Mesotherapy using Vitamin C as an anti-inflammatory agent in persistent gingival inflammation: A case series

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Abstract:
Background: Mesotherapy is a minimally invasive procedure which involves local intradermal therapy (LIT) with biologically active substances given in minor quantities to the area of pathology. Vitamin C is an important antioxidant agent which can modulate the attenuation of inflammatory process and enhance tissue repair.

Aim: The aim of this study was to investigate the efficacy of local injections of Vitamin C for treating persisting inflammation of the gingiva.

Materials and Methods: After phase I therapy was completed, five patients with persisting chronic inflammation of the gingiva were injected with the same dosages of Vitamin C into the gingival tissues. Patients were evaluated each week for resolution of gingival inflammation.

Results: Clinical observation showed a significant improvement in inflammation of the injected sites during recall appointments.

Conclusions: LIT with Vitamin C has a synergistic interaction along with scaling and root planing in the treatment of persistent gingival inflammation.

Key words: Anti-inflammatory agents, inflammation, mesotherapy, periodontal therapy, Vitamin C

INTRODUCTION

The clinical signs and symptoms of inflammation of the gingiva differ based on the distribution, severity, and response to therapy varying from those which are localized and amenable to therapy to persisting chronic lesions presenting with redness, bleeding, and different degrees of swelling.[1]

Vitamin C is an important antioxidant agent which can modulate the attenuation of inflammatory process and enhance tissue repair. This nutrient acts as a reducing and antioxidant agent, free radical scavenger, and enzyme cofactor in cells. It regulates the chemotaxis of immunologic cells, initiation of the process of phagocytosis, and release of inflammatory cytokines of catabolic pathways.[2-5] Furthermore, it stimulates the production of Type I collagen that would have been reduced due to inflammation and alters the rate of growth of fibroblasts. It also diminishes scarring by preventing fibrosis and crosslinking between collagen fibers. It is also important in angiogenesis. It functions as a cofactor in the synthesis of hydroxyproline which forms collagen and enhances the vitality and function of endothelial cells.[6]

Mesotherapy is a minimally invasive procedure which involves local intradermal therapy (LIT) with biologically active substances given in minor quantities to the area of pathology. LIT is used when there can be a synergistic interaction with other pharmacological/nonpharmacological treatments, and when it can eliminate the usage of systemic drugs.[7] Oral Vitamin C supplementation has been shown to reduce the risk of periodontal disease, however, there is no clear evidence that local injection of Vitamin C is beneficial in improving periodontal health. Hence, the aim of this study was to investigate the efficacy of local injections of Vitamin C for treating persisting inflammation of the gingiva.

MATERIALS AND METHODS

Patients reporting to the Department of Periodontology were selected for the study with the following inclusion criteria: (1) aged between 20 and 50 years, (2) systemically healthy, (3) diagnosed with plaque-induced gingivitis, (4) plaque level ≥ 50%.

After phase I therapy was completed, five patients with persisting inflammation of the gingiva were injected with the same dosages of Vitamin C into the gingival tissues. Patients were evaluated each week for resolution of gingival inflammation. Clinical observation showed a significant improvement in inflammation of the injected sites during recall appointments.

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The following patients were excluded from the study: (1) those with systemic conditions, (2) pregnant/lactating women, (3) those who had undergone treatment with antibiotics within 1 month before the study, and (4) presence of other factors (smoking, mouth breathing, and local trauma).

The study protocol was approved by the institutional ethics committee, and written informed consent was obtained from the patients after explaining the details of the procedure.

Each patient received oral hygiene instructions and underwent full-mouth scaling and root planing (SRP) using ultrasonic instruments with hand instruments. Mouth rinsing with 0.12% chlorhexidine was advised twice a day. Only those cases with persisting inflammation of the gingiva were included after a maintenance period of 4 weeks [Figure 1]. Five patients with chronic persisting inflammation of gingiva were then injected with Vitamin C.

