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The Effect of Carrageenan on Patients with Type2 Diabetes Mellitus with Burning Mouth Syndrome: Candida Albicans Isolation, Biochemical and Immunological Study.

A thesis
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Abstract

Background:

A Sulfated polyglycan, carrageenan, which is acquired from various genera of red seaweed such as chondrous, iridaea, gigartina and eucheuma. It is widely used as a food additive for its thickening, gelling emulsifying properties which makes it a vegetarian substitute for gelatin. In addition, Carrageenan is mainly used in cosmetics, pharmaceutical products, and toothpaste as well as in all oral products due to its bioactive compounds. Carrageenan is available in three types iota, kappa, and lambda. All these types differ in their composition and a sulfating degree in polymeric structure.

On the other hand, Diabetes Mellitus may affect all the vital body organs by changing the metabolic activity of the body. Some diabetic patients may suffer from burning mouth syndrome which has multiple causative factors and can be diagnosed clinically by a hot, burning feeling in the oral cavity but there is no noticeable lesion.

Subjects, materials, and methods:

Seventy-five subjects participated in this study 50 subjects were with diabetes mellitus type 2 with burning mouth syndrome and 25 healthy subjects; divided into:

- study group: 25 patients with Diabetes Mellitus type 2 with burning mouth syndrome who did receive carrageenan.
- control group 1: 25 subject who were healthy.
- control group 2: 25 subjects with Diabetic Mellitus type 2 with Burning mouth syndrome who did not receive carrageenan.

All diabetes patients were diagnosed by an endocrine specialist and confirmed by 2 laboratory tests, the fasting blood glucose and HbA1c. Burning mouth syndrome is diagnosed according to scale criteria and laboratory examination to exclude another causative factor for burning mouth syndrome. the pharmaceutical formulation of Carrageenan gel prepared in (percent) was carrageenan powder (0.9%). sucrose (20%)

potassium citrate (0.35%), citric acid (0.45%). The use of carrageenan was for 20 days after breakfast and before bedtime.

Collection of unstimulated whole saliva was done to determine the level of the salivary immunological markers and salivary alpha amylase which were measured by enzyme-linked immunosorbent assay. Saliva was taken on two intervals for the study groups and one interval for the control groups. Swabs were taken from oral mucosa to investigate the antifungal activity of carrageenan.

Aims of the study:

The present study was designed to determine the effect of topical carrageenan on the signs and symptoms of Burning Mouth Syndrome in diabetic patients type 2 and to determine the effect of topical carrageenan on the levels of salivary immunoglobulin A, interleukin-1beta and salivary alpha-amylase as well as the level of colony forming unit of Candida Albicans species.

Results:

Results showed that carrageenan gel was effective in relief burning sensation that is associated with Burning Mouth Syndrome. The results showed that no effect of carrageenan on the immunological markers (immunoglobulin A and interleukin 1), while there is a remarkable decrease in salivary alpha-amylase in patients after carrageenan usage. For candida, the results showed a decline in the number of colonies forming units after carrageenan utilization.

Conclusion:

The effect of carrageenan gel on Burning Mouth Syndrome may allow utilizing kappa carrageenan as a good compound to relieve burning sensation in burning mouth syndrome. Salivary immunological markers (immunoglobulin A and Interleukin 1) are not affected after the application of carrageenan while salivary alpha-amylase is highly affected. Carrageenan gel has a profound effect on Candida Albicans and can be used as an antifungal agent.