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Original Research

Comparative evaluation of adjunctive use of four commercially available antimicrobial topical gels in chronic gingivitis: A clinical study

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ABSTRACT

Aim: The aim of the study was to evaluate the effect of four topical antimicrobial dental gels as an adjunct to mechanical plaque control in chronic gingivitis patients.**Materials and Methods:** This was a randomized four arm parallel study including forty systemically healthy patients with chronic generalized gingivitis (MGI>1). They were randomly assigned into four groups i.e, group one- Curcuma gel, group two- Chlorhexidine gluconate gel group three- Povidone Iodine gel, group four- Metronidazole gel. After a thorough scaling, the subjects were instructed to use the topical gel assigned to them twice a day for a period of three weeks. The clinical parameters viz. Plaque Index (PI), Modified Gingival Index (MGI) and Sulcus bleeding index (SBI) were recorded at baseline and at the end of the study period (three weeks). Intra and inter-group comparisons of clinical parameters were done using appropriate statistical tests.
Results: No significant differences were seen among the four study groups with respect to mean PI and SBI scores at three weeks. However, there was significant difference with respect to mean MGI among the four study groups. Post-hoc analysis showed that group two had significantly lower reduction in mean MGI than Group one. **Conclusion:** In the present study the chlorhexidine group showed more reduction in MGI compared to other groups. Further studies with a larger sample size are required to attribute the effect of topical gel application on gingival status..

Introduction

Gingivitis is inflammation of the gingiva which is characterized as reversible disease. Bacterial plaque biofilm is the main etiological agent in gingivitis. Mechanical plaque control like scaling and root planing which disrupts the biofilm is the first advocated step in the management of plaque induced gingivitis and periodontitis and is a crucial phase of periodontal therapy. The goal of therapy is to primarily reduce the etiologic factors to decrease or eliminate inflammation, thereby allowing gingival tissues to heal. Appropriate periodontal maintenance protocol that includes personal and professional care is important in preventing re-initiation of inflammation. With the development of improved, practice-oriented carrier systems, the focus in periodontal therapy is increasingly relying on locally applied agents.

Chlorhexidine is one of the most commonly used antiseptics, antimicrobial and anti-plaque agents in the field of dentistry. It is available as antiseptic skin creams, gels, mouth rinses and also as a disinfectant which is used to prepare the skin for surgical procedures.[1] Curcuma longa, a member of ginger family, is indigenous to Southeast Asia, and has long been cultivated and used in India. Turmeric (haldi), a rhizome of Curcuma longa, is a flavourful spice. The active constituents of turmeric are the flavonoid curcumin and various volatile oils. Curcuma longa is also used externally for inflammation of oral mucosa. Curcumin (active constituent of turmeric) has been used for

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decades as a dye, flavouring, and medicinal herb.[2] Povidone-iodine is a multivalent broad spectrum local antiseptic which is anti-bacterial and anti-fungal. It is recommended for relief of painful infections and inflammatory conditions of the skin, mouth, pharynx and as a routine mouthwash.[3] Metronidazole is antibacterial primarily against obligate anaerobic organisms.[4] Till date, there is no study comparing Chlorhexidine, Curcumin, Povidone-iodine and Metronidazole topical application in gingivitis. In the present study, the effect of topical application of the above mentioned gels have been evaluated as an adjunct to scaling over period of three weeks in patients with chronic gingivitis.

Materials and Methods: The present study was a single blinded, randomized four arm parallel design. Ethical clearance was obtained from the Institutional Ethical Committe. All the patients were informed about the nature of the study and informed consent was taken. The inclusion criteria was systemically healthy patients aged between 16 - 45 years with chronic generalized gingivitis (MGI>1), probing depth ≤ 3mm and clinical attachment loss =0 and patient who had not received any periodontal therapy for past six months. The exclusion criteria were subjects with known allergies to constituents of formulations, antibiotic intake within the three months preceding the study, smokers, alcoholics and pregnancy and lactating women.

