Table 1 – Deformation and strength parameters of samples

Concentration of UDDD-SF in the sample, %	0	0,01	0,03	0,05	0,1	0,5	1,0	5,0	10,0
Tensile strength at break, MPa	22,2	78,0	54,0	67,2	44,7	74,0	54,3	53,9	49,0

The best result was obtained when testing samples containing 0.01% of the filler by weight: the tensile strength σ_p=78 MPa, which significantly exceeds the strength of unfilled UHMWPE and samples containing high concentrations of UDDD-SF (1–10% by weight).

Conclusions

Depending on their nature and degree of dispersion, carbon filler particles actively interact with the composite matrix, dramatically altering its physical and chemical properties. The deformation and strength characteristics of the composites were studied.

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THE CLINICAL POWER OF DE RITIS RATIO IN ALCOHOLIC LIVER DISEASE AND NON-ALCOHOLIC FATTY LIVER DISEASE

Introduction

The aspartate aminotransferase to alanine aminotransferase ratio, commonly known as the De Ritis ratio (DRR), acts as an important indicator in the clinical differentiation of Alcoholic Liver disease (ALD) and Non-Alcoholic Fatty Liver disease (NAFLD). This ratio is an also a non-invasive biomarker of damage to liver functions, and can be utilized to assess the causes and mechanisms of both these conditions. The term non-alcoholic fatty liver disease (NAFLD) refers to the entire spectrum of liver diseases that result from the presence of steatosis in more than 5% of the hepatocytes in the absence of alcohol use. NAFLD has a broad spectrum of severity and progression, ranging from mild steatosis to the more inflammatory condition known as non-alcoholic steatohepatitis, which may progress to the development of cirrhosis and finally hepatocellular carcinoma. ALD refers to liver injuries due to excessive usage of alcohol, that stimulates a redox imbalance and acetaldehyde toxicity. Despite these distinguishable etiologies, both conditions converge on hepatic steatosis as a common pathological starting point [1–3].

Goal

To showcase the significance of De Ritis ratio as a diagnostic marker in patients of non-alcoholic fatty liver disease and alcoholic liver disease, and to evaluate its prognostic value in assessing disease severity and progression.

Material and methods of research

The comparative cross-sectional study analyzed clinical laboratory tests from 36 patients aged 51.50 [44.50–66.25], diagnosed with chronic liver disease, comprising 18 individuals aged 66.50 [54.25–74.5] with NAFLD and 18 patients aged 46.50 [34.75–50.75] with ALD. Data were obtained from the General Hospital of Sri Lanka and biochemical indicators such AST, ALT, ALP, bilirubin, total protein content in serum, GGT, and albumin were statistical analyzed. De Ritis ratio was calculated as AST divided by ALT based on standard formula and subjected to intergroup comparison using The Mann-Whitney method. All information were presented as Mean [Q1–Q3] and [Percentage]. The analytic tool used was Statistica 10 and JASP applications.

The results of the research and their discussion

Comparative analysis of liver enzyme profiles revealed distinct patterns between ALD and NAFLD patients, consistent with their underlying pathogenetic mechanisms. Within the 36 patients analyzed, the NAFLD group comprised 05 females and 13 males while the ALD group included 06 females and 12 males. The data demonstrate clear differentiation between groups. NAFLD patients exhibit ALT predominant elevation with AST/ALT ratio less than 1 reflecting predominant hepatocellular injury causing predominant ALT increase, while ALD patients show AST predominant elevation with ratio greater than 2 consistent with pathological mechanisms including mitochondrial damage, pyridoxal phosphate deficiency impairing ALT synthesis, and ethanol induced AST release. The degree of enzyme elevation correlates with disease severity, with highest values in advanced cases. ALD patients exhibit elevated AST/ALT ratios (Table 1).

