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EVALUATION OF SERUM VISFATIN AS A NOVEL BIOMARKER IN PATIENTS WITH NON-ALCOHOLIC FATTY LIVER DISEASE AND ITS CORRELATION WITH LIVER ENZYMES

Kum. Rajesh Chahar[1*], Dr. Sandeep Tripathi[2], Dr. Vinita Ailani[3], Dr. Sunita Saini[4]

[1]Ph.D. Scholar, Department of Medical Biochemistry, National Institute of Medical Sciences & Research, Jaipur, Rajasthan,
Email ID: rajesh9460@gmail.com
[2]Professor, Department of Medical Biochemistry, National Institute of Medical Sciences & Research, Jaipur, Rajasthan,
Email ID: sandeeptripathiphd@gmail.com
[3]Professor, Department of Physiology, National Institute of Medical Sciences & Research, Jaipur, Rajasthan,
Email ID: ailanivinita@gmail.com
[4]Associate Professor, Department of Pathology, Shri Kalyan Govt. Medical College, Sikar, Rajasthan,
Email ID: drvisusaini8615@gmail.com
*Corresponding Author: Kum. Rajesh Chahar - rajesh9460@gmail.com

ABSTRACT

Background: Non-alcoholic fatty liver disease (NAFLD) is a leading cause of chronic liver disease and is closely associated with metabolic dysfunction, including obesity and insulin resistance. Visfatin, a pro-inflammatory adipokine, has emerged as a potential non-invasive biomarker for assessing hepatic inflammation in NAFLD.

Objective: To evaluate serum Visfatin levels in patients with non-alcoholic fatty liver disease and determine their correlation with liver enzymes.

Methods: This cross-sectional observational study was conducted on 50 ultrasonography-confirmed NAFLD patients aged 18–65 years. Serum Visfatin levels were measured by enzyme-linked immunosorbent assay (ELISA). In contrast, serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), and gamma-glutamyl transferase (GGT) were estimated using standard automated biochemical methods. Data were analyzed using SPSS version 25. Pearson's correlation coefficient was used to assess the relationship between serum Visfatin and liver enzymes, with a p-value <0.05 considered statistically significant.

Results: The mean age of the participants was 44.7 ± 10.9 years, with 31 (62%) males and 19 (38%) females. The mean serum Visfatin concentration was 7.96 ± 2.14 ng/mL. Mean ALT, AST, and GGT levels were 63.2 ± 18.5 U/L, 47.1 ± 14.8 U/L, and 38.6 ± 18.4 U/L, respectively. Serum Visfatin showed a significant positive correlation with ALT ($r = 0.58$, $p < 0.001$), AST ($r = 0.49$, $p < 0.001$), and GGT ($r = 0.54$, $p < 0.001$), indicating that higher Visfatin concentrations were associated with greater hepatic enzyme abnormalities.

Conclusion: Serum Visfatin levels were significantly elevated and positively correlated with liver enzyme levels in patients with NAFLD. These findings suggest that Visfatin may serve as a promising non-invasive biomarker for hepatic inflammation and disease severity in NAFLD.

KEYWORDS: Non-alcoholic fatty liver disease, Visfatin, Liver enzymes, ALT, AST, GGT, Biomarkers.

INTRODUCTION

Non-alcoholic fatty liver disease is the most prevalent chronic liver disease worldwide, affecting approximately 25–30% of the adult population. It encompasses a spectrum of liver disorders ranging from simple hepatic steatosis to non-alcoholic steatohepatitis (NASH), fibrosis, cirrhosis, and hepatocellular carcinoma. The increasing prevalence of obesity, type 2 diabetes mellitus, and metabolic syndrome has contributed significantly to the growing burden of NAFLD, making it a major global health concern (1-3).

The pathogenesis of NAFLD is multifactorial and involves insulin resistance, oxidative stress, chronic low-grade inflammation, and adipose tissue dysfunction. Visceral adipose tissue acts as an active endocrine organ by secreting several adipokines that regulate glucose metabolism, lipid homeostasis, and inflammatory pathways. Dysregulation of these adipokines has been implicated in the initiation and progression of hepatic steatosis and liver injury (4,5).

