Original Article

Comparison Of The Effect Of Curcumin Gel With Combination Of Coenzyme Q10 And Beta Carotene Gel In Periodontal Diseases Patients : A Clinical Study

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Abstract

Aim: This clinical comparative trial goal was to explore the clinical efficacy of two gel-based medications used as an adjuvant to mechanotherapy in chronic periodontitis patients, one having Curcumin (Curcuma longa) and the other comprising of Ubidecaronene, Beta carotene, and Neem.

Materials and Method: The split mouth study was a randomized clinical trial in which total 75 patients, diagnosed with chronic generalized periodontitis were selected & divided randomly into:

Group A: Scaling and root planing treatment for patients followed by delivery of Curcumin oral gel (curenext®).

Group B: Scaling and root planing treatment for patients is followed by delivery of UBI-Q™gum tonic gel.

All patients received oral hygiene instructions & their clinical parameters including Plaque Index (PI-Turskey- Gilmore glickman modification of Quinglwy Hein), ModifiedGingivalIndex(MGI-Lobene-1986),PocketDepth(PD),RelativeAttachmentLevel(RAL),were assessed at baseline, 1month & 3 months.

Results: At baseline 1 month & three months, both groups showed statistically significant gain in Relative attachment level which was recorded with help of stent and statistically significant decreases in PI, GI, and PPD when compared individually.

Conclusion: Non surgical mechanotherapy such as Scaling & Root Planing along with local drug delivery gives beneficiary results in specially helpful in systemically affected individuals. local drug-delivery agents containing curcumin and UBI-Q™gum tonic gel which is combination of Ubidecaronene, Beta carotene & Neem can be used as a useful addition to scaling and root planing for the reduction of gingival inflammation and periodontal pocket depth but long term follow up shows not much changes in Parameters.

Keywords: Oral health Care, Curcumin oral gel, Periodontitis, UBI-Q™Gum Tonic gel, Local Drug Delivery

INTRODUCTION

Inflammation of the surrounding structure of teeth involving the gingiva, periodontal ligament, cementum, and alveolar bone, leads to periodontal disease. This generally results in progressively destructive changes, which causes bone and periodontal ligament loss. There are numerous potential causes of periodontal disease. Pathogenic microorganisms that are present in the subgingival region are the main etiologic agents. The basic goals of periodontal therapy are to prevent progression of the advancement of periodontal diseases, regulate it, and maintain healthy periodontium. Therefore to bring back the patient's lost form, functionality, attractiveness, and comfort. Different types of periodontal disease are often treated with strict oral hygiene management along with mechanical debridement of the tooth surface and surrounding periodontal tissues. However, due to the difficulties in asseccibility, complete oral prophylaxis of areas with deep periodontal pockets is challenging to complete.[1]

Those pathogenic microbes that live in the oral and gingival tissues as well as in other places that are inaccessible to periodontal devices, cannot be eliminated by Scaling and Root planing alone. Systemic or local administration of antibiotics is done as add on therapy as periodontitis is caused by microorganisms. Numerous drawbacks of antibiotics given systemically, including organ toxicity from higher dosages, the development of antibiotic-resistance to bacteria, and hypersensitivity reactions for which allergic tests are necessary, along with the need for higher dosages to achieve the required GCF concentration at the target site, prompted the development of local drug delivery systems.[2]. Drugs which are utilised locally are tetracyclines,doxycycline and minocycline; metronidazole, ornidazole; and chlorhexidine, but each of which have their own side effects and they are quite expensive. Thus, another alternative available agents are curcumin, ubidecaronene, betacerotene and neem containing gel which are safe and also economical. Curcumin oral gel which contains turmeric, commonly known as Haldi(Curcumalonga). Its botanical source which contains rziome of curcuma longa which is immunostimulant, effective against sepsis, antimutagenic, and it also helps in wound healing[3].

