Is there any correlation between maternal bile acid levels and neutrophil/lymphocyte ratio in obstetric cholestasis?

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Objective

Obstetric cholestasis (OC) is a pregnancy specific liver disorder, which typically presents after the second trimester of pregnancy. OC is characterized by otherwise unexplained pruritus, raised bile acids (≥10 μ lmol/L) and/or liver transaminases. The pathogenesis of OC is not well defined. Multiple factors have been implicated in the pathogenesis of OC including environmental influences, nutritional deficiencies, hormonal changes, and genetic variations. Severe OC, defined as maternal serum bile acids above 40 μmol/L, is associated with poor fetal outcomes. Systemic inflammatory response is associated with changes in circulating white blood cells, particularly the existence of neutrophilia with a relative lymphocytopenia. Neutrophil-to-lymphocyte ratio (NLR) is a new, simple and cheap marker of subclinical inflammation and it was introduced as a potential marker to determine inflammation in cardiac and noncardiac disorders and several malignancies. We aimed to investigate the relationship between the neutrophil/lymphocyte ratio and total bile acid concentrations in pregnant women with cholestasis of pregnancy.

Methods

This study was conducted at Zekai Tahir Burak Women's Health Education and Research Hospital, Ankara, Turkey between June 2013 and December 2013. The study was approved by the Ethical Review Board of the Zekai Tahir Burak Women's Health Education and Research Hospital and was designed in accordance with the Declaration of Helsinki. All patients entered the study only after informed consent was obtained. A total of 32 pregnant women with mild OC, 33 pregnant women with severe OC and 70 healthy pregnant women were enrolled in the study. All CBC analysis was performed in the hematology laboratory of our hospital using the same analyzer within 2 hours of collection of blood samples. All samples were run in duplicate, and the mean values were used for statistical analysis. Data were analyzed using the Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA) version 12. 0. Descriptive statistics were expressed as mean and standard deviation for numerical variables. The level of statistical significance was considered as $p < 0.05$.

Results

The clinical characteristics of women with OC and controls are outlined in Table 1. The mean NLR was found to be elevated not only in pregnant women with cholestasis when compared to the ones without, it also predicted the severity of the cholestasis. The correlation between fasting TBA and NLR was significant.

Conclusion

To our knowledge, this is the first study investigating the relationship between NLR levels and maternal bile acid levels in OC. NLR can replace TBA as a marker in the diagnosis of OC and also predicts the severity of the cholestasis in pregnant women.

Table 1. Characteristics of the OC groups and the control group.

Clinical and laboratory parameters	Controls n=70	Mild cholestasis n=33	Severe cholestasis n=32	p value
Age (years)	28.1, ±4.7	28.8, ±4.8	28.9, ±5.3	0.686
Gestational week	38.7, ±1.1 [b c]	37.2, ±1.7 [a c]	35.6, ±2.7 [a b]	<0.001
BMI	28.9, ±3.8	28.5, ±3.9	29.6, ±4.2	0.915
Gravidity	1.6, ±0.7	1.8, ±0.9	1.6, ±0.7	0.53
Parity	0.6, ±0.6	0.7, ±0.8	0.5, ±0.6	0.465
AST (U/L)	22.4, ±7.1 [c]	44.8, ±38.3 [c]	176.0, ±94.7 [a b]	<0.001
ALT (U/L)	23.0, ±9.5 [c]	61.4, ±59.4 [c]	225.7, ±166.7 [a b]	<0.001
WBC X 10^9/L	8.32, ±1485 [c]	8.63, ±1696.8	9.12, ±1403.5 [a]	0.44
Neutrophils X 10^9/L	5.2, ±1.6 [b c]	6.7, ±2 [a c]	7.991, ±2 [a b]	<0.001
Lymphocytes X 10^9/L	2.4, ±0.8 [c]	2, ±1.4	1.6, ±0.4 [a]	<0.001
NLR	2.32, ±0.77 [b c]	3.97, ±1.5 [a c]	5.59, ±1.98 [a b]	<0.001

ALT: alanine aminotransferase; AST: aspartate aminotransferase; BMI: body mass index; NLR: neutrophil/lymphocyte ratio; ICP: intrahepatic cholestasis of pregnancy; WBC: white blood cell; [a] Different from the control group; [b] Different from the mild ICP group; [c] Different from the severe ICP group

Table 2. Fasting and postprandial TBA concentrations in pregnant women with mild and severe intrahepatic cholestasis (mean ± SD).

TBA μmol/L	Mild cholestasis n=33	Severe cholestasis n=32	p value
Fasting	18, ±5.9	57.3, ±28.6	<0.001
Postprandial	23.7, ±9.7	69.3, ±36.1	<0.001

NLR measurement