Table 1 – Biochemical Indicators of ALD and NAFLD patients

Biochemical Parameter	Patients with ALD (n=18)	Patients with NAFLD (n=18)
Age	66.50 (54.25–74.50)	46.50 (34.75–50.75)
Total protein	7.05 (6.55–7.45)	7.25 (6.64–7.70)
Albumin	3.95 (3.20–4.57)	4.30 (3.63–4.57)
Globulin	3.00 (2.35–3.27)	3.00 (2.60–3.30)
Albumin/globulin	1.31 (1.02–1.94)	1.40 (1.17–1.68)
Total bilirubin	0.80 (0.44–1.48)	0.66 (0.53–1.18)
AST	36.50 (26.75–53.50)	44.00 (31.25–70.50)
ALT	18.50 (15.00–34.25)	56.00 (36.25–119.50)
GGT	53.00 (23.25–83.50)	76.00 (59.00–95.75)
ALP	85.50 (62.75–111.75)	91.50 (59.00–107.00)
AST/ALT Ratio	2.18 (1.26–2.21)	0.77 (0.53–0.86)

The De Ritis ratio demonstrated significant correlation with markers of disease severity, and was found to be a useful diagnostic indicator for both conditions (Figure 1).

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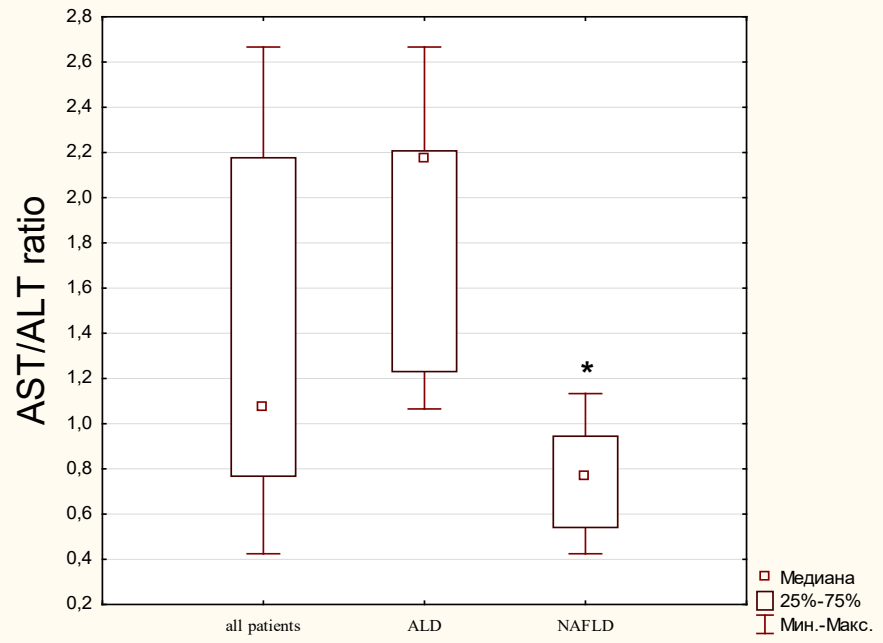


Figure 1 – De Ritis Ratio among ALD and NAFLD patients

Conclusions

The De Ritis ratio and serum enzyme parameters were found to be useful diagnostic indicators for both non-alcoholic fatty liver disease (NAFLD) and alcoholic liver disease (ALD), highlighting their importance. De Ritis Ratio holds a predominant promise as a diagnostic tool for assessing NAFLD and ALD, as it has been recognized as a autonomous prognostic indicator. In the case of ALD, elevated ratios correlate with advanced disease markers including hyperbilirubinemia and hypoalbuminemia, thus showing mitochondrial damage as a biological marker for the severity of the disease. In NAFLD, the increased ALT predominance with ratio less than 1 reflects the cytosolic injury pattern from metabolic overload. The biochemical basis of the De Ritis ratio lies in the differential subcellular localization of its component enzymes. ALT specifically are present in the cytosols and are liver-specific, while AST isoenzymes are present in the mitochondria as well as the cytosol. This relative distribution means that the pattern of enzyme elevation reflects increased levels of these enzymes in the serum are not only dependent on the source of damage but are also dependent on the severity of damage. The De Ritis ratio illustrates how an elementary and cost-effective test, based on simple biochemical principles, can offer diagnostic and prognostic insights that guide clinical and therapeutical management.

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