UBI-Q™ tonic gum gel contains Ubidecaronene, Beta-carotene and Neem as base. Ubidecaronene which is also known as Coenzyme Q10 has anti-inflammatory extract. It has various proven characteristic properties like acting against inflammation, neutralize free radicals , antimicrobial, hepatoprotective, andantioxidant actions[4]. Beta-carotene which is lipid soluble agent and act on the cell membranelevel. It protect against lipid peroxidation. Beta-cerotene also have antioxidant properties. Neem is also known as AzadirachtaIndica. Neem is a botanical product that has long been thought to have pharmaceutical, antibacterial, astringent, antiseptic, insecticidal, and antiulcer effects.

In current study, both of them were utilise as local drug delivery system adjunct to mechano therapy in chronic generalised periodontitis patients.

MATERIALSAND METHODS

Curenext®oralgelandUBI-Q™tonic gum gel which were used in this study. Methods of randomisation of 75subjects,from the out patient from department of Periodontology, Karnavati School of Dentistry,Gandhinagar,diagnosedtohaveChronic GeneralisedPeriodontitison the basis of classification were considered for present study. It was clinical trial where split mouth study was carried. One site treated with curcumin gel and other site UBI-Q™Gum Tonic gel was delivered in gel form in both sexes. They were divided randomly and chosen according to criteria given for evalutionof periodontium with the help of exploratory instruments. Patients who were not willing or not able to come again for follow up were excluded.

Inclusion Criteria

Patients having at least three locations where the UNC-15 probe revealed a probing pocket depth of between 5 and 7millimetres at least three sites; Patients with moderate or severely inflamed gingival sites that bleeds when probed; and patients who had at least 20 teeth from each arches remaining when they were investigated.

Excluded From Study

Patients who had just undergone extraction of teeth or patients who are undergoing orthodontic treatment or having enododontically&periodontically involved combined lesions were not enrolled in the study.Pregnant and

lactating women; tobacco users & smokers; patients taking anti inflammatory drugs such as NSAIDS, antibiotics such as Amoxicilline group, and immunesuppressants or oral contraceptives for at least last 8 months were not enrolled for study.patients wearing removable partial denture were also excluded.

ApprovalfromEthicalCommittee

Therandomised clinical trialwasapprovedfromethicalcommitteeofKarnavatiSchoolof Dentistry.

StudyDesign

Theappropriate relevantdatawererecordedforallsubjectsinspecialcase formatsheets. out of 100 patients 75 were ready to enroll & willing for follow up and fall into inclusion criteria.Oral Hygienexaminationwasclinically carriedindentalchairs,underproper conditions of light using a diagnostic tools such as mouth mirror,explorer,tweezers,andassessmentofclinicaldatawerecarriedout with UNC-15 probe.Selectedpatientsweredividedrandomlyintotwogroupdwhichweretreatedone side curcumin gel other side UBI-Q™tonicgumgelatbaselineclinicalparameterswererecordedPlaqueIndex(PI),ModifiedGingivalIndex(MGI), ProbingDepth(PD)usingUNC-15probeand Relative Attachment Level (RAL) was measuredusing stent on the selected sites of both the sides which was madeof acrylic resin.

Group Division-A75participants were treated by scaling and root planingaccompanied by placement of curcumin gel.
Group Division-B 75Participants were treated by scaling and root planingaccompaniedbyplacementof UBI-Q™tonic gum gel.

Patients were recalled at 1month and 3month following parameters were recorded again.

Tabulatingofclinicalparameters

All the clinically recorded parameters were measuredforallthepatientsatthebaseline,1month,and3months:PlaqueIndex,ModifiedGingivalIndex,wasscored.Probing PocketDepth,andRelativeAttachmentLevelweremeasuredusingUNC-15probe along with stent.

How Local Drugs Are Delivered

Each group was isolated after scaling and root planing to avoid saliva contamination. A 1ml disposable insulin syringe compromisedwith a blunted 25-gauge needle was used. For the purpose of assessing the clinical parameters, subjects were contacted back after 1month and 3 months after the gel insertion.

