Assessment of Body Fat Distribution and Serum Liver-Type Fatty Acid-Binding Protein (L-FABP) and Neutrophil Gelatinase-Associated Lipocalin (NGAL): Potential Noninvasive Markers for Non-Alcoholic Fatty Liver Disease

Moushira Zaki 1, Hala El-Bassyouni 2, Mona Abd Elmotaleb A Hussein 3, Mina Wassef Girgiss 4, Eman R. Youness 5

1 Biological Anthropology Department, National Research Centre, Giza, Egypt

2 Clinical Genetics Department, National Research Centre, Cairo, Egypt

3 Internal Medicine National Institute of Diabetes and Endocrinology, Cairo, Egypt

4 Medical Department, Medical Research Division, National Research Centre, Giza, Egypt

5 Medical Biochemistry Department, Medical Research Division, National Research Centre, Giza, Egypt

Abstract:

Previous studies reported significant positive correlations between liver-type fatty acid-binding protein (L-FABP) and neutrophil gelatinase-associated lipocalin (NGAL) marks with obesity.

L-FABP is a cytosolic protein that modulates fatty acid metabolism, and NGALs a biomarker of inflammation and infection.

Our objective was to investigate levels of NGAL and L-FABP in the serum of women with non-alcoholic fatty liver disease (NAFLD) and determine their diagnostic values. The subjects of this study comprised 150 women: 75 with NAFLD and 75 healthy control. Serum L-FABP and NGAL levels were determined by a sandwich enzyme-linked immunosorbent assay. Serum lipids were measured by enzymatic colorimetric methods. The abdominal fat was assessed by waist circumference (WC) and defined as WC ≥ 88 cm2. Visceral fat thicknesses (VFT) were investigated ultrasonographically.

Anthropometry and systolic and diastolic blood pressure (BP) were taken. Body composition was measured by Tanita Body Composition Analyzer (SC-330). NAFLD patients were diagnosed with elevated transaminases and with steatosis by ultrasonography. Serum NGAL, L-FABP, WC, triglycerides, LDL-C, VFT, systolic and diastolic BP were significantly higher in NAFLD than controls. Significant positive correlations were observed between serum NGAL and L-FABP and adiposity parameters (WC and VFT), body fat% and blood pressure, AST and ALT levels. NGAL and L-FABP might be used as novel biomarkers for early detection of NAFLD and metabolic abnormalities.

Elevated NGAL and L-FABP were associated with adiposity parameters, serum lipids, blood pressure, AST and ALT levels, which suggest the relationship of body fat distribution and lipid metabolism in NAFLD. Investigation of the two biomarkers and body fat content could serve as novel noninvasive diagnostic markers for NAFLD, propose a new perception for NAFLD's therapeutic interference, and might be useful biomarkers for detecting the preclinical stage of the metabolic abnormalities in the general population.

Keywords:

neutrophil gelatinase-associated lipocalin; liver-type fatty acid-binding protein; visceral fat thicknesses; waist circumference; lipid profile; NAFLD.