

ABSTRACT

EFFECTS OF THYROXINE REPLACEMENT ON GLYCOSYLATED HEMOGLOBIN LEVELS IN NON DIABETIC PATIENTS WITH OVERT HYPOTHYROIDISM.

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ABSTRACT

INTRODUCTION

HbA1c is used for screening as well as for diagnosing Diabetes Mellitus.

HbA1c - 4% – 5.7% - normal

5.7%- 6.5% - pre-diabetes

> 6.5% - diabetes mellitus.

It depends on ambient levels of glycemia over the preceding 2-3 months but also on the RBC turnover from the bone marrow. HbA1c may not accurately reflect the

level of glycemia in conditions of altered erythrocyte turnover.

Conditions which are associated with a low RBC turnover(hypoproliferative anemias) are associated with a falsely elevated HbA1c.

Hypothyroidism being one of the causes of hypoproliferative anemia may lead to false elevation of HbA1c resulting in erroneous diagnosis of pre diabetes or diabetes.

AIMS AND OBJECTIVES :

- The objective of our study was to determine the effects of hypothyroidism on HbA1c levels in individuals without diabetes.
- To observe whether HbA1c falls in hypothyroid patients following treatment.
- To assess the validity of using HbA1c for diagnosing diabetes in hypothyroid patients.

MATERIAL AND METHODS :

The study was conducted on 100 patients who were admitted and attending OP in Govt. Rajaji hospital, Madurai. It was a Prospective study for a duration of 6 Months. The study was conducted on non diabetic overt hypothyroid patients meeting the following criteria

INCLUSION CRITERIA:

All patients with Overt Hypothyroidism.

EXCLUSION CRITERIA:

- Diabetes mellitus (FBS \geq 126 mg/dl, PPBS: \geq 200 mg/dl)
- Impaired glucose tolerance(2h post 75g OGTT is between 140- 199 mg/dl).
- Hb $<$ 10 g/dl
- Known hemoglobinopathies
- Renal or Liver diseases.
- Recent blood transfusions ($<$ 3 months)
- Pregnant patients

History from the patient was collected from previously designed proforma with informed consent. Patients were followed up for a period of 6 months to check for FBS, PPBS and HbA1c levels before and after thyroxine replacement .Laboratory investigations includes Complete blood

count, Reticulocyte count, Fasting blood glucose, Post prandial blood glucose, HbA1c, TSH/T4, Liver and renal function tests

RESULTS :

In our study consisting of 100 patients majority of the patients belong to age group 36-45(43%). Females were more in number (85%).

The baseline TSH values on an average was between (10-20) in 66% of the study population. T4 levels were between 1.1-2.0 in 49% of patients. In these patients the post treatment FBS and PPBS were within normal limits.

The HbA1c estimation was done and was found to be increased. The average HbA1c was around 5.83%. This led to false diagnosis of dysglycemia in 67% of patients. False diagnosis of impaired glucose tolerance -60% and diabetes was 7%. thyroxine replacement and achievement of euthyroidal state, follow up was done for 3 months post achieving euthyroidal state on account of approximately 120 days of life span of RBC.

The T4 and T4 on the average was found to be TSH-3.66 and T4- 7.85 within normal range, although there was no difference in fasting and post prandial blood sugars the mean HbA1c decreased to 5.25%

CONCLUSION:

It is concluded from the above study that HbA1c are falsely elevated out of proportion to the level of glycemia in patients with hypothyroidism which leads to false diagnosis of dysglycemia and it is lowered without any change in blood sugar levels after thyroxine replacement and achievement of a euthyroidal state.

Therefore in hypothyroid patients diagnosis of pre diabetes or diabetes should only be based on fasting blood glucose and post prandial blood glucose .

So we conclude that HbA1c is not a valid test for diagnosis of prediabetes or diabetes in the presence of hypothyroidism.

Keywords:

FBS- Fasting blood sugar

PPBS- Post prandial blood sugar

TSH- Thyroid stimulating hormone T4- Thyroxine