All injection procedures were performed by the same examiner. The affected region was anesthetized with 1:200,000 lidocaine-adrenaline. Intraepidermal injection with 1 mL (150 mg concentration) Vitamin C was introduced into the keratinized gingival tissues using insulin syringes, which is the mesotherapy approach [Figure 2]. After each session, a rescue analgesic (ibuprofen 200 mg) was prescribed to the patients, which was to be used only if necessary.

The same dosage was repeated 1 week later until inflammation had noticeably subsided and patients were re-evaluated after 1 more week. Patients were last reviewed 1 week after the second injection for the final evaluation. Plaque Index (Silness and Loe, 1964) and Sulcus Bleeding Index (SBI) (Muhlemann and Son, 1971) were recorded before the injection procedure, at 1 week, and at 2 weeks.

**RESULTS**

Improvement in the inflammation was seen in all cases after two injections [Figures 3 and 4]. All the treated patients responded effectively to the treatment and showed satisfaction with the results. None of the patients reported adverse side effects or the need to use the rescue analgesic.

A significant reduction in the plaque index scores was seen in all patients from baseline until the completion of treatment.

Preoperatively, four out of five patients scored 5 and one patient scored 4 on the SBI. Postoperatively, all patients had an SBI score of 3 after one injection visit.

After two injection visits, the SBI score reduced to two in three patients, whereas the SBI score reduced to one in two patients.

**DISCUSSION**

Chronic or resistant inflammation identified by persisting redness, bleeding on probing, and varying grades of tissue edema that can be diffuse or localized persists even with elimination of the etiologic factors and reinforcement of oral hygiene.
Antibiotics or corticosteroids and, subsequently, surgical procedures, if needed, were used conventionally in such cases. These are now commonly avoided due to their side effects. Therefore, safer nonsurgical remedies to treat such conditions or, at least, enhance the tissue healing and decrease the signs and symptoms of inflammation before the surgical procedures are required.\[11\]

In the present study, a 100% reduction in gingival inflammation was seen as observed clinically was seen as observed clinically with improved color, form and from SBI scores, from the average baseline value over the 2 week period [Figure 5].

Single- or multiple-dose intraepidermal Vitamin C injection can be given according to the severity of the condition, with 1-week interval between the doses. Cautious handling of the inflamed tissues is important to prevent tearing and necrosis in tissues with thin gingival biotype.

These results were in accordance with the study by Yussif et al.\[11\] in which a notable improvement in gingival health was seen with the antioxidant usage.

Mammucari et al.\[7\] also observed that dermal mesotherapeutic techniques using anti-inflammatory agents showed encouraging results in the treatment of localized inflammation.

Levels of tissue antioxidants reduce rapidly during inflammation, which leads to escalated production of free radicals at the site.\[12,13\] Therefore, greater antioxidant doses, such as Vitamin C, are essential. Free radicals are stabilized by antioxidants which share electrons with them. Administration of high systemic doses is required for adequate dose to be reached at the region of localized inflammation, which can be detrimental to patients. Hence, the required doses are provided effectively by local injections.\[14\]

The local injection of Vitamin C is more beneficial than topically used Vitamin C dentifrice or gel seen in earlier studies by Daniels et al. and Shimabukuro et al.\[15,16\] as it is water soluble with a superficial penetrative action. The disadvantages associated with topical Vitamin C were a longer time for noticeable improvement, lack of substantivity on the oral soft tissues, reduced absorption, and instability on exposure to heat, light, or air, and localized erosions of enamel.\[17,18\]

Vitamin C works as an enzyme cofactor necessary for formation of collagen which is an important part in connective tissue forming the structure around which new tissue is formed. The walls of blood vessels also contain collagen which provides nutrition and oxygen to chronically damaged mucosal areas, enhancing their healing. Yussif et al. observed a marked reduction in thickness of the epithelium and inflammatory cells and a greater number of new subbasal capillaries with locally injected Vitamin C.\[11\]

CONCLUSIONS

Hence, it is concluded that mesotherapy with Vitamin C has a synergistic interaction with SRP for treating persisting inflammation of the gingiva. Additional studies with longer duration of follow-up are recommended to establish these results.

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Conflicts of interest
There are no conflicts of interest.

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