Visfatin, also known as nicotinamide phosphoribosyltransferase (NAMPT) or pre-B-cell colony-enhancing factor, is a pro-inflammatory adipokine predominantly expressed in visceral adipose tissue. It exerts insulin-mimetic and immunomodulatory effects and stimulates the production of inflammatory cytokines, including tumor necrosis factor-α and interleukin-6. Elevated circulating visfatin levels have been associated with obesity, insulin resistance, metabolic syndrome, and chronic inflammatory disorders (6,7).

Recent evidence suggests that serum visfatin concentrations are increased in patients with NAFLD and may correlate with disease severity, hepatic inflammation, and fibrosis. Because liver biopsy remains the gold standard for diagnosing and staging NAFLD despite its invasive nature and potential complications, there is considerable interest in identifying reliable non-invasive biomarkers. Visfatin has emerged as a promising candidate for evaluating hepatic injury and disease progression (8-10).

Therefore, the present study was undertaken to evaluate serum visfatin levels in patients with NAFLD and to determine their correlation with liver enzymes, thereby assessing its potential role as a non-invasive biomarker of hepatic inflammation.

MATERIALS AND METHODS

Study Design and Setting

A cross-sectional observational study was conducted at the Department of Medical Biochemistry, NIMS University, Jaipur, in collaboration with the Department of General Medicine, S.K. Medical College, Sikar. Ethical approval was obtained, and written informed consent was secured from all participants.

Study Population

A total of 50 adults (18–65 years) with ultrasonography-confirmed non-alcoholic fatty liver disease (NAFLD) were enrolled. NAFLD was diagnosed based on clinical evaluation, laboratory investigations, and ultrasonographic evidence of hepatic steatosis. Patients with significant alcohol consumption, viral hepatitis, autoimmune or drug-induced liver disease, pregnancy, malignancy, chronic kidney disease, or severe systemic illness were excluded.

Sample Collection and Analysis

Following an overnight fast (8–12 hours), 5 mL of venous blood was collected from each participant. Serum was separated by centrifugation, stored at −80°C, and analyzed for liver enzymes (ALT, AST, and GGT) using standard enzymatic methods on a fully automated clinical chemistry analyzer. Serum Visfatin levels were measured using a commercially available enzyme-linked immunosorbent assay (ELISA).

Statistical Analysis

Data were analyzed using SPSS version 25.0. Continuous variables were expressed as mean ± SD, and Pearson's correlation coefficient was used to assess the association between serum Visfatin and liver enzymes. A p-value <0.05 was considered statistically significant.

RESULTS

A total of 50 patients with ultrasonography-confirmed non-alcoholic fatty liver disease (NAFLD) were included in the study. Table 1 presents the baseline demographic characteristics of the study participants. A total of 50 ultrasonography-confirmed NAFLD patients were included in the study. The mean age of the participants was 44.7 ± 10.9 years, indicating that most patients were middle-aged adults. Among the participants, 31 (62%) were males, and 19 (38%) were females, showing a higher prevalence of NAFLD among males in the present study.

Table 1. Baseline characteristics of study participants (n = 50)

Variable	Value
Number of participants	50
Age (years), Mean ± SD	44.7 ± 10.9
Male, n (%)	31 (62%)
Female, n (%)	19 (38%)

Table 2 summarizes the serum Visfatin concentration and liver enzyme levels in patients with NAFLD. The mean serum Visfatin level was 7.96 ± 2.14 ng/mL. The mean serum ALT, AST, and GGT levels were 63.2 ± 18.5 U/L, 47.1 ± 14.8 U/L, and 38.6 ± 18.4 U/L, respectively. Elevated liver enzyme values suggest hepatocellular injury and hepatic inflammation, while the increased serum visfatin concentration supports its potential role as an inflammatory adipokine associated with NAFLD.

