ORIGINAL RESEARCH PAPER
Volume-6 | Issue-11 | November-2017 | ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ROLE OF ANTIOXIDANTS AS AN ADJUNCT TO THE PERIODONTAL TREATMENT- A PLACEBO CONTROLLED RANDOMIZED CLINICAL TRAIL

Periodontology

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ABSTRACT

Periodontal treatment involves a multipronged approach and use of antimicrobial agents, anti -inflammatory agents both systemically and local has shown encouraging results although the results of many studies are not in unison, recent approach of using the Antioxidants as an adjunct to periodontal therapy has gained momentum hoping that they will minimize the host cell destruction by the superoxides or reactive oxygen species. Present study has evaluated the effect of Antioxides in the treatment of periodontitis, it has been observed that there were some initial improvements in the gingival bleeding scores in the Atioxidant group.

KEYWORDS

Antioxidant, Periodontitis, Reactive oxygen species, Superoxides , Lycopene.

Introduction:

Periodontitis is a multifactorial disease having agent, environmental and host related factors playing a vital role in the initiation, progression of disease. Although microbiological factor is said to be inevitable causative factor in the form of microbial plaque, the extent of the damage and the aggressiveness of the periodontitis is mainly attributed to the genetic composition of the host which decides the way the etiological agents are tackled with may be either in the manner of its inflammatory reaction or the other immunological defensive mechanisms. Although the immunological defensive is put up by secretion of many immunoglobulins and antibodies, primarily most acute response is in the form of reaction by the Polymorpho Nuclear Neutrophils (PMNs), PMNs uses various mechanisms like phagocytosis, which involves engulfing a foreign body or a microorganism and encapsulating it in a sac like structure called phagosome into which the reactive oxygen species along with hydrolytic enzymes are secreted, in the process of neutralizing or killing the pathogenic microorganisms by the way of reactive oxygen species a considerable amount of superoxides are released into the surrounding tissues thus inflicting damage to the normal tissues, recent understanding of the destruction occurring in the vicinity of the periodontal supporting tissues a majority of the researchers were of the opinion that the uncontrolled super oxide activity is causing a considerable damage to the periodontal tissues in patients showing higher rate of bone loss, this has lead to the concept of supplementing the periodontal treatment with the Antioxidants and thereby minimizing the uncalled for damage to the host tissues.

Aim of the study:

The aim of this study was to investigate the benefits of adjunctive use of anti-oxidants after phase I therapy when compared with the phase I therapy.

Materials and method:

A total of 853 subjects aged between 20 to 60 years visiting the postgraduate clinic of periodontology who were screened and confirmed to be periodontitis patients were selected after thorough scrutiny for lack of any systemic disease, long term medication, pregnancy, lactation and any other deleterious oral habits like tobacco chewing and smoking, those who were selected were free of any allergic history to the drugs and had not underwent any form of periodontal treatment nor had taken antibiotics in a period upto 6 months before enrolling to this study. All the subject were thoroughly examined and OPGs were taken to assess the extent of damage and gingival bleeding around each tooth was noted and graded as 0 when no bleeding was noticed, 1 when when there was bleeding which appeared with a delay of 5-8 Seconds and graded as mild gingivitis, a score of 2 was given and graded as moderate gingivitis when bleeding appeared within 5 seconds and a score of 3 was given when bleeding was spontaneous and it was noted as advanced gingivitis, and clinical attachment loss (CAL) around each tooth was recorded with Williams periodontal probe taking Cemento Enamel Junction(CEJ) as reference point, all the examiners recording the CAL were trained to use optimal probing force of25N (Approx),every individual patient was given phase I therapy and all of them were given primary oral hygiene instructions after which the individual was handed over a sachet containing 28 capsules of either Antiooxidant capsule(Lycopene 4mg) or Placebo (Gelatin Capsule containing Dextrose), the sachets were blinded and all the paticipants were informed about the study and their consent for participation was taken, they were asked to consume a capsule everyday night before bed time for a period of 28 days and then report to the hospital on 29th day, routine checkup was done on the 29th day and Gingival Bleeding were noted and they were asked to revisit after 5 months for reevaluation, all the patients except 3 females and and two males reported after 5 months for reevalution, at this appointment the Gingival bleeding scores were again recorded and OPGs were taken to assess the bone levels 6 months after the initial visit.

Classification of patient's Gingival condition.

Patients in whom there was no bleeding after probing –No gingivitis All the patients who have recorded less than 30 percent of sites (4 sites per tooth were examined) with mild bleeding- Mild Gingivitis All the patients who have recorded more than 30 percent of sites (4 sites per tooth were examined) with severe and spontaneous bleeding- Advanced gingivitis.

Classification of patients Periodontal condition:

No attachment loss were classified as periodontally healthy

Patients with 3 to 4 mm Clinical attachment loss in less than 30 % of sites examined were classified as patients with Localized periodontitis.

Patients with 4to 6 mm Clinical attachment loss in more than 30% of sites examined were classified as patients with Generalized periodontitis.

Results:

A total of 848 people completed the study among which 426 were females and 430 were males excluding 3 females and 2 males who did not report for 6 month evaluation. There was no significant difference between the Ages of the two groups i..e Phase I and Antioxidase group and Phase I and Placebo group, there was no significance with P value less than 0.05, during the initial evaluation all the patients for the attachment loss.

