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EFFICACY OF TOPICALLY APPLIED H2 RECEPTOR ANTAGONIST GEL IN SUBJECTS WITH GENERALIZED CHRONIC GINGIVITIS

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ABSTRACT

Inflammatory disease affecting the gingiva is prevalent in individuals of all age groups. It is caused by microorganisms such as porphyromas gingivalis, tannerella forsythia and treponema denticola that reside in the gingival sulcus and cause gingivitis. Every individual responds differently to these pathogens depending on their immunity and the virulence power of the bacteria. Scaling and Root Planing procedures do not eliminate the bacteria alone. Therefore, host modulative agents are used as an adjunct to the non surgical therapy. These immunomodulative agents suppress the proinflammatory mediators to produce a therapeutic effect. Histamine exerts certain effects on cells which are opposed by H2 receptor antagonists. These receptors also obstruct the process of inflammation.

KEYWORDS: Gingivitis, Histamine, H2 Receptor Antagonists, immunomodulation, mast, cells, gel, ranitidine.

INTRODUCTION

Mast cells are involved in the propagation of inflammation by slowly releasing histamine, heparin, eosinophilic chemotactic factor and bradykinin into the gingival tissues present in the cytoplasmic granules. Histamine produces tissue inflammation by binding to specific cellular receptors (H1, H2, H3, H4) located on the surface of cells like macrophage, monocyte and neutrophils. H2 receptor antagonist opposes the effects of histamine on the cells and obstructs the process of inflammation[1] by eliminating histamine's effects of chemotaxis, phagocytosis, superoxide anion production, and the secretion of tumor necrosis factor alpha (TNF- α) and interleukin-12 (IL-12) by macrophages via the H2 receptor.

Histamine-mediated increase in IL-1 induced by IL-6 synthesis is completely reversed. H2 receptor antagonists exerts its immunomodulative effects by inhibiting the activity of suppressor T – lymphocytes, increase the production of IL-2 and the natural killer cell activity is enhanced.[2]

H2 receptors play a quintessential role in regulation of inflammatory reactions that are histamine mediated and various physiological events extending from tissue inflammation and gastric acid secretion. Neutrophil chemotaxis has been shown to increase by the treatment with H2 receptor antagonist. Neutrophil production of superoxide (O2) and hydrogen peroxide (H2O2) is altered in a dose dependent manner. B-cell and T-cell functions are modulated by cell surface H2 receptor interactions and histamine.[3] B-cell production of immunoglobulin (immunoglobulin IgG and IgM) is directly inhibited by histamine which can be blocked by treatment with H2 receptor antagonists. Taken together, these observations suggest that H2 receptor antagonists may enhance host defenses through both humoral and cellular pathways and result in reduced inflammation.[4]

AIM

The aim of this study is to compare the effects of topically applied H2 receptor antagonist as an adjunct to Scaling and Root Planing with Scaling and Root Planing alone.

MATERIALS AND METHODS

The study design was a double-blind, randomized, placebo-controlled clinical trial in twenty systemically healthy individuals between the ages of 18 and 65 years for a period of three weeks. It was approved by the Ethical Committee of the Subharti Dental College & Hospital, Meerut. Informed consent was taken from all patients. Patients on antibiotics/anti-inflammatory therapy for the last six months, pregnant females and unwilling patients who did not agree for complete treatment were excluded from the study. Patients were selected randomly in two groups.

Patients with Generalised Chronic Gingivitis were included in the study. Twenty patients were selected who were divided in two groups consisting of ten patients each. Group 1 patients were treated with single sitiing scaling and root planing [Fig 1] alone while Group 2 patients were treated with single sitting scaling and root planing along with topical H2 antagonist receptor gel (Ranitidine gel) application [Fig 3]. This gel was formulated at a concentration of 0.25 %. Patients were instructed to use the gel twice a day for three weeks.