Result

Microsoft Excel was used to tabulate the information, while SPSS version 26 was used for analysis. Evaluation of Using a ANOVA test, the baseline, 1-month, 3-month and data for each group were examined independently (Within group).Comparison of the two groups' differences from the baseline to the third month paired t-test was used to analyse the data (inter group).**Table 1 (A) &Table 1(B)**shows PI, GI, PPD and CAL at different follow up within Curcumin groups mean and standarad deviation where p value was <0.001.**Table 2(A) to table2(B)** shows PI, GI, PPD and CAL at different follow up within UBI-Q™ mean and standarad deviation where p value was <0.001 significant reduction in all four clinical parameters.**Table 3** shows that comparison of baseline as well as 3 monthsvaluesof all 4 clinical parameterswerenot statistically significant.While comparing both the groups for Plaque index for group Curcumin gel and Group UBI-Q™ gel respectively mean &standard Deviation was 1.58 ± 0.17&1.48 ± 0.2 at the end of 3 months. These shows both medicaments in gel form was not showing much difference which was 1.14 ± 0.14 and 1.15 ± 0.17 respectively for Modified Gingival index, wheres probing pocket depth mean and standarad deviation for both groups was 3.76 ± 0.26 and 3.85 ± 0.37 respectively shows some amount of reduction in Probing Pocket Depth. As shown in table Relative attachment level also some amount increase while inter group comparison shows insignificant results.

Table 1 (A): PI, GI, PPD and CAL at different follow up within Curcumin groups

Curcumin groups	Baseline	1 month	3 month	p value
PI	2.21 ± 0.23	1.82 ± 0.19	1.58 ± 0.17	< 0.001
GI	2.62 ± 0.15	1.73 ± 0.14	1.14 ± 0.14	< 0.001
PPD	5.81 ± 0.3	4.59 ± 0.28	3.76 ± 0.26	< 0.001
CAL	3.31 ± 0.28	2.64 ± 0.28	2.22 ± 0.3	< 0.001

Table 1 (B): Comparison of PI, GI, PPD and CAL at different follow up within Curcumin groups

Curcumin groups	Mean ± SD	Mean ± SD	Paired T test (p value)
PI(Baseline) v/s PI(1month)	2.21 ± 0.23	1.82 ± 0.19	< 0.001
PI(Baseline) v/s PI(3months)	2.21 ± 0.23	1.58 ± 0.17	< 0.001
GI(Baseline) v/s GI(1month)	2.62 ± 0.15	1.73 ± 0.14	< 0.001
GI(Baseline) v/s GI(1month)	2.62 ± 0.15	1.14 ± 0.14	< 0.001
PPD(Baseline) v/s PPD(1month)	5.81 ± 0.3	4.59 ± 0.28	< 0.001
PPD(Baseline) v/s PPD(3 month)	5.81 ± 0.3	3.76 ± 0.26	< 0.001
CAL(Baseline) v/s CAL(1 month)	3.31 ± 0.28	2.64 ± 0.28	< 0.001
CAL(Baseline) v/s CAL(3 month)	3.31 ± 0.28	2.22 ± 0.3	< 0.001

Table 2 (A): Comparison of PI, GI, PPD and CAL at different follow up within UBI q groups

UBI q groups	Baseline	1 month	3 month	P value (ANOVA)
PI	2.29 ± 0.26	1.77 ± 0.22	1.48 ± 0.2	< 0.001
GI	2.55 ± 0.16	1.69 ± 0.13	1.15 ± 0.17	< 0.001
PPD	5.7 ± 0.37	4.49 ± 0.34	3.85 ± 0.37	< 0.001
CAL	3.23 ± 0.45	2.59 ± 0.38	2.32 ± 0.34	< 0.001

Table 2 (B): Comparison of PI, GI, PPD and CAL at different follow up within UBI q groups