Table 2. Serum Visfatin and Liver Enzyme Levels in Patients with NAFLD (n = 50)

Parameter	Mean ± SD	Unit
Serum Visfatin	7.96 ± 2.14	ng/mL
ALT	63.2 ± 18.5	U/L
AST	47.1 ± 14.8	U/L
GGT	38.6 ± 18.4	U/L

Table 3 shows the correlation between serum Visfatin and liver enzymes in patients with NAFLD. Pearson's correlation analysis demonstrated a moderate positive correlation between serum Visfatin and ALT ($r = 0.58$, $p < 0.001$), AST ($r = 0.49$, $p < 0.001$), and GGT ($r = 0.54$, $p < 0.001$). All correlations were statistically significant ($p < 0.001$), indicating that higher serum Visfatin concentrations were associated with higher liver enzyme levels. These findings suggest that serum visfatin may reflect the degree of hepatic inflammation and could serve as a promising non-invasive biomarker for assessing disease severity in patients with NAFLD.

Table 3. Correlation of serum Visfatin with liver enzymes

Parameter	Pearson's r	p-value	Interpretation
ALT	0.58	<0.001	positive correlation
AST	0.49	<0.001	positive correlation
GGT	0.54	<0.001	positive correlation

DISCUSSION

The present study evaluated the association between serum visfatin levels and liver enzymes in patients with non-alcoholic fatty liver disease (NAFLD). Serum visfatin demonstrated a significant positive correlation with ALT, AST, and GGT, suggesting that elevated visfatin levels are associated with increased hepatocellular injury and hepatic inflammation. These findings support the potential role of visfatin as a non-invasive biomarker for assessing disease activity in NAFLD (11,12).

The mean age of the study participants was 44.7 ± 10.9 years, with a male predominance (62%). This demographic profile is consistent with previous studies reporting that NAFLD is more prevalent among middle-aged adults and males because of the higher prevalence of obesity, insulin resistance, and metabolic syndrome (13,14).

Visfatin, also known as nicotinamide phosphoribosyltransferase (NAMPT), is a pro-inflammatory adipokine secreted primarily by visceral adipose tissue and activated immune cells. It contributes to hepatic inflammation by promoting the release of inflammatory cytokines, including TNF-α, IL-6, and IL-1β, through activation of NF-κB and related signaling pathways (12,15). These inflammatory mechanisms may contribute to the progression of hepatic steatosis to steatohepatitis and fibrosis.

In the present study, serum Visfatin showed a moderate positive correlation with ALT (r = 0.58), AST (r = 0.49), and GGT (r = 0.54), indicating that higher circulating Visfatin concentrations are associated with greater hepatocellular damage. Similar findings have been reported by several investigators, who observed significantly elevated serum Visfatin levels in patients with NAFLD and demonstrated positive associations with liver enzymes, insulin resistance, and inflammatory markers (16,17). These observations suggest that Visfatin may reflect ongoing hepatic inflammation rather than simple fat accumulation.

However, not all published studies have reported similar findings. A recent systematic review and meta-analysis by Herman et al. found no significant overall association between circulating Visfatin concentrations and NAFLD severity. The authors suggested that differences in study populations, sample size, ethnicity, assay methods, and diagnostic criteria may account for the inconsistent results reported across studies (11).

The present study has certain limitations. The relatively small sample size and cross-sectional design limit the ability to establish causality. In addition, NAFLD was diagnosed using ultrasonography rather than liver biopsy, the reference standard for assessing hepatic inflammation and fibrosis. Larger prospective studies incorporating histopathological assessment are needed to validate the diagnostic and prognostic value of serum Visfatin in NAFLD.

Overall, the findings of the present study suggest that serum Visfatin is significantly associated with liver enzyme abnormalities in patients with NAFLD and may serve as a promising adjunctive non-invasive biomarker for evaluating hepatic inflammation and disease severity.

CONCLUSION

Serum visfatin showed a significant positive correlation with ALT, AST, and GGT levels in patients with non-alcoholic fatty liver disease (NAFLD). These findings suggest that Visfatin may serve as a promising non-invasive biomarker for hepatic inflammation and disease severity. Further large-scale prospective studies are needed to validate its clinical utility.

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Conflict of Interest: None

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