Abstract

Background

Diabetes mellitus is chronic progressive disease that characterized by several complications affect several body systems. Diabetic foot ulcer is one of the most incurable conditions that including slow healing rate, that may lead to amputation, which would increase morbidity and mortality state. Treatment of diabetic foot ulcers is complicated and need team up to overcome such problem. One of the suggested ways and addition treatment is using micronutrient supplements, which by knowing their action in body, in order to aid and fasten ulcer healing process. Zinc plays an essential role in growth, immune function, antioxidant defense, and wound healing. Zinc deficiency was shown to increase the time for wound closure and to decrease wound strength. Keratinocyte differentiation induced by 1, 25$(OH)_2$ D_3 is mediated through vitamin D receptors, whose expression in the skin has been well established. These effects were demonstrated on cell growth in vivo and in vitro.

Objective

The present work was designed to study the possible effect of addition of zinc or vit.D_3 to the usual diabetic foot therapy on percentage of ulcer healing of diabetic foot and to find their effect on glycated albumin which can reflect their glycemic control action. Also study their effect on lipid parameters and their anti-inflammatory action.

Subjects & Methods

45 diabetic patients with foot ulcer(s) were participating in this study (22 male and 23 female) with mean age 54.37 and duration of diabetes mellitus 13.82 years and in addition to 15 apparently healthy people considered as control group. The patients were divided into three groups with 15 patients in each group. Group received zinc gluconate 50 mg/day, another received 1000 IU (25µg) of vit.D_3 twice daily, and finally group received placebo. Clinical assessment of the ulcer is done by measuring ulcer surface area each 2 weeks and then calculates the percentage of ulcer changes. Blood samples were collected at the beginning of the study to measure serum fructosamine, random blood sugar (RBS), serum total cholesterol (TC), high density lipoprotein (HDL-c), low density lipoprotein (LDL-c), serum tumor necrosis factor alpha (TNF-α) and serum C-reactive protein (CRP). Serum fructosamine and RBS are detected after 2 weeks of beginning of the study. After 4 weeks, blood sample is collected again to measure the tests mentioned above.

Results

The results of the present work in patients with diabetic foot ulcers showed increased in serum fructosamine level, lipid parameters and inflammatory markers. There were significant decreased in fructosamine levels, ulcer surface area, swelling, and increase in healing percentage after 4 weeks of zinc and vit.D_3 treatment in comparison with placebo. The serum levels of CRP and low density lipoprotein showed significant decrease in zinc treated group while was not significant for TNF-α. Significant elevation in high density lipoprotein in vit.D_3 treated group while non-significant decrease in

TNF-α, CRP and LDL-c level. Total cholesterol level showed non-significant decrease in zinc and vit.D_3 treated groups.

Conclusion:

Using of zinc or vit.D_3 as adjuvant therapy in diabetic patients with diabetic foot ulcer could be helpful in fastening ulcer healing and, if used for longer time, may aid in regulate glycemic control and lipid profile with lowering inflammation.