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ALCOHOLIC LIVER DISEASE (ALD) AND NON-ALCOHOLIC FATTY LIVER DISEASE (NAFLD): SIMILARITIES AND DIFFERENCES IN PATHOGENESIS

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Relevance. Alcoholic Liver Disease (ALD) and Non-Alcoholic Fatty Liver Disease (NAFLD) are the found to be the major causes of severe liver diseases globally. In recent studies, it is visible that both are rising in their prevalence. The prevalence rate of NAFLD has been reported to be 30% worldwide, and in specific region of the Western Nations, the rate has been elevated up to 45%, whereas ALD has been considered to be one of the vital causes of liver-related morbidity, especially in Europe. ALD and NAFLD represent cascade of liver abnormalities, starting with simple hepatic steatosis, also known as a significant accumulation of fat percentages in more than 5% of hepatocytes, that progresses towards steatohepatitis, fibrosis, cirrhosis, and ultimately hepatocellular carcinoma (HCC). Understanding these shared convergent and divergent molecular mechanisms in both is crucial to design potential therapeutic strategies and interventions based on common processes, that includes oxidative stress, lipid toxicity, fibrogenesis and gut-liver axis malfunctioning.

Aim: the aim of the study was to systematize, analyze and perform current scientific data on the pathogenic mechanisms in Alcoholic Liver Disease and Non-Alcoholic Fatty Liver Disease, identifying common pathways and disease-specific features for a deeper understanding of chronic liver disease development.

Materials and methods. Relevant publications were searched in the international databases PubMed/MEDLINE, Web of Science, and Scopus. Biochemical test reports of 36 patients with median age of 51.50[44.50-66.25], including 18 patients with ALD with median age of 66.50[54.25-74.5] and 18 patients with NAFLD with median age of 46.50[34.75-50.75], were obtained from Asiri Central Hospital of Colombo, Sri Lanka and analyzed for biochemical parameter such as total protein, albumin, globulin, bilirubin, AST, ALT, GGT, ALP, and AST/ALT ratios. Statistical data and plotting were performed using Statistica 10.0. All values are presented as Median [25%-75%]. The Mann-Whitney method was used for comparative analysis of the reliability of differences between groups.

Results and their discussion. Statistical analysis of biochemical parameters revealed different metabolic signatures differentiating ALD from NAFLD. The AST/ALT ratio proved characteristic opposing patterns. ALD patients exhibit elevated AST/ALT ratios with median of 2.18[1.26-2.21] U/l, consistent with established pathophysiological mechanisms including mitochondrial damage, pyridoxal phosphate deficiency impairing ALT synthesis, and ethanol induced AST release. In contrast, NAFLD patients showed increased ratios with median of 0.77[0.53-0.86] U/l, reflecting predominant hepatocellular injury with ALT predominance. This enzymatic pattern showcases one of the most reliable clinical based distinguishers between the two conditions. ALD patients have GGT levels with median of 53.00[23.25-83.50] U/l when compared to NAFLD patients with median of 76.00 [59.00-95.75] U/l patients reflecting the inductive effects of ethanol and metabolic dysfunction respectively. Both groups showed related total protein and albumin levels, however patients with ALD reflected greater variability in hepatic synthetic function.

Conclusions. It has been identified that the characteristic De Ritis ratio (AST/ALT ratio) patterns serves as a diagnostic and prognostic indicator for both diseases through several statistical tests and comparative analysis thus highlighting its importance. Increased ratios support ALD and decreased ratios favor NAFLD diagnosis, hence proving that ALD and NAFLD, despite different initiation points, in most cases, share common biochemical pathways focused on steatohepatitis, oxidative stress, and inflammatory fibrogenesis. These finding help in the development of treatment methodologies for both severe conditions.