Hepatic Steatosis Index (HSI): A Valuable Biomarker in Subjects with Metabolic Dysfunction-associated Fatty Liver Disease (MAFLD)

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Introduction and Objectives: Metabolic Dysfunction-associated Fatty Liver Disease (MAFLD) has been recognized as the hepatic component of metabolic syndrome and has become a growing public health concern. Early and accurate detection of MAFLD is crucial for implementing appropriate intervention strategies and preventing progression to serious complications such as liver cirrhosis. We aimed to describe the diagnostic performance of the Hepatic Steatosis Index (HSI) in subjects with MAFLD and compare it with the Homeostatic Model Assessment of Insulin Resistance (HOMA), Waist-to-Hip Ratio (WHR), and Visceral Fat (SECA).

Materials and Methods: Retrospective design study. Bioanthropometric, clinical, and biochemical variables were collected. The HSI was calculated using the formula HSI = 8 * ALT/AST + BMI + 2 (if diabetic) + 2 (if female). ROC curves and their areas were generated. Statistical significance was determined at $p < 0.05$.

Results: A total of 585 subjects were evaluated, of whom 279 were classified with MAFLD (65.5% females) and 306 without MAFLD (76.8% females). Subjects with MAFLD exhibited higher values of age, BMI, WHR, HOMA, CAP, and HSI (Table 1). The HSI showed a diagnostic performance with an area under the curve (AUC) of 0.80. A cutoff point of 39.9 was established for the HSI, with a sensitivity of 63%, specificity of 74%, positive predictive value (PPV) of 73%, and negative predictive value (NPV) of 64%. The HSI demonstrated superior diagnostic performance compared to visceral fat (0.70), HOMA (0.70), and WHR (0.66) (Fig 1).

Conclusions: The results of this study demonstrate that HOMA, visceral fat, and ICC can be useful as screening strategies in MAFLD. However, the Hepatic Steatosis Index (HSI) showed superior diagnostic performance compared to the other evaluated biomarkers. Therefore, it is suggested that HSI be considered a useful diagnostic tool in MAFLD.

Ethical statement

The protocol was registered and approved by the Ethics Committee. The identity of the patients is protected. Consentment was obtained.

Declaration of interests

None

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Table 1
Comparison of variables in subjects with MAFLD and without MAFLD. Numerical variables are expressed as medians and interquartile ranges, and categorical variables with frequency and percentage. Student's t-test or Wilcoxon test was used for the difference of means as appropriate. Categorical variables were compared using Chi-square test. HOMA, Homeostasis Model Assessment of Insulin Resistance; WHR, Waist-Hip Ratio Index; MAFLD, Metabolic Associated Fatty Liver Disease.

Variable	MAFLD (n=279)	Non MAFLD n=306	P-value
AGE	51 (41.7-59)	47 (35-57)	<.0001
Gender			.002
-Male	96 (34.5%)	71 (23.2%)	
-Female	183 (65.5%)	235 (76.8%)	
BMI	31.8 (28.9-35.3)	26.2 (23.9-30.6)	<.0001
Visceral Fat (SECA)	3.4 (2.7-4.5)	2.5 (2-3.2)	<.0001
WHR	.93 (.86-.98)	.86 (.81-.92)	<.0001
Glucose	94 (86-105)	89 (83-95)	<.0001
Insuline	8 (5.9-11.6)	6.3 (4.5-8.9)	<.0001
HOMA	1.8 (1.3-2.9)	1.3 (.94-1.9)	<.0001
Hepatic steatosis index	42.9 (39.6-47.9)	38 (33.8-42)	<.0001

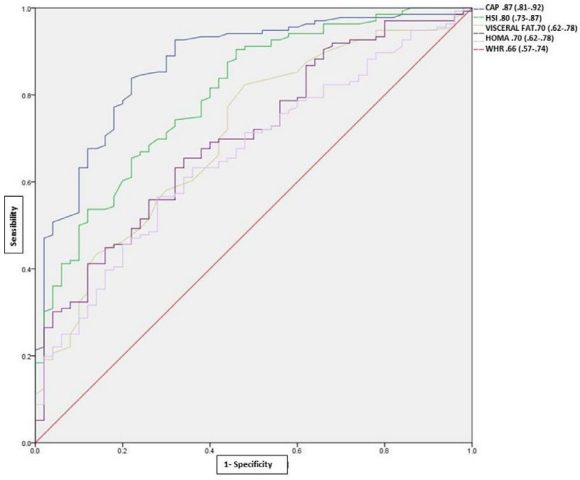

Figure 1. Diagnostic performance of non-invasive biomarkers in subjects with Metabolic Dysfunction-Associated Fatty Liver Disease (MAFLD). Receiver Operating Characteristic (ROC) curves were plotted, and the area under the curve was calculated. The Youden index was used to select the optimal cutoff point. CAP, Controlled Attenuation Parameter; HSI, Hepatic Steatosis Index; HOMA, Homeostatic Model Assessment of Insulin Resistance; ICC.- Waist-to-Hip Ratio.

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Secondary Attack Rate of Hepatitis C Virus (HCV)

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Introduction and Objectives: The transmission routes of Hepatitis C Virus (HCV) are categorized as horizontal and vertical. The former includes sexual contact, parenteral exposure, and intrafamilial transmission, while the latter pertains to mother-to-child transmission. Although extensive literature has documented the parenteral route and sexual contact, there is a paucity of studies examining intrafamilial transmission within the Mexican population. This study aims to determine the rate of horizontal viral transmission among first-degree relatives of patients diagnosed with HCV infection who received treatment at Hospital de Especialidades No. 14, Centro Medico Nacional "Adolfo Ruiz Cortines."

