Adiponectin and Pro-inflammatory Cytokines in Obese Diabetic Boys

Adiponectin serum levels were significantly lower in obese diabetic than in non-obese healthy boys ($P<0.001$). Circulating soluble E-selectin levels was significantly higher in obese diabetic boys than the healthy non-obese ($P<0.01$). There were significant inverse correlations between adiponectin and sE-selectin, hsCRP, IL-1β, and MCP-1 and positively with NO^x. We conclude that sE-selectin and MCP-1 may represent a link between obesity and related co-morbidities in children and adults.

Key words: *Adiponectin, Children, Egypt, Inflammation, Obesity, sE-selectin, Type 2 Diabetes.*

We conducted this study to investigate circulating levels of pro-inflammatory cytokines (hsCRP, IL-1β, and MCP-1) in children and the influence of obesity in early life on adulthood as well as the correlation to markers of glucose metabolism (adiponectin) and endothelial damage (NO and sE-selectin).

Twenty boys (age 10-13 years) were included in this study, 10 of which were healthy non-obese controls (Group I). The other 10 were obese boys with newly diagnosed type 2 diabetes mellitus (T2DM) (Group II) and not receiving insulin. They were compared to 20 male adults with normal glucose metabolism with mean age

TABLE I CLINICAL AND HEMODYNAMIC CHARACTERISTICS OF SUBJECTS

	Adults		Boys		*P value*
	Group I (*n*=20) Normal glucose metabolism	Group II (*n*=50) Impaired glucose metabolism	Group III (*n*=10) Control	Group IV (*n*=10) Diabetic	
Age (years)	38.5 ± 3.7	42.2 ± 2.8[a]	11.4 ± 1	11 ± 1	NS
BMI (kg/m^2)	31 ± 1.2	32.1 ± 1.4	24 ± 1	28.5 ± 1	NS
DM Duration (years)	—	3.3 ± 1	—	2.7 ± 1	—
CVD (MI/-)	—	25/-	—	—	—
FBG (mg/dL)	102.6 ± 3.1	208.2 ± 89[a]	106 ± 5.1	256 ± 7[b]	-0.05
HbA_{1c}%	4.5 ± 0.6	9.6 ± 4.3[a]	4.2 ± 0.7	12.6 ± 0.7[b]	0.05
TAG (mg/dL)	115.7 ± 25	280 ± 21[a]	97.4 ± 7.45	222 ± 10[b]	0.05
TC (mg/dL)	176 ± 16	305.4 ± 44.45[a]	136.4 ± 11.2	250 ± 4.5[b]	0.05
HDL-C (mg/dL)	39 ± 1.6	26 ± 2.3[a]	40.3 ± 1.3	39 ± 1.8[b]	0.05
LDL-C (mg/dL)	115.5 ± 20	266 ± 22.3[a]	108 ± 14.3	227.2 ± 9[b]	0.05
MDA (nmol/mL)	2.9 ± 0.7	5 ± 1.8[a]	2.6 ± 0.45	4.8 ± 0.4[b]	0.05
hsCRP (mg/L)	1.7 ± 0.4	34.8 ± 12.7[a]	0.21 ± 0.12	3.8 ± 1.9[b]	0.05
Insulin (uIU/mL)	8 ± 1.3	105.2 ± 13.7[a]	12 ± 1	58 ± 8.2[b]	0.05
HOMA-IR	2 ± 1.47	73 ± 11.6[a]	3 ± 0.3	36.6 ± 5.6[b]	0.05
NO^x (Umol/L)	39.9 ± 7.9	5.9 ± 1.3[a]	37.6 ± 6.3	8.7 ± 1.2[b]	0.05
IL-1β (pg/mL)	20 ± 1.7	28.4 ± 2.3[a]	21 ± 1.3	28 ± 1.4[b]	NS
sE-selectin (ng/mL)	22.3 ± 5	37.8 ± 5[a]	30 ± 2.5	31 ± 2.9	0.05
Adiponectin(pg/mL)	732.4 ± 142.4	266 ± 47.2[a]	597 ± 75.4	282.5 ± 61[b]	0.05
MCP-1 (ng/mL)	110.5 ± 7.4	137.2 ± 16[a]	104.5 ± 3.6	218 ± 32[b]	0.05

Data is given as mean ± S.D; BMI: body mass index; FBG: Fasting blood glucose, HbA_{1c}%: glycated hemoglobin, TAG: triacylglyceriol, TC: total cholesterol, HDL: high density lipoprotein, LDL: low density lipoprotein, MDA: malondialdehyde, hsCRP: high sensitivity C-reative protein, HOMA-IR: homeostasis model of assessment-insulin resistance, NO^x: nitric oxide metabolites, NS: not significant a,b significant difference from control adult and control boys, respectively; P values are for the comparison between the control and the study groups at significance level ≥0.05.

38.5 ± 3.7 years and BMI 31 ± 1.2 kg/m^2. Fifty male obese adults with impaired glucose metabolism were also recruited for comparison (mean age 42.2 ± 2.8 years). ***Table* I** compares the recruited boys and adults for various biochemical markers. Fasting blood sugar, lipids, insulin, insulin resistance (IR) as HOMA-IR, HDL-C, NO^x, and adiponectin differed significantly between cases and controls, both for the boys and adults.

Correlation of either adiponetin or sE-selectin with selected anthropometric, biochemical, and clinical parameters in the studied groups was negative and positive, respectively, for boys in the case as well as in the control groups. Negative correlation between adiponectin and BMI demonstrated in our study, has been observed previously [1]. Since, NO inhibits leukocyte adhesion and rolling as well as cytokine-induced expression of MCP-1, its level correlated negatively with hyperglycemia, dyslipidemia, and inflam-mation. The abundance of MCP-1 in blood is increased in obese subjects, suggesting that MCP-1 might be an adipokine whose expression is increased in obesity [2].

Our results demonstrated an elevated level of MCP-1 and sE-selectin in newly diagnosed T2DM obese boys, where both are considered as amplifiers of the inflammatory cascade, and moreover, both showed an inverse correlation with adiponectin. Winer, *et al*. [3] reported that adiponectin may function as a biomarker of the metabolic syndrome (MetS) in childhood obesity because of its strong correlation with several indices of IR. Similarly, Gilardini, *et al*. [4] reported that hypoadiponectinemia may be associated with a high risk for the MetS. Another explanation was provided by Rosa, *et al*. [5] who reported that infiltration of inflammatory cells may represent the critical step in adipose tissue-associated inflammation, although the initial trigger(s) for accumulation of these cells remains elusive. The present study extends the existing knowledge about alterations in the pro-inflammatory cytokines family in obese adults to obese children. It also supports the widely accepted theory that low adiponectin levels promote the production of adhesion molecule(s) (namely sE-selectin) in ECs [6].

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Gram Stain as a Predictor of Urinary Infections in Children under 2 years

During early life, clinical manifestations of urinary tract infection (UTI) are nonspecific and definitive diagnosis through urine culture is often late. It is essential to have rapid and reliable diagnostic tests to guide initial treatment. We compared the diagnostic effectiveness of the urine dipstick, urine sediment, and Gram stain in infants with suspected UTI.

This was a retrospective study conducted by reviewing medical records of patients admitted to the pediatric emergency service during the past five years. We included patients aged up to 24 months with symptoms suggestive of UTI, in which a urine sample was obtained by bladder catheterization to perform urine dipstick, urine sediment, gram stain and urine culture. The presence of leukocyte esterase and nitrites of 1+ or greater by dipstick were considered positive. Leukocyturia was defined as >10 leukocytes per high power field in centrifuged urine; and