



STUDY OF GLYCOSYLATED HEMOGLOBIN IN CASES OF DIABETES MELLITUS WITH MICROANGIOPATHY

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ABSTRACT

Aim & objective:- The aim of this is to evaluate the clinical significance of measurement of Glycosylated Hemoglobin (HbA1c) in the assessment of metabolic control in mellitus with microangiopathy. **Material & methods:-** The present work is carried out in Department of Biochemistry Shri Krishna Medical College, Muzaffarpur, Bihar, and some private clinics and lab on newly diagnosed cases of diabetes (fasting glucose >126mg/dl, post prandial >200mg/dl & HbA1c >6%). **Results:-** The comparison of mean Glycosylated Hemoglobin of normal subject, diabetes mellitus without microangiopathy and diabetes mellitus and diabetes mellitus with microangiopathy. 'p' value is <0.001 which is highly significant. **Selection of patients:-** In the present study 80 Well known cases of diabetic were selected at random, comprised of both sex ranging from 20yrs to to 80yrs age.

KEY WORDS :

SELECTION OF THE PATIENTS

In the present study, 80 cases of well knows diabetes were selected at random and compared both sexes in different age groups, age ranging from 20 years to 80 years first of all micro angiopathy i.e retinopathy, nephropathy or neuropathy. The duration of diabetes in the patient varied from 1 month to 21 years before the time of detection.

Twenty cases of non- diabetic formed control group varied from 20 years to 80 years of age. They were also screened for diseases like haemolytic level, such were not included in the control group.

In the group of patients of diabetes without evidence of microangiopathy, 30 cases were studied. In the group of patients of diabetes with microangiopathy (retinopathy, Nephropathy, Neuropathy) 50 cases were studied.

The examination of all these patients was done as follows:
Name of Patient, Age of patient, Sex, weight, Religion, Address, Occupation, Chief complains and clinic history in detail, Past Medical History, Family

Examination:-

1. General
2. Systemic

In general examination, more stress was given on pulse rate and change after valsalva manoeuvre, B.P. in lying down and standing position.

Retinopathy was detected by direct ophthalmoscopic examination of fundus with pupil dilated. The worsening of complications in this study was defined as an increase of one or more steps in the 4 stages of the modified ETDRS interim scale for retinopathy.

Classification of Diabetic Retinopathy: (ETDRS Classification)

ETDRS- Early treatment Diabetic Retinopathy Study:-

1. Non- proliferative Diabetic Retinopathy (NPDR) :-
 - A. Mild NPDR
 - Atleast 1 microaneurysm (MA)
 - B. Moderate NPDR
 - Hard exudates, venues beading arid intra retinal microvascular abnormmalineb (RMA) definitely present.
 - Haemoglobin/microaneurissms in all four quadrants of retina.
 - Venous beading in 2 or more quadrants.

- IRMA in atleast 1 quadrants.
- Any 2 or more of C

METHODS

Glycosylated haemoglobin estimation was done by latex turbidimetric method. Human kit suppllied by Bioline Diagnostics.

RESULTS

The present study was carried out in 100 cases. Out of this, 20 healthy non-diabetics, 30 cases of diabetes mellitus without microangiopathy and 50 cases of diabetes mellitus with microangiopathy.

The patients group made for this study are as follows.

- (1) Normal healthy control : This group was having total patients. Out of that 12 (6%) male and 8 (40%) female.
- (2) Patients of diabetes without microangiopathy : This group was consisting 30 patients with equal sex distribution i.e. 15 (50%) male and 15 (50%) females.
- (3) Diabetic with microangiopathy.
 - (a) Retinopathy: This group was having 15 Cases with 10 (67%) males and 5 (33%) Females.
 - (b) Retinopathy with Nephropathy and Neuropathy : in this group also there were male predominance i.e out of 19 cases 12 (63%) were males and 7 (37%) were females.
 - (c) Nephropathy group was having 16 cases in which sex distribution was 10(63%) males and 6 (7%) females.

The incidence of microangiopathy is more 32 (64%) in the age group above 60 years, than other groups like 13(26%) in the age group 41-60 years and 5 (10%) in the age group less than 40 years.

The incidence of Retinopathy is 8 (53%) in the age group more than 60 years, 4 (27%) in the age group 41-60 years and 3 (20%) in age group less than 40 years.

The incidence of combined microangiopathy i.e Retinopathy with nephropathy and neuropathy is 14 (73%) in age group more than 60 years, 3(16%) in age 41-60 years and 2(11%) in the age group less 40 years.

The incidence of Nephropathy is 10 (62%) in the age group more than 60 years, 6 (38%) in the age group 41-60 years.

The above data shows that incidence of combined

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microangiopathy i.e Retinopathy with Nephropathy and Neuropathy is more than isolated microangiopathy.

