

Study of Fibroscan in Non-alcoholic Fatty Liver Disease in Obese Children and Adolescents

Thesis

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List of Abbreviations

ALT	: Alanine transaminase
ANOVA	: Analysis of Variance
APTT	: Activated partial thromboplastin time
AST	: Aspartate aminotransferase
AUC	: Area under the curve
BMI	: Body mass index
CAP	: Controlled Attenuation Parameter
CDC	: Centers for Disease Control
CT	: Computed tomography
dSAT	: Deep subcutaneous adipose tissue
ELF	: Enhanced Liver Fibrosis
ELISA	: Enzyme linked immune sorbent assay
GGT	: G-glutamyl transpeptidase
HA	: Hyaluronic acid
HDL	: High density lipoprotein
HOMA-IR	: Homeostasis model assessment for insulin resistance
HRP	: Horseradish Peroxidase
INR	: International normalized ratio
IQR	: Interquartile range
KLF 6	: Kruppel-like factor 6
LDL	: Low density lipoprotein
LSM	: Liver stiffness measurement
NAFLD	: Non-alcoholic fatty liver disease
NAS	: NAFLD activity score
OSA	: Obstructive sleep apnea
ox-LDL	: Oxidized low-density-cholesterol
PB	: Peripheral blood
ROC	: Receiver operating characteristic

List of Abbreviations (Cont.)

SAFETY	:	Screening ALT for Elevation in Today's Youth
SAT	:	Subcutaneous adipose tissue
SDS	:	Standard deviation score
TBARS	:	Thiobarbituric acid-reacting substance
TE	:	Transient Elastography
TE	:	Transient Elastography
TIMP-1	:	Metalloproteinase 1
TNF	:	Tumor necrosis factor
US	:	Ultrasound
VAT	:	Visceral adipose tissue
WHO	:	World health organization

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Abstract

Background: Non-alcoholic fatty liver disease (NAFLD) is one of the most common causes of chronic liver disease worldwide. Obesity is associated with an increased risk of NAFLD. FibroScan, or transient elastography (TE), non-invasively assesses liver fibrosis and presents comparable performance to liver biopsy to predict liver-related outcomes in patients with chronic liver diseases. Controlled attenuation parameter (CAP) is a novel parameter for detection of hepatic steatosis. TE with CAP is a viable alternative to ultrasonography, both as an initial assessment and during follow-up of patients with NAFLD. Visfatin is a novel adipokine originally described to be produced predominantly by visceral fat tissue. **Aim:** To assess the prevalence of hepatic abnormalities in obese children and adolescents by transient elastography using liver stiffness and CAP and evaluate their relation to clinical and laboratory variables as well as serum visfatin levels. **Methods:** Eighty children and adolescents with simple obesity (42 males and 38 females) were compared with 40 healthy controls and studied stressing on blood pressure and auxological measures (body mass index [BMI] and waist/hip ratio). Abdominal ultrasound was done for assessment of the liver. Liver stiffness and CAP measurements were performed for all patients using FibroScan. Fasting lipid profile, fasting blood glucose (FBG) and insulin level, liver and kidney functions and coagulation profile were assessed. Data for serum visfatin levels were obtained from patients' files. **Results:** As regards hepatic abnormalities among the studied obese patients, 16 (20%) patients had elevated alanine aminotransferase (ALT), 54 (67.5%) had hepatomegaly and 31 (38.8%) had NAFLD by abdominal ultrasound while 9 (11.2%) had both NAFLD and elevated ALT. It was found that 61.2% of the studied obese patients had NAFLD grade 0 (i.e. normal echogenicity of the liver), 36.2% had NAFLD grade 1 and 2.5% had NAFLD grade 2 while none of the patients had grade 3. According to liver stiffness, 81.2% of patients had F0, 12.5 % had F1, 2.5% had F2 and another 2.5% had F3 while none had F4. Using CAP, 43.8% had S0 (no steatosis), 23.8%, 13.8% and 17.5% had S1, S2 and S3, respectively. According to either CAP or elevated ALT was observed in 47 patients; only 3 of them had S0 by CAP but their ALT was elevated. Obese patients with NAFLD had higher age, weight, height, BMI, waist and hip circumference as well as waist/hip ratio, FBG, serum creatinine, ALT, triglycerides, total cholesterol and low density lipoprotein cholesterol (LDL-cholesterol)