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Treatment of Oral Soft Tissue Lesions and Wounds Using Nano-Antioxidants Infused Gel: A Case Report

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ABSTRACT

It is a high functional gel containing vitamin C, E and Propolis with a nanoemulsion state. We reported to treat patients who had poorly-healing lesion or large wound defect after minor surgery or ulcer-like lesion by using nanoemulsion gel without any side effects. We discuss the way how these favourable results come out and suggest that it could be an alternative treatment of selective lesion and wound in oral cavity.

Keywords: Nanoemulsion, Propolis, Oral wounds

INTRODUCTION

Nano-antioxidants infused gel is a gel containing vitamin C, E and propolis extract with a nanoemulsion state. *In vitro* and *in vivo* study have demonstrated that it has a good antibacterial effect especially against *Staphylococcus aureus* and *Escherichia coli* [1]. It means that this nanoemulsion is effective in protection of gingiva and treatment of gingival diseases. There was a report about their favourable results of applying nano-antioxidants infused gel on gingival lesions without using antibiotics and mouth rinses [2]. We present cases of outstanding result in oral mucosa lesions and wounds except gingiva.

CASE PRESENTATION

Case 1

A 64-year-old female patient was attended with a 3 days history of painful herpes-like lesion (Figures 1a and 1b). There was no specific finding in medical history. Nano-antioxidants infused gel was applied for twenty minutes a day, 4 days a week on the dental unit chair without any medication (Figure 1c). After 10 days, the lesion was completely healed (Figure 1d).

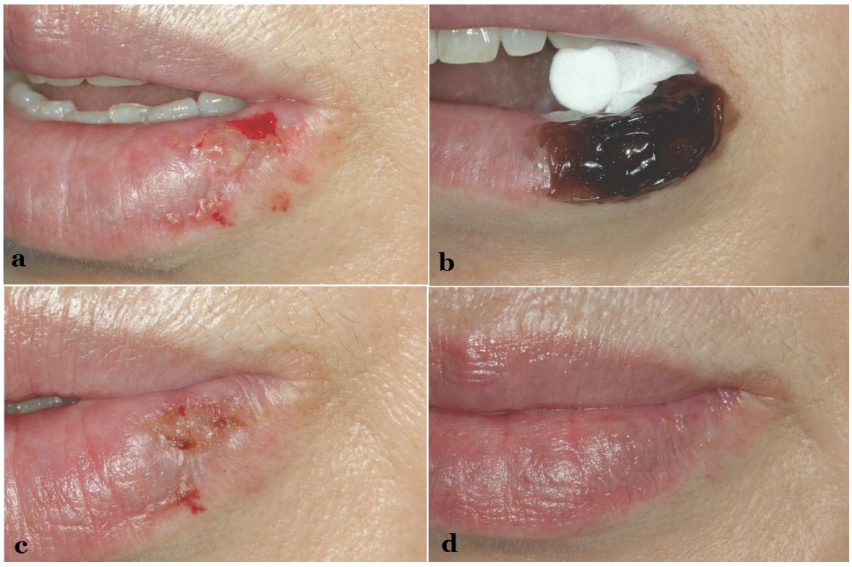

Figure 1 a-Herpes-like lesion on the lower lip; b-Application of nano-antioxidant infused gel; c-Results after 1 day of application; d after 10 days

Case 2

A 23-year-old female patient was referred to the maxillofacial unit as she had found increasing swelling on the floor of mouth (Figure 2a). After diagnosed as a ranula, the mass was excised. The wound was filled with Nano-antioxidants infused gel without any packing material (Figure 2b). The wound was well healed within 10 days (Figure 2c).

Figure 2 a-Excision of ranula; b-Wound filled with nano-antioxidant infused gel; c-Results after 7 days

Case 3

A 37-year-old female patient was diagnosed as a palatal papilloma. After the mass was excised, Nano-antioxidants infused gel was applied (Figures 3a and 3b). The wound was healed well after 10 days (Figure 3c).

Figure 3 a-Excision of palatal papilloma and Wound after excision; b-Application of nano-antioxidant infused gel; c-result after 10 days

Case 4

A 42-year-old female patient was diagnosed as a pleomorphic adenoma. After the mass was excised, packing was done. After 4 days, packing was removed and the wound was filled Nano-antioxidants infused gel (Figures 4a and 4b). The wound was healed well after 4 weeks and completely after 6 weeks (Figures 4c and 4d).