UBI q groups	Mean ± SD	Mean ± SD	Paired T test (p value)
PI(Baseline) v/s PI(1month)	2.29 ± 0.26	1.77 ± 0.22	< 0.001
PI(Baseline) v/s PI(3months)	2.29 ± 0.26	1.48 ± 0.2	< 0.001
GI(Baseline) v/s GI(1month)	2.55 ± 0.16	1.69 ± 0.13	< 0.001
GI(Baseline) v/s GI(1month)	2.55 ± 0.16	1.15 ± 0.17	< 0.001
PPD(Baseline) v/s PPD(1month)	5.7 ± 0.37	4.49 ± 0.34	< 0.001
PPD(Baseline) v/s PPD(3 month)	5.7 ± 0.37	3.85 ± 0.37	< 0.001
CAL(Baseline) v/s CAL(1 month)	3.23 ± 0.45	2.59 ± 0.38	< 0.001
CAL(Baseline) v/s CAL(3 month)	3.23 ± 0.45	2.32 ± 0.34	< 0.001

Table 3: Comparison of PI, GI, PPD and CAL at different follow up within Curcumin and UBI q groups

Follow up	Curcumin group	UBI q group	p value
PI(Baseline)	2.21 ± 0.23	2.29 ± 0.26	0.18
PI(1month)	1.82 ± 0.19	1.77 ± 0.22	0.33
PI(3months)	1.58 ± 0.17	1.48 ± 0.2	0.30
GI(Baseline)	2.62 ± 0.15	2.55 ± 0.16	0.05
GI(1month)	1.73 ± 0.14	1.69 ± 0.13	0.31
GI(3month)	1.14 ± 0.14	1.15 ± 0.17	0.77

PPD(Baseline)	5.81 ± 0.3	5.7 ± 0.37	0.18
PPD(1month)	4.59 ± 0.28	4.49 ± 0.34	0.19
PPD(3 month)	3.76 ± 0.26	3.85 ± 0.37	0.24
CAL(Baseline)	3.31 ± 0.28	3.23 ± 0.45	0.41
CAL(1 month)	2.64 ± 0.28	2.59 ± 0.38	0.26
CAL(3 month)	2.22 ± 0.3	2.32 ± 0.34	0.30

DISCUSSION

Becterial load is main reason for initiation for Periodontal Disease.Periodontal therapy aim is to target becterial flora. Asadjunctive therapeutic modalities, Scaling and RootPlaningremainsthebeststandardofperiodontaltherapywithvariousotheragentsbeingrecently used. This clinical trial aimed at evaluating theeffectiveness of curcumin gel and UBI-Q™ tonic gumgel used along with non surgical periodontal therapy with a local drug delivery inchronicgeneralisedperiodontitispatients.The findings of the clinical trial shows the efficacy ofcurcumin gel and combination of coenzymeQ10 &betacarotene gel in reducing allclinicalparametersandgaininattachmentlevel.

Curcumin is a diferuloylmethane present inextract of plants (turmeric or rhizome). The yellowcolorofturmericisbecauseofcurcuminoids.Curcuminhasvariouspropertieslikeanti-inflammatory,anti-oxidant,anti-microbial along with hepatoprotective, immunostimulant, antiseptic and mutagenic properties.Curcumin has various beneficiary properties like anting as suppressing inflammation, scavanges free radicals& antimicrobial. Anti-inflammatorypropertiesofcurcuminareby blockingtheprostaglandinbiosynthesisfromarachidonicacidpathway. It alsoactbydown regulatingthe functionsofbackbone of immunity that is neutrophilsby alteration in chemo taxis phagocytosis of pathogen like properties duringinflammation.Antioxidant nature of curcumin is because of to its nature to inhibitfreeradicalformation such as nucear factor kappa b.Lastly it also reduces inflammation ofby its ability to stop the growth ofvarious microorganisms[5].

