

Comparative Evaluation of Serum HbA1C Level among Patients with and Without Diabetic Foot Complications: An Institutional Based Study

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ABSTRACT

Introduction: Diabetic foot syndrome (DFS) is one of the most serious, important and economically demanding complications that patients with diabetes can develop. Hence; the present study was undertaken for assessing and comparing the serum HbA1C level among patients with and without diabetic foot complication.

Materials & Methods: A total of 150 diabetic patients were enrolled in the present study. Clinical examination was done in all the patients and prevalence of diabetic foot complication was assessed. Blood samples were withdrawn from all the patients and mean HbA1c concentrations were assessed using autoanalyzer. All the values were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi- square test was used for assessment of level of significance.

Results: Prevalence of diabetic foot complication was found to be present in 30 patients. Mean HbA1C values of patients with diabetic foot complications was 10.75%, while among the patients without diabetic foot complication, it was 8.76%. While

correlation of occurrence of diabetic foot complication with diabetic profile, significant results were obtained.

Conclusion: Patients with diabetic foot complications are accompanied by significant alteration in mean HbA1c levels.

Key words: Diabetic Foot Complication, HbA1C.

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INTRODUCTION

Diabetes is a global epidemic of the 21st century. Its prevalence has been alarmingly growing in the recent years; the number of patients with diabetes is projected to exceed 500 million by 2030.¹⁻³ Despite considerable progress in diabetes treatment, particularly in terms of its acute complications (hypo-and hyperglycaemic coma), chronic consequences of this disease still constitute a serious clinical problem and lead to increased mortality, disability and lower quality of life.^{4,5}

Diabetic foot syndrome (DFS) is one of the most serious, important and economically demanding complications that patients with diabetes can develop. It encompasses ulcers, infections, and destruction of the deep tissues of the foot, often resulting in troublesome, non-healing wounds.⁶ Hence; under the light of above mentioned data, the present study was undertaken for assessing and comparing the serum HbA1C level among patients with and without diabetic foot complications.

MATERIALS & METHODS

The present study was conducted with the aim of assessing and comparing the serum HbA1C level among patients with and without diabetic foot complications. Ethical approval was obtained from institutional ethical committee.

A total of 150 diabetic patients were enrolled in the present study. Clinical examination was done in all the patients and prevalence of diabetic foot complication was assessed. Blood samples were withdrawn from all the patients and mean HbA1c concentrations were assessed using autoanalyzer. All the values were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi- square test was used for assessment of level of significance.

RESULTS

In the present study, a total of 150 patients were analysed. Among these 150 patients, prevalence of diabetic foot complication was

found to be present in 30 patients. Mean HbA1C values of patients with diabetic foot complications was 10.75%, while among the patients without diabetic foot complication, it

was 8.76%. While correlation of occurrence of diabetic foot complication with diabetic profile, significant results were obtained.

Table 1: Prevalence of diabetic foot complications

| Diabetic foot disease | Number of patients | Percentage of patients |
|-----------------------|--------------------|------------------------|
| Ulcer | 18 | 12 |
| Gangrene | 6 | 4 |
| Amputation | 6 | 4 |
| Overall prevalence | 30 | 20 |

Table 2: Correlation of occurrence of diabetic foot complication with diabetic profile

| Parameter | Patients without Diabetic foot complications | Patients with Diabetic foot complications | p- value |
|----------------|--|---|----------|
| Mean HbA1c (%) | 8.76 | 10.75 | 0.00 |

DISCUSSION

Diabetic foot complications are contributing to both mortality and morbidity among the diabetic population leading to substantial physical, physiological and financial burden for the patients and community at large. It is estimated that 24.4% of the total health care expenditure among diabetic population is related to foot complications.⁷

The risk of ulceration and amputation among diabetic patients increases by two to four folds with the progression of age and duration of diabetes regardless of the type of diabetes. It has also been proven by many longitudinal epidemiological studies that among diabetic patients, the life time foot ulcer risk is about 25%, thereby accounting for two thirds of all non-traumatic amputations.⁸

In the present study, a total of 150 patients were analysed. Among these 150 patients, prevalence of diabetic foot complication was found to be present in 30 patients. Mean HbA1C values of patients with diabetic foot complications was 10.75%, while among the patients without diabetic foot complication, it was 8.76%. While correlation of occurrence of diabetic foot complication with diabetic profile, significant results were obtained. In a study conducted by Hasan CMM et al, and Zubair M et al, mean HbA1C concentration was 10.50% and 9.6% respectively. HbA1c reflects glycaemic control over past 2-3 months and its role in management of diabetes is well established. In ADVANCE trial, a target 6.5% HbA1c value was found to drastically reduce the macro and microvascular complications.^{7,8}

With the Rise in HbA1c, patients develop nonproliferative and proliferative retinopathy, indicating severity of retinopathy with uncontrolled diabetes. But, those patients who are having average HbA1c levels under controlled or less; they are within normal limits. In other words, diabetic complications will occur if blood sugars remain high for long time, and may occur at any level of the disease process, but those patients whose HbA1c was higher, have definitely developed the chronic complications. In addition, by identifying high-risk patient and tailoring a total foot care prevention program accordingly, the incidences of ulceration and lower extremity amputations can be reduced.^{9,10}

The results of the study conducted by Zubair M et al clearly indicated that the most important complications of diabetes finally leads to the Diabetic Foot Syndrome, which occur together as glycaemic control worsens. In other words, to prevent the complications, the blood sugars should be controlled to the target levels as recommended by American Diabetes Association and other associations and others as well. Lowering HbA1C to below or around 7% has been shown to reduce microvascular and neuropathic complications. Therefore, for microvascular disease prevention, the HbA1C goal for non-pregnant adults in general is 7%. Further, HbA1c is now considered also a diagnostic tool, as has been recommended by American Diabetes Association in 2010 because now its methodology is standardized. Nevertheless in the past and still now it has been a good tool for monitoring diabetes and its complications. It is easy to measure and gives reliable evidence for the past control of diabetes.⁸⁻¹²

Numerous risk factors for the development of diabetic foot have been suggested, the most important being peripheral sensory neuropathy followed by peripheral vascular disease. The proportion of neuropathic, neuroischemic, and purely ischemic lesions in diabetics is 54, 34, and 10%, respectively. In India, it is estimated that approximately 40,000 legs are being amputated every year, of which 75% are neuropathic with secondary infection, which is potentially preventable. Certain factors, such as, barefoot walking, illiteracy, low socioeconomic status, late presentation by patients, ignorance about diabetic foot care among primary care physicians, and belief in the alternative systems of medicine contribute to this high prevalence.^{8,9}

Since the development of foot ulcers and amputations are preventable and this condition can greatly affect the quality of life of patients, prevention of this complication can relieve direct and indirect cost burdens on society.^{10,11}

CONCLUSION

Patients with diabetic foot complications are accompanied by significant alteration in mean HbA1c levels. However; further studies are recommended.

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