The clinical parameters recorded at baseline with Loe and Silness gingival index (1963), Silness and Loe (1963) plaque index, Oral hygiene index- simplified Greene and Vermilion, Ainamo and Bay bleeding index (1975) at baseline and after three weeks. Patients were recalled 3 weeks post operative for recording the clinical parameters in Group A [Fig 2] and Group B [Fig 4]

PHOTOGRAPHS

Scaling and Root Planing

PRE OPERATIVE

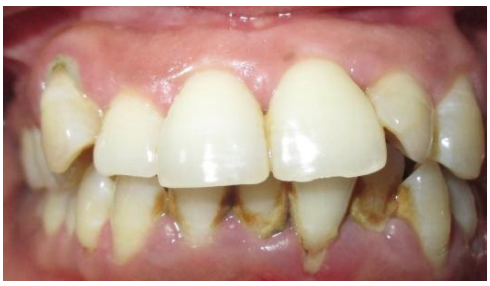


Fig. 1.

POST OPERATIVE 3 WEEKS

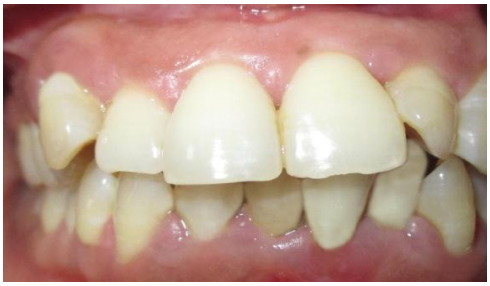


Fig. 2.

SCALING AND ROOT PLANING WITH RANITIDINE GEL

Pre Operative

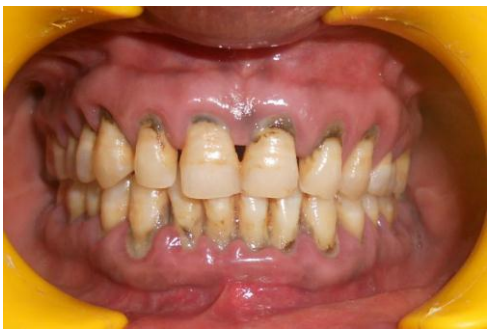


Fig. 3.

Post Operative Three Weeks

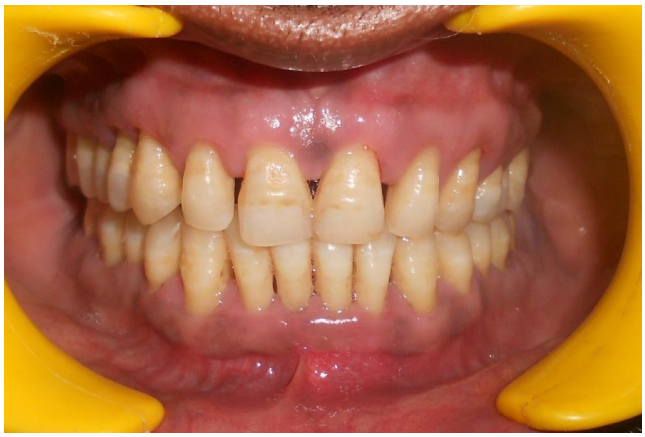


Fig. 4.

Statistical analysis

The data obtained was compared statistically. Paired '*t*' test was carried out for intergroup comparison and unpaired 't' test for intragroup comparison. A $P \leq 0.05$ was considered statistically significant.

RESULTS

The clinical parameters showed significant reduction after three weeks in both the groups.

