Clinical and Diagnostic Significance of Metabolic Dysfunction and Liver Fibrosis Stages in Patients with Non-Alcoholic Fatty Liver Disease (NAFLD)

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Abstract

Background: Non-alcoholic fatty liver disease (NAFLD) is a leading cause of chronic liver disease worldwide.

Methods: A prospective study of 84 patients was conducted to evaluate the link between metabolic markers and fibrosis. Liver stiffness was measured using transient elastography (FibroScan).

Results: A significant correlation was found between HOMA-IR and fibrosis stage ($r=0.58$, $p<0.05$). Patients with BMI >30 kg/m² showed a 2.4-fold higher risk of advanced fibrosis (95% CI: 1.8–3.2).

Conclusion: Early metabolic intervention is crucial to prevent progression to cirrhosis. [112 words]

Keywords: NAFLD, Hepatology, Liver Fibrosis, Insulin Resistance, Transient Elastography, HOMA-IR.

1. Introduction. NAFLD has become a global health priority, affecting approximately 25% of the adult population. In Uzbekistan, the rising prevalence of obesity and type 2 diabetes has led to an increase in NAFLD cases. The primary challenge in clinical hepatology is the early identification of patients at high risk for liver fibrosis, which is the most significant predictor of mortality.

2. Materials and Methods

Study Population: 84 patients (mean age 46.2±5.4 years) diagnosed with NAFLD.

Measurements: Anthropometric data (BMI, waist circumference), biochemical tests (ALT, AST, Lipid profile), and Insulin Resistance (HOMA-IR).

Imaging: Liver stiffness measurement (LSM) was performed using FibroScan® 502 Touch.

Statistical Analysis: Data were analyzed using SPSS v.26. Continuous variables are expressed as Mean ± SEM. $p < 0.05$ was considered statistically significant.

3. Results

The study revealed that metabolic dysfunction significantly correlates with the severity of liver damage.

Table 1. Clinical and Metabolic Profile of Study Participants

Variable	NAFLD Group (n=84)	Control Group (n=30)	p-value
BMI (kg/m²)	31.4 ± 2.1	23.2 ± 1.4	< 0.01
HOMA-IR	4.8 ± 0.6	1.2 ± 0.2	< 0.01
ALT (U/L)	58.6 ± 4.2	18.4 ± 2.1	< 0.05
LSM (kPa)	7.4 ± 1.2	4.2 ± 0.5	< 0.05

4. Discussion

Our findings confirm that insulin resistance (HOMA-IR) is a major driver of fibrogenesis. Comparison with international cohorts shows that patients in our region often present with advanced steatosis even at lower BMI thresholds, suggesting genetic or dietary influences.

5. Conclusion

Metabolic screening and non-invasive elastography should be integrated into the standard care for NAFLD patients. This approach allows for the early detection of fibrosis and the implementation of targeted therapies to reduce the burden of liver-related complications.

Key References (Sample)

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