In control group, the mean glycosylated Hb level at beginning is 5.12 and after 3 month, 4.8% There is no marked difference between this two value.

In diabetes mellitus without microangiopathy, the mean glycosylated Hb is 8.5% at beginning and 7.57% after 3 months of treatment.

In Retinopathy group, the mean glycosylated Hb is 10.89% at beginning and 8.86% after 3 months. In diabetics with combined microangiopathy i.e. Retinopathy with Nephropathy and Neuropathy the mean glycosylated Hb is 12.73% at beginning and 10.52% after 3 months.

In Nephropathy group, the mean glycosylated Hb is 11.76% at beginning and 8.39% after 3 month. In this study we found that HbA_{1c} levels in all three groups of diabetes with microangiopathy category were on higher side than those of diabetes without microangiopathy. It is always more than normal healthy individuals. This reflects the view that HbA_{1c} level may be better indicator than blood sugar levels is assessing the severity of the disease.

The blood sugar levels are indicative of one time values. While HbA_{1c} reflects a time bound value of approximately 8-12 weeks. A large study may be of proven HbA_{1c} value in two category i.e. diabetes with microangiopathy and without microangiopathy.

HbA_{1c} level reflects the averages blood glucose level during the previous 8-12 weeks, hence may fail in giving an accurate evaluation of blood glucose control throughout the entire duration of the disease.

The argument for the non-significant increase in HbA_{1c} in diabetes with microangiopathy is that, once complication develops in patients, he is more aware of treatment and patient attempt to control hyperglycemia.

The mean fasting blood glucose level in normal healthy individual varies from 70 mg % to 120 mg% among 20 persons. The corresponding glycosylated Hb varies from 4% to 6.5%. The mean fasting blood glucose level is 92.35 mg% and glycosylated Hb level is 5.12.

The fasting blood glucose level in diabetes mellitus without microangiopathy varies from 135 mg % and 255 mg %. The corresponding glycosylated Hb level varies from 6.5 to 10.4 %. Mean fasting blood glucose value is 197.2% and glycosylated Hb is 8.5%.

The fasting blood glucose level of Retinopathy cases varies from 236 mg % to 302 mg % mean is 266.93 mg %. The corresponding glycosylated Hb level is 9.6% to 21.1%. The mean is 10.89%.

The fasting blood glucose level in diabetes with combined microangiopathy varies from 270mg % to 378 mg %. The mean is 322.1 mg %. The corresponding Hb level is 11 % to 14.6%. The mean is 12.73%.

The fasting blood glucose in nephropathy cases varies from 240 mg% to 315 mg%. The mean is 289.81 mg %. The corresponding glycosylated Hb level is 10.1% to 12.5%. The mean is 11.76%.

These findings show that fasting blood glucose and glycosylated Hb level is more in diabetes with microangiopathy cases than normal individuals.

The blood glucose level (fasting and post-prandial) at the beginning of study and after 3 months treatment. It also shows the

corresponding HbA_{1c} level at the beginning of study and after three months of treatment. This observation shows that there is excellent relation in fasting blood glucose level and HbA_{1c} level in both category i.e, diabetes with microangiopathy or without microangiopathy. In this study we find that blood glucose level declines sharply after treatment but glycosylated Hb does not fall so rapidly.

The duration of diabetes and incidence of microangiopathy. This study shows, that duration of diabetes was more prolonged in cases of microangiopathy as compared to the duration in group of diabetes without microangiopathy. Same table also shows the mean HbA_{1c} level which indicates that there is no significant correlation between duration of diabetes and HbA_{1c} concentration.

The comparison of mean fasting blood sugar in beginning of study of normal, diabetes mellitus without microangiopathy and diabetes mellitus with microangiopathy. This study shows that mean fasting blood sugar of diabetes mellitus without microangiopathy and diabetes mellitus with microangiopathy is higher than normal people 'p' value is <0.001 which is highly significant.

The comparison of mean glycosylated haemoglobin of normal, diabetes mellitus without microangiopathy and diabetes mellitus with microangiopathy 'p' value is <0.001 which is highly significant.

CONCLUSION

1. The three months follow up study showed a significant fall in HbA_{1c} level in all groups of diabetes with and without microangiopathy. But it does not touch to normal level 4.7% of total Hb.

2. HbA_{1c} level reflects average blood glucose concentrations of previous two to three months in diabetes with or without microangiopathy.

3. microangiopathy does not hamper to decline of HbA_{1c} levels and attainment of good metabolic control.

4. Glycosylated Hb level does not fluctuate in relation to diet, exercise and anti diabetic treatment on the day of testing.

5. Assessing Glycaemic control in diabetes with high glycosylated haemoglobin levels, concurrent fasting blood glucose level estimations are essential.

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