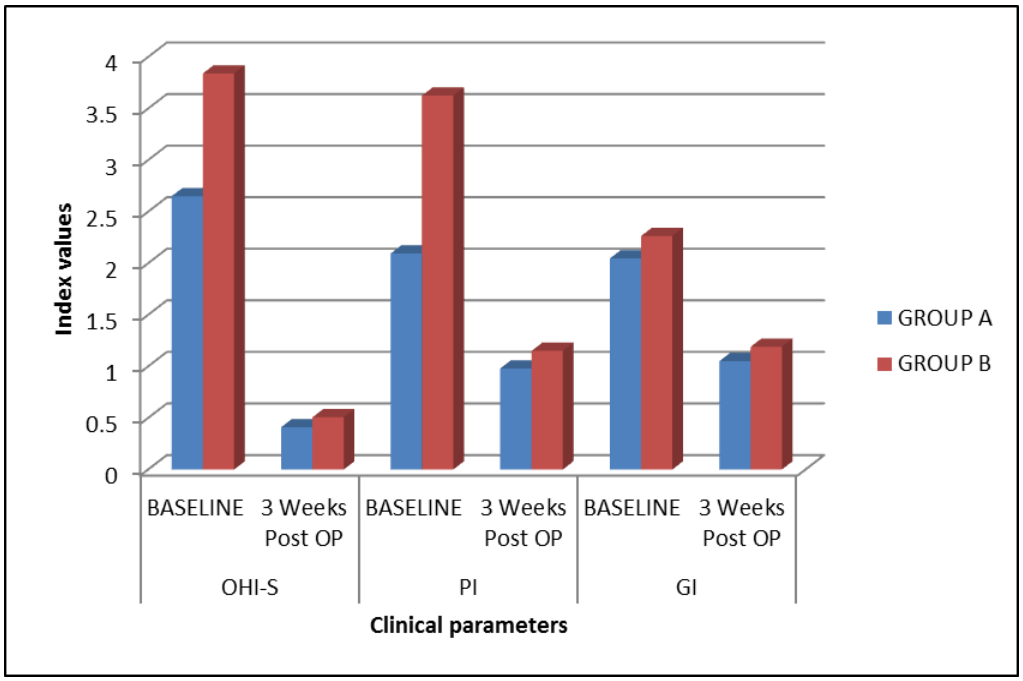
Table 1: The intra-group comparison between Pre-scores and Post 3 weeks for the following clinical parameters is significant.

S.No.	Parameters	Group A (srp)			Group b Topical Gel (rantidine) +Srp		
		Pre Scores	Post 3 Weeks	P Value	Pre Scores	Post 3 Weeks	P value
1	Ohis Scores	2.65±.762	.41±.145	.0000** P<.05 (SIG.)	3.84±1.29	.506±.371	0000** P<.05 (SIG.)
2	Plaque Index	2.094±.786	.98±.407	.0015** P<.05 (SIG.)	3.625±2.521	1.15±.530	.0080** P<.05 (SIG.)
3	Gingival Index	2.046±.689	1.05±.197	.0005** P<.05 (SIG.)	2.264±1.39	1.19±.307	.0331**P<.05 (SIG.)
4	Gingival Bleeding Index	48.34±5.98	9.58±2.312	.0000** P<.05 (SIG.)	50.05±15.214	12.825±2.918	.0000** P<.05 (SIG.)

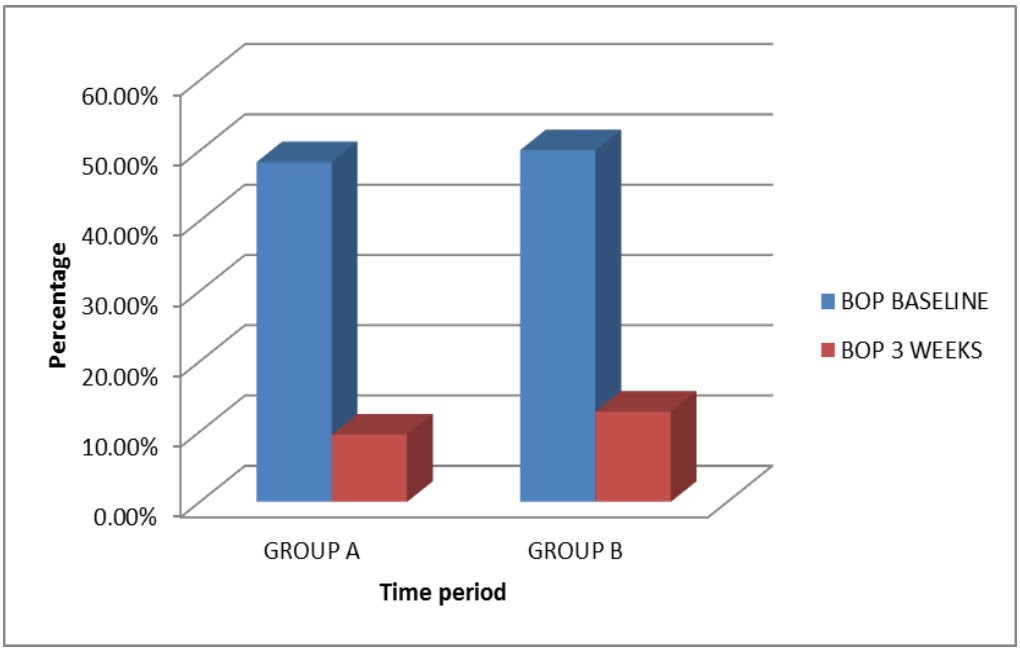
However, inter group comparison showed no statistical difference post non-surgical treatment.

