Evaluation of glycemic abnormalities in patients with Beta Thalassemia major using continuous glucose monitoring system (CGMS) and oral glucose tolerance test (OGTT): A pilot

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Introduction:
Both insulin deficiency and insulin resistance are reported in patients with β thalassemia major (BTM). The use of CGMS among the different methods for early detection of glycaemic abnormalities has not been studied thorough.

The aims of this study are: 1. to detect glycemic abnormalities in young adults with BTM using fasting blood glucose (FBG), (OGTT), 72-h continuous glucose concentration by CGMS, and serum insulin and C-peptide concentrations; 2. To compare the results of these two methods in detecting glycemic abnormalities in these patients; and 3. To calculate (HOMA), and (QUICKI) in these patients. In order to evaluate whether glycemic abnormalities are due to insulin deficiency and/or resistance.

Materials and methods:
Randomly selected young adults (n = 14) with BTM. All patients were investigated using (OGTT) 75 gram of glucose and 72-h by CGMS. Fasting serum insulin and C-peptide concentrations were measured and HOMA-B, HOMA-IR were calculated accordingly.

Results:
Using OGTT, 5 patients had impaired fasting glucose (IFG) (Fasting BG from 5.6 to 6.9 mmol/L). Two of them had impaired glucose tolerance IGT (BG from 7.8 and < 11.1 mmol/L) and one had BG = 16.2 mmol/L after 2-hrs (diabetic). Using CGMS in addition to the glucose data measured by glucometer (3-5 times/ day), 6 patients had IFG. The maximum (postprandial) BG recorded exceeded 11.1 mmol/L in 4 patients (28.5%) (Diabetics) and was > 7.8 but < 11.1 mmol/L in 8 patients (57%) (IGT).

The mean values of HOMA and QUICKI in patients with BTM were < 2.6 (1.6± 0.8) and > 0.33 (0.36±0.03) respectively ruling out significant insulin resistance in these adolescents. There was a significant negative correlation between the β-cell function (B%) on the one hand and the fasting and the 2-h BG (r= -0.6, and - 0.48, P< 0.01 respectively) on the other hand. Ferritin concentrations were negatively correlated with the β-cell function (r= -0.41, P< 0.01).

Conclusion:
CGMS has proved to be superior to OGTT for the diagnosis of glycemic abnormalities in adult patients with BTM. In our patients, defective β-cell function rather than insulin resistance appeared to be the cause for these abnormalities.