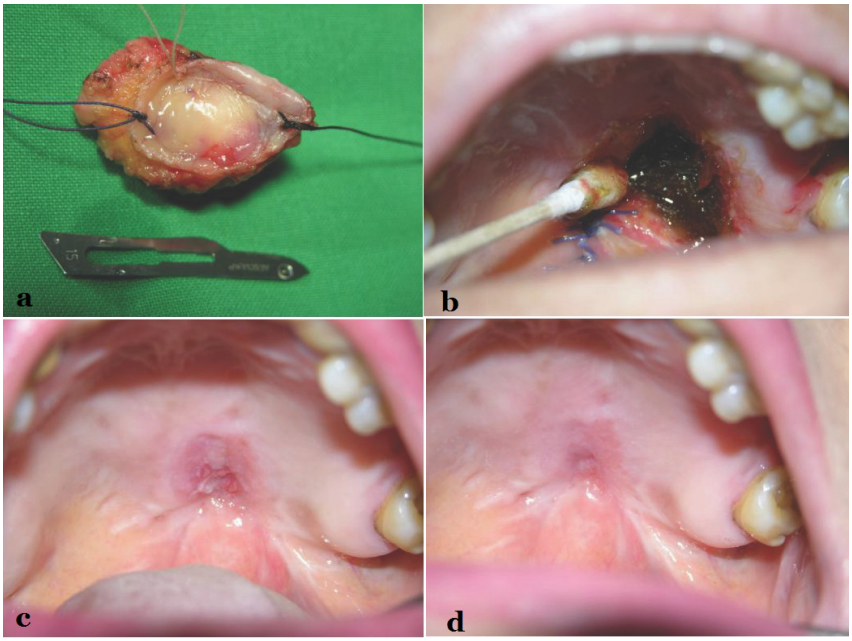

Figure 4 a-Excised mass of benign tumour (pleomorphic adenoma of palate); b-Application of nano-antioxidant infused gel; c and d-Results after 4 and 6 weeks

DISCUSSION

The normal healing cascade begins with an orderly process of haemostasis and fibrin deposition, which leads to an inflammatory cell cascade, characterized by neutrophils, macrophages, and lymphocytes within the tissue. This is followed by attraction and proliferation of fibroblasts and collagen deposition, and finally remodelling by collagen cross-linking and scar maturation. Despite this orderly sequence of events responsible for normal wound healing, pathologic responses leading to fibrosis or chronic ulcers may occur if any part of the healing sequence is altered.

All cases which we reported shown as a rapid healing without any fibrosis or chronic ulcers. It meant that Nano-antioxidants infused gel had played a role in promoting the normal healing process and it could be a solution in the therapy of poorly- healing wounds in the oral cavity. The Nano-antioxidants infused gel could also cover and protect the wound from other pathologic factors in healing period from which Case 2, 3 and 4 were shown to have good result. All good results could be come out from effect and form of containing components in nano-antioxidants infused gel. It consists of antioxidants like vitamin C, vitamin E and propolis which have antibacterial and anti-inflammatory effects. Nanoemulsion state of vitamin C and E are already biocompatible, and they are known to act in immunity and anti-oxidation. Vitamin C has been shown to have a favourable effect in the postoperative treatment of patients with cleft lip and/or cleft palate [3], and also in postoperative nutrition. Vitamin E plays a role in shortening the process of reepithelization. Further, vitamin E creams inhibit the development of mucosal ulcers caused by Doxorubicin [4]. The propolis also promoted wound healing [5].

It is considered that effects of these factors in combination could get good results. Especially, vitamin C and E act synergistically to be provided as an antioxidant. I t has been shown that a topical combination of L-ascorbic acid with D-tocopherol gives fourfold protection against UV- induced erythema, compared to twofold protection by either vitamin alone [6-8].

The form of nano-emulsions (NEs) also had an advantage of healing process. NEs can be defined as oil-in-water (o/w) emulsions with mean droplet diameters ranging from 50 nm to 1000 nm.

Usually, the average droplet size is between 100 nm and 500 nm [9]. NEs have a much higher surface area and free energy than macro-emulsions that make the m an effective transport system. The scientists have investigated the NE containing risperidone (RSP) to accomplish the delivery of drug to the brain via nose. Risperidone NE (RNE) and mucoadhesive NE (RMNE) were characterized for drug content, pH, percentage transmittance, globule size and zeta

potential. Studies conclusively demonstrate d rapid and larger extent of transport of RSP by RMNE into the rat brain [10]. Because of these characteristics of nano-emulsion, it is considered that ingredients which were contained in the Nano-antioxidants infused gel also had the equally high efficiency to heal the wound on the oral mucosa.

CONCLUSION

From the results of this report, we conclude d that nano-emulsion gel which containing vitamin C, E and propolis extract could be effective in healing oral soft tissue lesions and protecting of mucosal wounds. To further assess its effectiveness, randomized control trials and multicenter study are needed regarding the function of nano-emulsion gel.

DECLARATIONS

Acknowledgement

The presented study has been carried with interdisciplinary assistance of all authors.

Conflict of interest

The authors have disclosed no potential conflicts of interest, financial or otherwise.

Ethical considerations

In accordance with the ethical standards of experimentation (institutional or regional) and with the Helsinki Declaration of 1975, as revised in 2000 (available at https://www.wma.net) initials, or hospital numbers, especially in illustrative material.

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