Curcumin down regulatescox-2 protein, mostly via down regulation of nuclearkillerfactorKbexpression,whichisrequiredforcox-2expression[6].Thereductionofinflammatorymediatorsoccurswhichleadstoshrinkage.Final outcome because of decrease in amount of inflammatory molecules are that changes in clinical signs of edematous lesions with connective tissue engorgemetnt.Another action by whichcurcuminreducesinflammatorychangesisby helping the migration of epithelial cells to aid in re -epithelialization[7].

Similar to our findings Sidhuetal.foundthatcurcumintreatedlesionshadincreased in amount of TGF-β1whichhelps inwoundhealingwhichmaybereason for the gain in attachment along with periodontal therapy. curcumin has anti inflammatory action like other Non-steriodal anti inflmatoryproprties which inhibit formation of prostaglandin and thomboxene like mediators.

UBI-Q™tonicgumgelwhichcontainsubidecaronene,beta-caroteneandneemasbase.Ubidecaronenewhich is also known as CoenzymeQ10,is found in mitochondria which is energy producing center for cell. ATP as suggests Adenosine triphosphatase molecule act as cell' s major source of energy which helps in production of protein[8].

CoQ10 is also a powerful antioxidant. The dangerous elements in the body are free radicals.Free radicals that affect DNA, cell membranes, and even cause apoptosis in some cells.Free radicals can be neutralised by antioxidants inside the body. They typically exist in our to protect the body from harmful free radicals. Free radical production is excessive in a sick state, Free radicals are produced in excess when a person is ill, which is why antioxidants are required. Damage to tissue results from inability to combat them. When periodontal tissue is affected, connective tissues, the attachment mechanism is weakened, resulting in tooth movement and eventual tooth loss. As a supplement, anti-oxidants are used to prevent the overproduction of

free radicals in PeriodontitiesPateients.

Ravinshankar et al also concluded that 1 month follow up shows, curcumin group showed a significant reduction in pocket depth, plaque index, and clinical attachment loss when compared to the ornidazole group[9].

Recntly Terby et al did systemic review and meta analysis found that out of 963 participants in the 27 Randomized control trial (RCT) studies were considered for a systematic review. They summerised that for a long duration evaluation of 9 studies involving probing pocket depth with 400 participants, in which final outcome suggesting there was a statistically significant difference in the reduction when curcumin topical gel was used as compared with the other medicaments[10]. Similar to our study we have used curcumin gel in one group shows beneficiary results for PI,GI,PPD, and CAL 1.58 ± 0.17, 1.14 ± 0.14, 3.76 ± 0.26 &2.22 ± 0.3 respectively.

Beta-carotenewhichcontainsceratinoidswhichpreventproductionofreactiveoxygenspecies and also prevent lipid peroxidation[11]. Neem leaves have been used in the management of gingivalandperiodontaldiseases.Theantiinflammatoryactionofneemisbyinhibitingprostaglandin Eand5HTandwhi chdow nregulate inflammation. Similarly it will help to reduce inflamation in our study UBI Q gel contains neem also.The role against becterial contamination actionthat isexplainedby“Azadiachtin”that is famous to act on bacterialcellwallandthusunintentionallyinhibit the growth ofbacteria,[12]also the breakdownof cell wall disturbs osmotic pressure and leads tocelldeath. Recently, this medicaments were tried for experimental models for its protective effects of curcumin and beta-carotene on cisplatin which induces toxicity[13].

This study shows that Curcumin oral gel and UBI-Q^{TM}tonic gum gel both effectively reduces gingival inflammation and gain in attachment level.

Conclusion

As to conclude from this study local drug delivery agents in the different form used as adjunct to scaling & rootplaning reduces inflammation. Curcumin gel and combination of Coenzyme 10 &Betacarotene gel improves periodontal health. Patients having Periodontal Diseases and on Maintainance Pahse with or without systemically involved patients thease agents can be used with scaling and root Planing procedures.

Limitations of Study

In this study long term follow up was required. Both medicament concenctrations amount should be specified. Microbiological analysis can provide better results about becterial load.

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