AN ASSOCIATION OF METABOLIC SYNDROME WITH NONALCOHOLIC FATTY LIVER DISEASE

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INTRODUCTION
Metabolic syndrome (MetS), as insulin resistance (IR), represents an association of risk factors for cardiovascular disease and type 2 diabetes mellitus (T2DM) that co-occur more frequently than by chance. These risk factors may be high blood pressure (HBP), fasting glucose, increased level of triglycerides (TG), low high-density lipoprotein (HDL) cholesterol levels, and obesity (mainly abdominal), mainly in those with an excess of intra-abdominal or visceral adipose tissue [1]. It is assessed that 32.4% of the population worldwide has nonalcoholic fatty liver disease (NAFLD). The incidence and prevalence have rapidly increased over time, from 25.5% before 2005 to 37.8% in 2016 [2], synchronizing with the global obesity pandemic [3] and becoming one of the leading causes of cirrhosis in some countries [4]. Moreover, it is foreseen that, in terms of indication for liver transplantation, NAFLD will exceed the viral etiology [5]. Significantly higher overall prevalence of NAFLD was found in male than female. For diagnosis of NAFLD liver biopsy is the gold standard, since it is invasive, other noninvasive ways of diagnosis were used (serum biomarkers and imaging-based biomarkers).

Objectives: The objectives of the study are to find an association of MetS with NAFLD.

METHODS
This cross-sectional study recruited total 342 healthy persons from which 86 NAFLD 86 control were suitably selected for study duration of 1 year. Diagnosis of nonalcoholic fatty liver disease was done by liver imaging and based on liver enzymes. MetS assessment was done by the national cholesterol education program adult treatment panel III (NCEP ATP III) criteria. Estimation of all biochemical and hematological parameters and liver enzymes was done following standard guidelines. Mean comparison of quantitative data in different groups was analyzed with one-way analysis of variance.

RESULTS: There were significant high levels of body mass index, waist circumference, and lipid profiles in NAFLD patients in comparison to control population (p<0.001). According to the NCEP ATP III criteria, 59.3% of NAFLD were present with MetS where risk estimate was significant (odds ratio=2.15).

Conclusion: This study suggests that there is an increased in all the components of MetS and gross changes in biochemical markers in cases of NAFLD. Therefore, whenever MetS factors are met in the clinical checkups, patients must be diagnosed for NAFLD by imaging (fatty liver).

Keywords: Nonalcoholic fatty liver disease, Metabolic syndrome, Body mass index.

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Our study showed that NAFLD cases associated with MetS were 59.3%, i.e., 51 cases out of 86 cases, while in control group, 28 people were present with MetS.

In NCEP ATP III criteria, 13.66% of NAFLD were present with MetS with OR=2.15 where risk estimate was significant while in our study, 59.3% cases of NAFLD were present with MetS (Table 3). In the study of Tse et al., the prevalence of MetS was 1.11% based on diagnostic criteria international diabetes federation, NCEP ATP III [7]. NAFLD cases were 62.8% high, 37.2% normal, and 0.00% with low BMI were found in our study similarly the association between BMI and NAFLD, which were 11.4%, 10.8%, 10.2%, respectively [8].

**CONCLUSION**

This study suggests that there is an increased in all the components of MetS and gross changes in biochemical markers in cases of NAFLD. Therefore, whenever MetS risk factors are seen in the routine checkups, patients must be diagnosed for NAFLD by USG. Furthermore, endeavors are essential to study the NAFLD within the population to monitor this disease. Early diagnosis would help in delaying its complications and play a major role in preventing cardiac diseases as its association with MetS is frequent.

**CONFLICTS OF INTERESTS**

No conflicts of interest.

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