PATTERN OF GLYCOSYLATION IN OBESE AND NON-OBESE DIABETICS OF PESHAWAR

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ABSTRACT

Background: The serum glucose and HbA1c levels were found to be deranged in obese and non-obese diabetics. It was concluded that HbA1c values correlated well with fasting plasma glucose values reinforcing its value as a monitor of diabetes control.

Research Methodology: There were two groups comprising 120 obese and 40 non-obese diabetics from Peshawar district. All patients had their serum glucose and HbA1c checked after over night fast (12hrs)

Results: The comparison of serum glucose level in obese diabetics was found to be significantly higher as compared to non-obese diabetics. Similarly the comparison of HbA1c levels in obese diabetics was found to be significant as compared to non-obese diabetics. The level of HbA1c was found high in obese diabetics as compared to non-obese group.

Conclusions: It was concluded that HbA1c less than 8% is strongly associated with reduction of micro vascular complications; the blood glucose result are very useful in preventing hypoglycemia, as well as adjusting medications and insulin doses, diet and exercise.

Key words: HbA1c, obese, non-obese, type 2 diabetics

INTRODUCTION

The glycated hemoglobin or glycosylated hemoglobin or HbA1c is used to monitor the treatment of diabetes; however it is not recommended for routine diagnosis of the condition because of lack of standardization of the tests and results. Glycosylation is the attachment of glucose to the amino groups in protein to form glycated plasma and tissue proteins that is glycated hemoglobin is one example.[1] In controlled diabetes the HbA1c level is less than 7% and in uncontrolled diabetes the level is more than or equalent to 7%.[2] While in our set up HbA1c less than 8% is controlled and more than 8% is uncontrolled level. The relationship is altered by uremia, intake of vitamin C or E and conditions that affect erythrocyte turnover.[3] There is still no agreement on standardization, so varieties of methods are available for its measurement.

The word obesity is derived from a Latin word obesus "to devour" and it is defined as excessive accumulation of fat including increase fat cell size and number. The most statistical unit used for obesity measurement is the body mass index (BMI). Body mass index is the measurement of choice for many physicians and researcher studying obesity. BMI equals to a person's weigh in kilograms divided by height in meter squared (BMI=kg/m2).[4]

The prevalence of diabetes in rural areas of N.W.F.P is high and is almost similar to that of Sindh and Balochistan. Usually the advance age, positive family history and obesity are associated with higher rates of diabetes.[5]

Usually due to lack of knowledge our diabetics have uncontrolled hyperglycemia. That is why this study was done to know about the glycaemic control and to give more attention towards management in our set up.

RESEARCH METHODOLOGY

Patients were randomly selected from department of Pathology, Khyber Medical College, Peshawar. One hundred and sixty (160) subjects were randomly included in this study aged 40-80 years; diabetic patients included 120 obese and 40 non-obese diabetics (according to the BMI criteria).

The sample was taken after 12 hour fast for serum glucose analysis and estimation of HbA1c levels. Data obtained was subjected to statistical package SPSS V13 (Special package for social sciences), arithmetic mean, standard deviation, degree of freedom, chi square distribution and ultimately p- value were calculated.[6]

RESULTS

All patients had their serum fasting glucose and glycosylated hemoglobin (HbA1c) analyzed. The results are as under.

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Table 1: One-Sample Test for serum glucose in obese and non-obese diabetics (3.349, p value 0.008 (P<0.05)

Subgroups	Glucose	Obese diabetics (%)	Non obese diabetics (%)	Total (%)
A	< 110	66(55)	13(32.5)	79(49.3)
B	110 - 126	10(8.3)	2(5)	12(7.5)
C	> 126	44(36.6)	25(62.5)	69(43.1)
	Total	120	40	160

Table 2: Glycosylated haemoglobin (HbA1c) (chi-square 2.4, p value .034) (P<0.05)

Subgroups			Obese diabetic (%)	Non obese (%)
A	HbA1c	6-8%	84(70)	29(72.5)
B		8-10%	20(16.6)	6(15)
C		>10%	16(13.3)	5(12.5)
	Total		120	40

The comparison of serum glucose level in obese diabetics was found to be significant as compared to non-obese diabetics. The serum glucose level was high in obese diabetics as compared to non obese group. The p value calculated statistically was 0.008.

The comparison of HbA1c levels in obese diabetics was found to be significant as compared to non-obese diabetics. The level of HbA1c was found high in obese diabetics as compared to non-obese group. The p value calculated statistically was 0.034.

DISCUSSION

HbA1c level correlates closely though not perfectly with blood glucose level in patients with diabetes. Correlation is higher for glucose level in the day time, than earlier. It is higher for the blood glucose levels in the most recent thirty than from prior 31 to 120 days. The glycaemic control is fundamental in managing patients with diabetes; treatment target needs to be individualized. Patient's education about the importance of both HbA1c and self blood glucose monitoring are crucial in accomplishing this goal.[7] The relationship of glucose with HbA1c is higher for type 2 diabetes when compared with type1 diabetes.[8] In a study conducted by Malik[9] who observed HbA1c values correlated well with fasting plasma glucose values reinforcing its value as a monitor of diabetes control. The relationship between HbA1c and blood glucose levels is such that blood glucose levels from preceding 30 days determine about 50% of the total HbA1c.[10] These observations have marked resemblance to the results of present study. American Diabetic Association (ADA) has decided that there is insufficient data to determine relative contribution of fasting plasma glucose and postprandial plasma glucose to HbA1c.[11]

CONCLUSION

It is recommended that HbA1c less than 8% is strongly associated with reduction of micro vascular complications; the blood glucose result are very useful in preventing hypoglycemia, as well as adjusting medications and insulin doses, diet and exercise.

The new minimally invasive at-home glucometers and HbA1c test kits, which are recently approved by food and drug administration, improve compliance and help patients take control of their diabetes management.

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