Materials and Methods: The study design is observational, descriptive, and retrospective. Patient records from outpatient clinics were scrutinized for the period spanning January 2018 to January 2022. Clinical and epidemiological characteristics, risk factors obtained from medical histories, and laboratory results (including positive HCV viral load and HCV serum PCR test) were evaluated to classify cohorts. Informed consent was obtained from all patients. The research work was registered and approved by the Local Research Committee (R-2022-3001-088).

Results: A total of 129 patients were analyzed, with an average age of 39.56 years. Female gender predominated among 68 patients (52.7%), and 29 patients (22.5%) acquired HCV infection. The primary risk factors identified were Systemic Arterial Hypertension (RR: 7.47, 95% CI: 2.951-18.914, p<0.05), Type 2 Diabetes Mellitus (RR: 16.125, 95% CI: 5.985-43.441, p<0.05), and Chronic Kidney Disease (RR: 10.795, 95% CI: 3.736-31.188, p<0.05) (Table 1). Only two patients (6.89%) were classified as having chronic infection based on measured viral load. All patients received Direct-Acting Antiviral treatment, resulting in sustained viral response at three months post-treatment completion. The primary attack rate was 22.48%, the secondary attack rate was 412.5%, and the R_0 was 1,492,953 (Table 2).

Conclusions: The study demonstrated that first-degree relatives with comorbidities are at a higher risk of contracting HCV infection. The study's findings also revealed that the prevalence of HCV infection is higher than the reported rate in the general population. These results highlight the importance of targeted screening programs, especially in high-risk populations with comorbidities, to identify and treat HCV infections promptly. Such efforts will contribute significantly to the international goals for eradicating this virus and preventing further transmission. Moreover, the study's findings underscore the need for increased awareness and preventive measures to reduce the impact of HCV within the Mexican population.

Ethical statement

The protocol was registered and approved by the Ethics Committee. The identity of the patients is protected. Consentment was obtained.

Declaration of interests

None

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Table 1
Frequency Distribution of Risk Factors in first-degree relatives diagnosed with Hepatitis C Virus (HCV) infection.

Risk Factors		Hepatitis C Virus Infection		p	RR	Lower 95% CI	Upper 95% CI
		No	Yes				
Tobacco Use Disorder	Negative	90	24	0.28	1.875	0.585	6.006
	Positive	10	5				
Alcoholism	Negative	87	22	0.14	2.129	0.759	5.791
	Positive	13	7				
Hypertension	Negative	74	8	<0.05	7.471	2.951	18.914
	Positive	26	21				
Diabetes Mellitus, Type 1	Negative	99	29	0.58	0.773	0.704	0.849
	Positive	1	0				
Diabetes Mellitus, Type 2	Negative	86	8	<0.05	16.125	5.985	43.441
	Positive	14	21				
Pulmonary Disease, Chronic Obstructive	Negative	97	26	0.09	3.731	0.711	19.578
	Positive	3	3				
Renal Insufficiency, Chronic	Negative	93	16	<0.05	10.795	3.736	31.188
	Positive	7	13				
Immunocompromised	Negative	100	23	<0.05	0.187	0.129	0.27
	Positive	0	6				

Table 2
Calculation of attack rate, secondary attack rate, and R_0 in first-degree relatives diagnosed with Hepatitis C Virus (HCV) infection.

Rate	%
Attack Rate	22.48
Secondary attack rate	412.50
R_0	1,492,953

Number of new cases of the disease: 29
Number of infectious contacts: 129
Total number of individuals exposed to an infection, outbreak, or epidemic: 29
Number of individuals who have developed the disease: 129
Total number of susceptible individuals exposed:169
Transmissibility: 161

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Association of *IFNL3* gene rs4803217 with spontaneous clearance of Hepatitis C virus in patients from West Mexico

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Introduction and Objectives: Cytokines are crucial in modulating immune responses and the outcome of hepatitis C virus (HCV) infection. Polymorphisms in the IL10 and IFNL3 genes have been associated with spontaneous clearance (SC) in populations worldwide. However, their effect on the Mexican population remains unknown. This study aimed to analyze the association of polymorphisms in the IL10 (rs1800871, rs1800872, and rs1800896) and IFNL3 (rs4803217) genes with SC in HCV patients from West Mexico.

Materials and Patients: A total of 203 treatment-naïve, anti-HCV-positive patients were included in the study. Among them, 60 had undetectable viral load, and 143 had a detectable viral load. Genotyping was performed using Real-Time PCR. Biochemical and serological analyses were conducted. Comparative statistical analysis was performed using SPSSv24 software. Written informed consent was obtained from all participants. The Institutional Review Board approved this study.

Results: The CC genotype of the *IFNL3* rs4803217 gene was associated with SC (OR=2.046, p=0.026). In SC patients, the CC genotype increased total cholesterol (TChol) compared to AA+AC genotypes (209.76 vs. 176.86 mg/dL, p=0.061). The IL10 rs1800871, rs1800872, and rs1800896 polymorphisms were not associated with SC. In SC patients, the CC+CT genotypes of IL10 rs1800871 and CC+CA genotypes of IL10 rs1800872 were associated with higher TChol levels