



Serum Gamma-Glutamyltransferase Correlates Negatively with Paraoxonase 1 in Pregnant Women at Term: Association with Atherogenic Dyslipidemia of Pregnancy

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Letter to Editor

Dear Editor,

Gamma-glutamyltransferase (GGT) is an emerging cardiovascular (CV) risk factor: its values in the upper quartile reference range are independently predictive of CV risk [1,2]. GGT activity on extracellular glutathione promotes LDL oxidation and this has been proposed as a key mechanism to favor atherogenesis [1,2]. Paraoxonase 1 (PON1) is an HDL-associated enzyme implicated in detoxifying oxidized phospholipids in LDL and believed to be atheroprotective [3-6]. Pregnancy is known to elicit a transient atherogenic lipoprotein profile due to the physiological insulin resistance that characterizes the pregnant state. Little is known about the interactions between these potentially antagonistic enzymes [7,8]. We hypothesized that GGT and PON1 activities correlate in pregnant women's serum.

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In this cross-sectional study we studied consecutive serum from 64 healthy, non-diabetic pregnant women aged 34.1 ± 4.2 y at term (gestational age 38.8 ± 1.4 weeks) from the Dept. of Obstetrics and Gynecology, Northern Yokohama Hospital, Showa University, Yokohama, Japan. Informed consent was obtained and the investigation was approved by Showa University IRB committee. We assessed lipoprotein profiles, PON1, and GGT levels Total cholesterol, triglycerides, LDL-C, HDL-C, and GGT were measured with standard auto-analyzer methods. PON1 arylesterase activity was measured with kinetic methods using phenylacetate as a substrate [3].

Data are expressed as mean \pm SD when normally distributed or median and 95% confidence interval when not normally distributed. For non-normally distributed parameters the Mann-Whitney U test was employed to test differences between groups. Otherwise, t-test for independent samples was used. Bivariate correlations were calculated by Spearman's rank correlation test. All statistical tests were considered significant at $p < 0.05$ based on two-tailed tests. All analyses were conducted with STATA version 12.1 (StataCorp, College Station, TX, USA).

As shown in Table 1, pregnant women displayed dyslipidemia with marked hypertriglyceridemia. Only 12.5% of subjects displayed TG < 150 mg/dl; 67% showed TG > 150 mg/dl; 16% TG > 300 mg/dl and 4.5% TG > 400 mg/dl. GGT levels were within the reference range.

Table 2 shows the correlations between PON1, GGT and lipids. GGT and PON1 activity were negatively correlated.

This study confirms a high incidence of moderate to severe hypertriglyceridemia in pregnant women in addition to high TG/HDL-C ratios, hallmarks of insulin resistance of pregnancy. It shows for the first time a significant negative correlation between pro-oxidant atherogenic GGT activity and antioxidant PON1 activity, supporting the role of GGT in CV risk while suggesting another possible mechanism: GGT may disrupt PON1 activity and HDL function.

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Table 1: Biochemical parameters in term pregnant women (n=64).

Total Cholesterol (mg/dL)	267.3 ± 60.0
HDL-C (mg/dL)	71.4 ± 14.7
LDL-C (mg/dL)	101.9 ± 38.9
Triglycerides (mg/dL)	230.6 (110-330)
GGT (U/L)	12.5 ± 20.9
PON Lactonase U/L	134.5 ± 58.1
PON Arylesterase U/L	115.07 ± 29.5

Table 2: Correlations between PON1 activity and biochemical parameters in term pregnant women (n=64).

	GGT	TG	LDL-C	HDL-C
PON1	-0.47	0.2*	0.44	0.37

All correlations significant $p < 0.05$

Except * NS

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