = 30)
0.10 – 1.50	30 (100%)	20 (66.7%)
1.51 – 2.40	0	10 (33.3%)
Mean±SD	0.41±0.1	1.10±0.77
P value	0.000	

There was significantly greater gain in CAL in Azithromycin group compared to SRP only group as shown in Table-II.

Stratification for an increase in clinical attachment levels with respect to age and gender is presented in Table-III. There was a statistically greater gain in CAL in Azithromycin group in both young patients (30 – 40 years) and elder patients (41 – 50 years). When data was stratified for gender it showed significantly greater gain in CAL in Azithromycin group compared to SRP group in both females (*P* value < 0.01) and males (*P* value < 0.05).

Table-III: Stratification of gain in CAL according to age and gender

Age (years)	Gain in CAL		*P* value
	SRP group (n=30)	SRP+Az group (n=30)	
30 – 40	0.55±0.49	1.43±0.64	.000
41 – 50	0.25±0.49	0.85±0.78	.019
Gender	Gain in CAL	*P* value	
Male	0.41±0.53	0.99±0.75	.014
Female	0.49±0.48	1.20±0.80	.007

DISCUSSION

Chronic periodontitis is a common periodontal disease which if left untreated ultimately leads to tooth loss.[5, 19] The basic management is scaling and root planning (SRP), which may be reinforced with adjunctive treatments or at times periodontal surgery.

Studies show systemic antibiotics to have favorable periodontal tissue response compared to SRP alone.[12] Among the systemic antibiotics, Azithromycin has shown better patient compliance.[20] This was confirmed in present study as no adverse effects were noted, apart from mild diarrhea in 3 of the 30 patients (10%) from the study group. The approved dosages of Azithromycin are (5-day regime, 1st dose of 500mg and then 250mg everyday) and (3-day regime of 500mg everyday). In the present study, 3-day, 500 mg/day regime was choosed which had confirmed better results in contrast with course of the 5-day, while bacterial treatment ratio was examined.[21]

In the present study adjunctive use of Azithromycin with SRP was more effective in gaining CAL in chronic periodontitis patients than SRP alone. This was in accordance with a study conducted by Gomi et al in which the mean CAL gain when Azithromycin was used along with SRP was 2.76+0.84 mm compared to 1.86+0.49 in SRP alone *P* value > 0.001.[17] A similar recent study found significantly greater gain of CAL by systemic Azithromycin of 1.13mm compared to 0.46mm with SRP alone (*P* value = 0.016).[21] This might be explained because Azithromycin is active against periodontopathic bacteria, has good periodontal tissue penetration, a long half-life and is maintained above minimum inhibitory concentration to inhibit the growth of 90% of organisms.[15]

On the other hand, another study found no additional clinical benefit of azithromycin as adjuvant to conventional periodontal therapy (Yashima et al).[18] Mean clinical attachment level in azithromycin group was found to be 3.7±1.1 mm, compared to 3.5±0.9 mm in control group, (*P* value > 0.05). Their results might be explained by the fact that patients included in their study had moderate to severe periodontitis (stage III or IV) which does not respond as well to adjunctive treatments than milder cases

do. No similar national or local study was found to our knowledge.

Periodontal tissues not only withstand cumulative damage with increasing age but their regenerative capacity also reduces as evidenced by reduced number of stem cells. [22] This might explain the less noticeable response with Azithromycin in older patients in present study compared to younger patients.

In present study, results of Azithromycin group were superior in both genders with more noticeable difference in males. It is known that periodontitis has greater prevalence and severity among males.[23] The greater degree of clinical attachment loss in males might allow for greater gain in CAL and thus superior results.

CONCLUSION

It was concluded that the adjunctive use of Azithromycin was more beneficial in chronic periodontitis patients compared to conventional treatment. Careful clinical judgement about the benefits and risks of its use are necessary on a case to case basis.

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