Patients were recruited from outpatient block, Department of Periodontics. Sixty three systemically healthy patients with chronic generalized gingivitis were assessed for the study. Forty patients met the inclusion criteria and they were randomly assigned by block randomization into four groups with ten each i.e group one- Curcuma gel (one gm of gel contained ten mg of extract of curcuma longa; Abbott Pharmaceuticals, India); group two- Chlorhexidine gluconate gel (1% w/w; ICPA, Mumbai, India); group three- Povidone Iodine gel (Povidone-Iodine 10 % w/w; Win Medicare, Delhi, India); group four- Metronidazole gel (1gm of gel contained 10mg of metronidazole; Lekar Pharmaceuticals, Mumbai, India). After a thorough scaling, the subjects were instructed to apply pea sized gel assigned to them twice a day after brushing and to leave it for 5-10 minutes before rinsing for a period of three weeks. No other oral hygiene instructions were given to the patients like flossing or oral rinses. The clinical parameters viz. Turesky Glickman Gilmore modification of Quigley Hein Plaque Index (PI)[5], Modified Gingival Index (MGI)[6] and Sulcus Bleeding Index (SBI)[7] were recorded at baseline and at the end of the study period i.e three weeks. The examiner who recorded the parameters at baseline and post scaling three weeks was unaware of the gel which the patient was instructed to use, ensuring single blindness of the study.

Statistical analysis:

All the analysis was done using SPSS version 14 (SPSS, Chicago, IL). A p-value of <0.05 was considered statistically significant. Inter-group comparisons were done using ANOVA with post-hoc Tukey's test. Intra group comparisons were done using paired t test.

Results:

There were no significant difference in the mean PI, MGI, SBI among the four groups at baseline (p=0.089, 0.203, 0.089) respectively. There was significant reduction in the mean PI, MGI and SBI at three weeks when compared to baseline (P<0.001, <0.001 and <0.001) in group one, two, three and four respectively (Table 1). Significant difference was not found among

the four study group with respect to mean PI and SBI scores at three weeks (p=0.075 and 0.084 respectively). However, there was significant difference with respect to mean MGI among the four study groups (p=0.03). Post-hoc analysis showed that group two had significantly lower mean MGI than Group one. No other significant differences were seen with respect to MGI at three weeks (Table2).

Table 1: Intra group evaluation from baseline to 3 weeks post scaling.

Group		BL		3 weeks		Difference		p-value
		Mean	SD	Mean	SD	Mean	SD	
1	PI	0.69	0.14	0.18	0.05	0.51	0.12	<0.001; S
	MGI	1.17	0.35	0.33	0.09	0.84	0.31	<0.001; S
	SBI	0.71	0.09	0.04	0.04	0.67	0.09	<0.001; S
2	PI	0.60	0.08	0.15	0.02	0.45	0.09	<0.001; S
	MGI	1.19	0.45	0.20	0.10	0.99	0.43	<0.001; S
	SBI	0.65	0.15	0.05	0.05	0.60	0.15	<0.001; S
3	PI	0.67	0.11	0.14	0.02	0.53	0.13	<0.001; S
	MGI	1.26	0.36	0.23	0.12	1.03	0.41	<0.001; S
	SBI	0.54	0.20	0.02	0.01	0.52	0.20	<0.001; S
4	PI	0.59	0.10	0.19	0.09	0.40	0.10	<0.001; S
	MGI	1.48	0.18	0.22	0.10	1.26	0.18	<0.001; S
	SBI	0.66	0.15	0.08	0.09	0.58	0.15	<0.001; S

BL – Baseline; 3W- 3 weeks post scaling; NS – Non significant; S- Significant

Table 2: Inter group comparisons of PI, MGI and SBI at baseline and 3 weeks post scaling.

	GROUP								p-value	Post-hoc test
	1		2		3		4			
	Mean	SD	Mean	SD	Mean	SD	Mean	SD		
BL PI	0.69	0.14	0.60	0.08	0.67	0.11	0.59	0.10	0.089; NS	-
BL MGI	1.17	0.35	1.19	0.45	1.26	0.36	1.48	0.18	0.203; NS	-
BL SBI	0.71	0.09	0.65	0.15	0.54	0.20	0.66	0.15	0.089; NS	-
3W PI	0.18	0.05	0.15	0.02	0.14	0.02	0.19	0.09	0.075; NS	-
3W MGI	0.33	0.09	0.20	0.10	0.23	0.12	0.22	0.10	0.03; S	Group 1> Group 2
3W SBI	0.04	0.04	0.05	0.05	0.02	0.01	0.08	0.09	0.084; NS	-

BL – Baseline; 3W- 3 weeks post scaling; NS – Non significant; S- Significant.

