STUDY OF THE CORRELATION BETWEEN TRIGLYCERIDE GLUCOSE INDEX AND SOME INFLAMMATORY MARKERS AMONG EGYPTIAN ADULT OBESE INDIVIDUALS

Fathy Zakaria Alsewy, Samir Aly Abd El-Kader El- Sheikh, Heba Sadek Kassab, Ahmed Abdelkarem Sharaf, Amira Ali Hamed Aboukamar

Department of Internal Medicine, Faculty of Medicine, Alexandria University

Introduction

Obesity is defined as excessive adiposity that can impair health, it plays a role in multiple chronic diseases as hypertension, stroke, cardiovascular diseases and T2DM. Management of obesity is through life style modification, pharmacological treatment and in some cases metabolic surgery may be needed.

Dysfunction of adipose tissue in obesity leads to development of insulin resistance, which is a state of failure of cells to adequately respond to insulin, through impairment of insulin signaling.

The levels of FFA are inversely correlated with insulin sensitivity in humans and TyG index used as a surrogate marker of insulin resistance.

The excess of macronutrients in obesity stimulates the adipose tissues to release inflammatory mediators such as tumor necrosis factor α and IL 6and reduces production of adiponectinleading to inflammatory state.

Hs-CRP, Neutrophil Lymphocytic ratio and platelet lymphocytic ratio are used as inflammatory markers.

Aim of the Work

The aim of the current study was to study the correlation between triglyceride glucose index as indicator of Insulin resistance and some inflammatory markers among a cohort of Egyptian adult obese individuals.

Subjects and Methods

After giving their informed consent all patients were subjected to the following:

1. **History taking**(age, sex, smoking and medications)

2. **physical examination:**
Mainly blood pressure, Weight, height and waist circumference
Body mass index was calculated as weight (kg) / height (m) 2.

1.3-**Laboratory investigations :** Venous Blood samples were drawn in the morning after a 12h of overnight fast.
-Complete Blood Count including neutrophils and lymphocytes
- Serum creatinine.   - SGPT.
- Fasting Plasma glucose.   - Total serum cholesterol.
- Serum TG.   - Serum HDL-C.
- Serum LDL-C.   - High sensitivity C-reactive protein.

4-Equations :

1-The TyG index was calculated by using plasma glucose and TG using the formula: Ln [Fasting TAG (mg/dl) x FG (mg/dl)]/ 2

2-The TG/HDL-C ratio was also calculated as (FTG [mg/dL]×Fasting HDL-C [mg/dL]))

3- Neutrophil-Lymphocyte ratio (NLR) calculated by dividing absolute neutrophil count by absolute lymphocyte count.

4-Platelet-Lymphocyte ratio (PLR) calculated by dividing platelet count by lymphocytic count.

Results

The total sample was classified according to TyG index into 2 groups: the first group included participants with IR (TyG index≥4.5) (n=50) while the other groupincluded participants without IR (TyG index<4.5) (n=50). (Table 1) There was no statistically significant different between different grades of obesity according to TyG index.

Table 1: Relation between TyG index and BMI in the total sample

	TyGindex				χ^2	P
	< 4.5 (n = 50)		(n = 50)			
	No.	%	No.	%		
BMI (kg/m²)						
Obese (30-34.9)	15	30.0	11	22.0		
Severely obese (35-39.9)	14	28.0	18	36.0	1.115	0.573
Morbidly obese (≥40)	21	42.0	21	42.0		

Table 2 shows that in Grade 2 obesity individuals whose BMI of 35-39.9 Hs.CRP was the only risk factor for developing insulin resistance in those individuals.
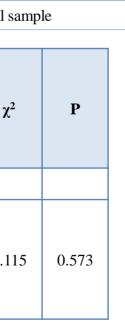
Table 2: Univariate and multivariate analysis for the risk factors of insulin resistance (TyG index ≥4.5) for Grade II obesity (35 - 39.9) (n = 32)

Insulin resistance (TyG index ≥4.5)	Univariate		#Multivariate	
	P	OR (95%C.I)	P	OR (95%C.I)
BMI (kg/m²)	0.781	0.936 (0.587 – 1.492)		
Age (years)	0.821	0.990 (0.903 – 1.084)		
Waist circumference	0.061	1.092 (0.996 – 1.198)		
Hs. CRP	0.041*	1.238*(1.009 – 1.519)		
PLR	0.363	1.008 (0.990 – 1.027)		
NLR	0.166	2.931 (0.641 – 13.399)		
Total cholesterol	0.115	1.014 (0.997 – 1.032)		
HDL	0.516	0.972 (0.893 – 1.059)		
LDL	0.247	1.017 (0.988 – 1.047)		
Cr	0.716	2.924 (0.009 – 956.215)		
SGPT	0.971	1.003 (0.871 – 1.154)		
eGFR	0.403	0.981 (0.938 – 1.026)		

Conclusion

From the results of the present study, the following can be concluded
There is a positive correlation between TyG index and Hs-CRP in total sample of 100 obese people and also in grade 1 and 2 obesity there was a positive correlation between TyG index and Hs-CRP and we found that in grade 2 obesity , Hs-CRP was a risk factor of IR

Regarding correlation between inflammatory markers and different parameters of total sample, Hs-CRP had a statistically significant positive correlation with BMI, wbc, TG / HDL and TyG index, PLR showed a statistically significant positive correlation with Age and NLR and NLR had a statistically significant positive correlation with BMI and PLR.