Table 2: The inter-group comparison is non-significant for the following parameters.

S.No.	Time points	Probability of indpendent " t" test b/w the two groups			
		Ohis Scores	P.I.	G.I.	G.B.I.
	POST 3 WEEKS (Group A and B)	.4608* P>.05 (N.S.)	.4321* P>.05 (N.S.)	.2602* P>.05 (N.S.)	.0133** P<.05 (SIG.)



Graph 1: These are the index values of clinical parameters at baseline and 3 weeks post-operative. (Group A and Group B).



Graph 2: This is the percentage and time period based on bleeding on probing at baseline and 3 weeks post-operatively. (Group A and Group B).

DISCUSSION

In the present study ranitidine gel is a powerful H2 receptor antagonist that eliminates effects of histamine on chemotaxis, superoxide anion production and phagocytosis by phagocytes. These receptors are potent inhibitor of leukocyte migration which is elicited by porphyromonas gingivalis. The leukocytes migrate towards the site of infection and therefore prevent tissue destruction and affect cell populations present in the inflammatory cell infiltrate. H2 receptor antagonists may enhance host defences through both humoral and cellular pathways and result in reduced inflammation.[5]

Studies examining H2 receptor antagonists showed increased neutrophil chemotaxis, overriding the suppressive effects of histamine.[6] Mechanical removal of bacteria reduces tissue destruction, not all individuals respond predictably to elimination of bacteria alone.[7] Therefore, in addition to bacterial control, adjunctive host modulation therapy may aid in the prevention of the disease or enhance clinical therapeutic responses in the susceptible host.[8]

Histamine inhibits lysosomal enzyme release, respiratory burst, adhesion, chemotaxis, and calcium influx in agonist-stimulated human neutrophils. All of these inhibitory effects of histamine on human polymorphonuclear leukocytes are the consequences of H2 receptor activation, which causes the elevation of intracellular cyclic AMP concentrations.[9]

Bathini et al[10] did a randomized, double-blind clinical study to assess the antiplaque and anti-gingivitis efficacy of Aloe vera mouthwash on gingivitis subjects to show the various beneficial properties such as anti-inflammatory (due to the presence of sterols and anthraquinones) and antiseptic activity. Mulikar S et al[11] studied the efficacy of curcumin mouth wash as an adjunct to scaling and root plainng in the treatment of chronic gingivitis and to compare chlorhexidine in terms of its anti-inflammatory and anti-microbial properties. They concluded that curcumin is comparable to chlorhexidine as an anti-inflammatory mouth wash and it is an effective adjunct to mechanical periodontal therapy. Davis *et al* [12] tested the anti-inflammatory and wound healing activity of aloe vera due to presence of growth substance mannose-6 phosphate.

CONCLUSION

In this clinical study it can be concluded that inflammatory components of the gingival disease are effected by the treatment of H2 Receptor Antagonist. In the end of the study it was concluded that gingiva exhibited change in colour and inflammation decreased markedly.

Significant anti-inflammatory property was seen with the use of H2 Receptor antagonists gel. It can be used as an adjunct to non-surgical therapy for resolving inflammation in plaque induced gingivitis subjects. Present study has an quintessential impact and use of such formulations can benefit society with low socioeconomic status.

CONFLICT OF INETREST: NIL.

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