Figure1: Clinical picture of gingivitis baseline

Figure 2: Clinical picture after 3 weeks post scaling

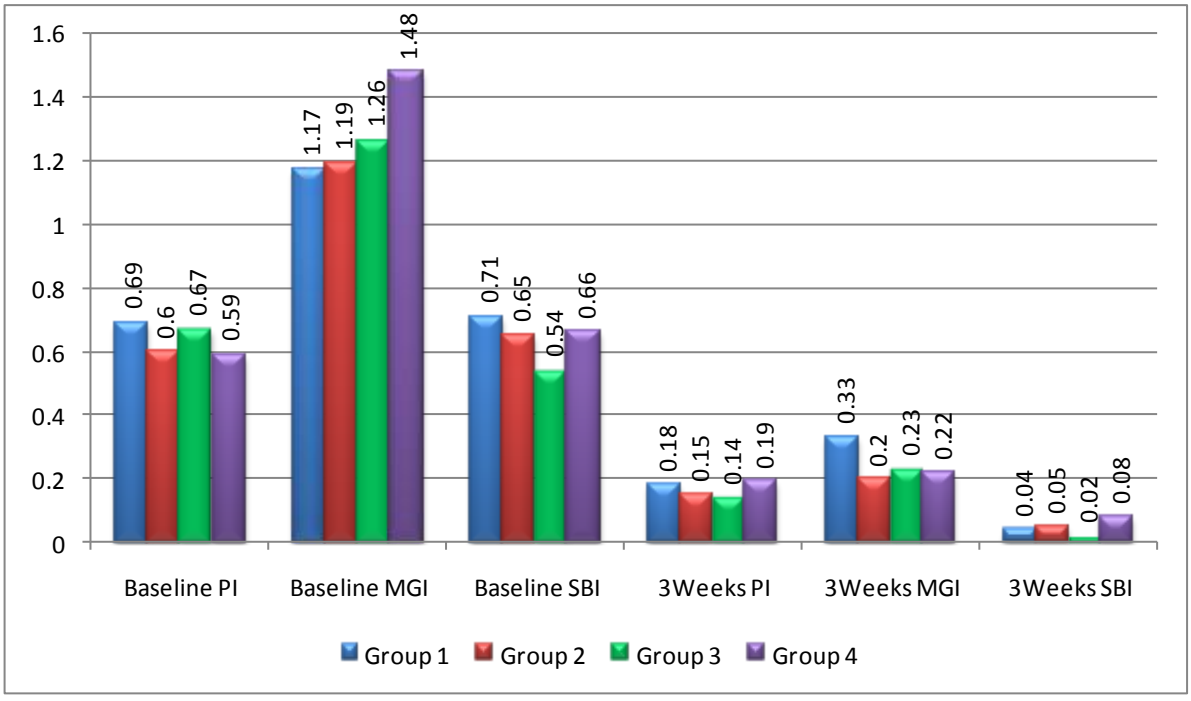

Figure 3: Graphical representation of clinical parameters at baseline & at 3 weeks post scaling among four groups