S. no.	Group	Total number of patients	Patients with mild gingivitis at base line	Patients with severe gingivitis at base line	Patients with mild gingivitis at 2nd visit (after 28 days)	Patients with severe gingivitis at 2nd visit (after 28 days)	Patients with mild gingivitis at 3rd visit (6months)	Patients with severe gingivitis at 3rd visit (after 6 months)
1	Placebo+Phase I therapy	415(208 males and 207 females)	87(33males and 54 females)	328 (153males and 175 females)	258 (118 males and 140 females)	157 (87 males and 70 females)	203 (102 males and 101 females	212 (100 males and 112 females)
2	Antioxidant+Phase I therapy	433(214males and 219 females)	98(43 males and 55 females	335 (158 males and 177 females)	240 (102 males and 138 females)	193 (84 males and 109 females)	210 (100 males and 110 females)	223 (121 males and 102 females)

S. no	Group	Total number of patients	Patients with localized periodontitis at base line	Patients with generalized periodontitis at base line	Patients with localized periodontitis at 2nd visit (after 28 days)	Patients with generalized periodontitis at 2nd visit (after 28 days)	Patients with localized periodontitis at 3rd visit (after 6 months)	Patients with generalized periodontitis at 3rd visit (after 6 months)
1	Placebo+Phase I therapy	415 (208 males and 207 females)	183 (102 males and 81 females)	232 115 males and 117 females)	192 (102 males and 90 females)	223 (109 males and 114 females)	186 (105 males and 81 females)	229 (110 males and 109 females)
2	Antioxidant+Phase I therapy	433 (214 males and 219 females)	192 (98 males and 94 females)	241 (118 males and 123 females)	196 (99 males and 125 females)	237 (115 males and 122 females)	198 97 males and 101 females)	235 (118 males and 117 females)

The analysis of results showed that there was a significant improvement in the gingival bleeding scores of both males and females at the first visit and subsequent visit which was statistically significant when compared to base line scores, but the results were not significant when compared at 6 months. In the same way there was no significant improvement in the placebo v/s antioxidant group both at base line and subsequent visits although there was slight improvement in the gingival bleeding scores of antioxidant group it was not statistically significant.

The periodontal attachment loss has improved in both the groups in all subsequent visits when compared to the baseline but the difference has diminished at the 6 months post treatment visit.

The females showed slightly higher improvement in both gingival bleeding and periodontal clinical attachment loss but the results were not statistically significant at any point of time.

Discussion:

Approximately 18 to 20 % of adults are known to be affected by periodontitis all over the world at one or other point of their life time.[1] There had been intense scientific research and speculation over the treatment of periodontitis so as to minimize the morbidity caused by the disease there by reducing the risk of teeth being lost, but periodontitis being a multifactorial disease its treatment not only should target the etiological agent that is microbial plaque but also the Host response should be tuned to be optimum without causing exacerbated or under response when the host has been challenged in the form of periodontitis, the clear analysis of the disease trends makes it clear that the excessive host response and subsequent acute and chronic inflammatory reactions which sets in after a microbial challenge is inducting a major damage to the periodontal attachment tissues. The neutrophils which release reactive oxygen species to kill the intracellular microorganisms and as a signaling mediator in the cells for various cellular functions also causes oxidative stress when the process is continuous for extended period of times as occurs in the periodontitis, which may trigger cell death, inflammatory responses and perturbation of tissue hemostasis in a row [2]. The key in modulating the host response may lie in the curbing the action of superoxides, few studies in the past have shown a positive response when a topical application of dentifrice containing green tea extract were applied over periodontitis affected areas in rat models when compared with a placebo dentifrice[3]. Recently, it was shown that catechin suppressed LPS-induced inflammatory bone resorption, and protected against alveolar bone loss in mice[4]. Catechin may be effective in preventing gingival and periodontal inflammation and bone loss. Several proteolytic enzymes, including gingipains, collagenases, and dipeptidyl aminopeptidase, produced by *P. gingivalis* also play important roles in the pathogenesis of periodontitis by hydrolyzing serum and tissue proteins, leading to tissue destruction[5]. Therefore, inhibitors of these enzymes may play important roles as valuable therapeutic agents. Furthermore, the epidemiological relationship between the intake of green tea and periodontal disease also demonstrated a significant reduction in periodontal pocket probing depths [6] and tooth loss [7]. Furthermore, locally delivered lycopene gel as an antioxidant in the treatment of chronic periodontitis was effective in increasing clinical attachment and reducing gingival inflammation, probing depth, and oxidative injury [8]. In the present study we tried to evaluate benefits of the systemically administered antioxidants in the periodontitis patients after phase I therapy and the study has revealed that the administration of Anti-oxidants showed a marginal improvement in the gingival bleeding scores at the initial visits the results were however not long lasting and there was no significant difference between the placebo group and Antioxidant group at the end of 6 months post-operative period.

Conclusion:

Within the limitations of the present study we would like to conclude that the beneficial effects of systemically administered Antioxidants were seen only for a short period of time and the gingival bleeding has improved to a greater extent in the Antioxidant group, the periodontitis and clinical attachment has not shown any significant difference between two groups at any point of the study. We recommend an indepth and more multicenter studies to confirm our findings.

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