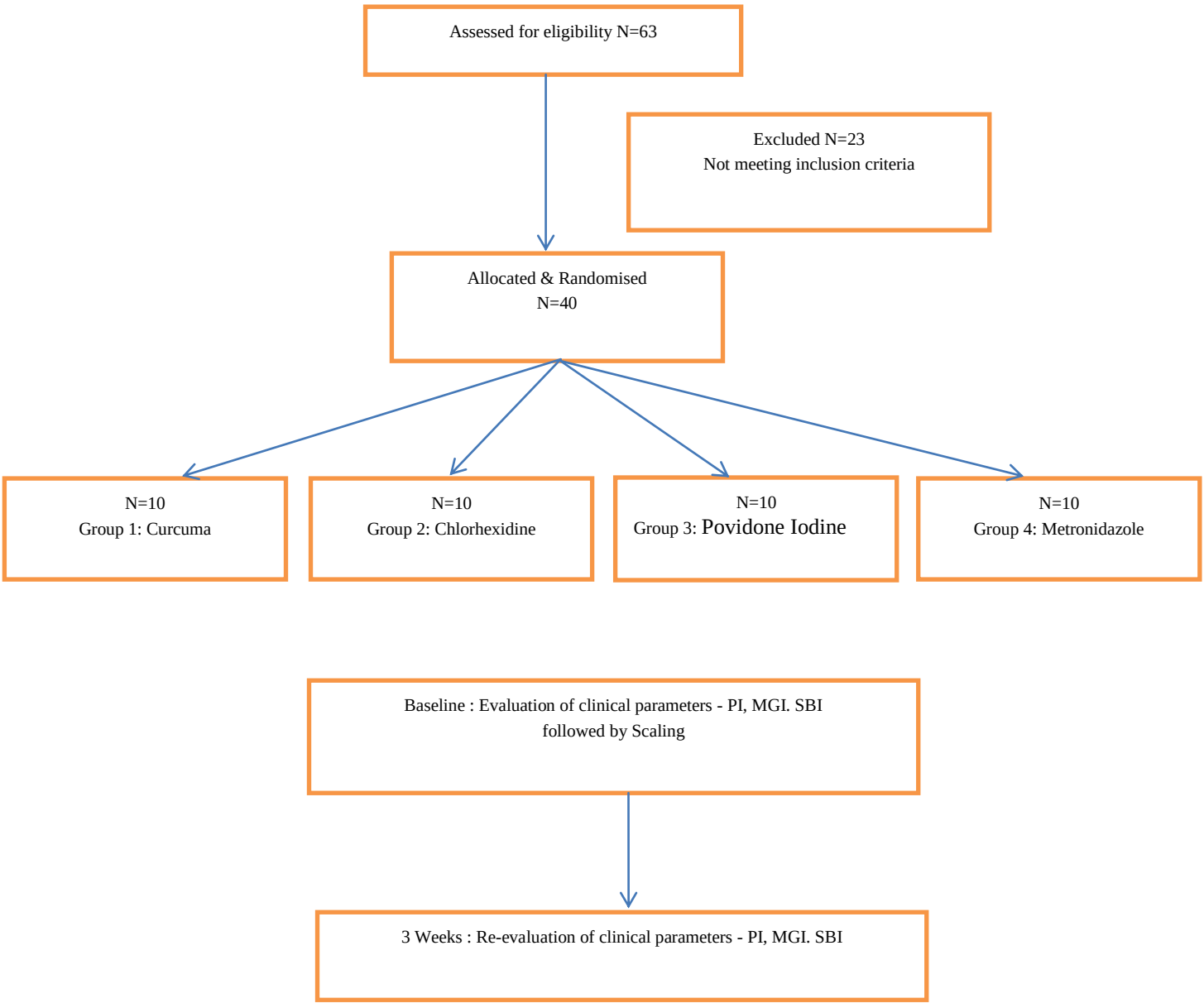

Figure 4: Consort diagram showing the patients allocation and follow up

Discussion:

Dental plaque bacteria play a key role by which the most common types of oral disease occur – dental caries, gingival and periodontal diseases. Plaque is the primary etiological agent for the inflammation of the gingival tissues.[8] Therefore, disruption and elimination of plaque is key to success for maintaining good oral hygiene. Secondly, mechanical cleaning methods are inadequate to reduce gingivitis.[9] Hence professional assistance is required to maintain periodontal health and this includes a regular oral prophylaxis and an adjunct to mechanical plaque control. Topical application of antiseptics have been tried and tested as adjuncts to mechanical methods which can reduce plaque-associated gingivitis. Chlorhexidine, Triclosan, Povidone iodine and assorted phenolic compounds have been used successfully as anti-plaque agents.

Chlorhexidine gluconate (CHX) has been considered as a gold standard for the reduction in the plaque and is used as mouthwash and gels for the treatment of gingivitis. It acts on the cell walls of the microorganisms by causing permeability and leakage of the cell contents leading to cell death.[1] Various studies have demonstrated the efficacy of chlorhexidine in the treatment of gingivitis, all of which showed positive results.[10,11,12]

Anti-inflammatory property of turmeric has been studied extensively which demonstrated significant reduction in inflammation. Very few studies have been done regarding curcuma gel as antiplaque agent. Muglikar et al,[13] Waghmare PF et al,[14] Gottumukkala et al,[15] Behal et al[16] studied the efficacy of curcumin in gingivitis patients and reported positive benefits of curcuma.

The improvement seen in the CHX group of the present study i.e MGI reduction is in accordance with previous studies, this could be attributed to the anti-inflammatory, antibacterial and antiplaque effects of CHX compared to the other agents.

Conclusion:

In the present study the chlorhexidine group showed better result compared to other groups. Further studies with a larger sample size are required to attribute the effect of other topical gel application on gingival status.

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