

Liver steatosis in HIV-positive patients with and without HBV infection accessing care in a programmatic setting in Africa



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INTRODUCTION

- Non-alcoholic fatty liver disease (NAFLD) is expected to become the leading cause of liver transplantation in the next decade¹
- Liver disease is a leading cause of mortality among HIV-positive subjects²
- Owing to the success of antiretroviral therapy (ART), non-communicable diseases, including NAFLD, are an emerging concern in HIV care³
- There is a paucity of data on NAFLD in sub-Saharan Africa, where HIV and HBV infection often co-exist⁴

AIM

Using controlled attenuation parameter (CAP), this study investigated liver steatosis in a programmatic HIV care setting in Ghana, where prevalence of HBV co-infection is ~13%⁵

METHODS

- Population:** 330 consecutive adults accessing 4 HIV clinics in Feb 2018 in Kumasi, Ghana
- Questionnaire:** Use of alcohol, cigarette smoking, and herbal or traditional remedies
- Clinical examination:** Medical history, height, weight, waist circumference, and blood pressure
- Fibroscan** (Ecosens, Siemens): Liver steatosis (CAP) and liver fibrosis (stiffness in kPa)
- Laboratory tests:** Full blood count, CD4 cell count, serum biochemistry, blood lipids, and glycated haemoglobin (HbA1c)
- Virology:** HBsAg (Architect); HBV DNA, HCV RNA, and HIV-1 RNA load (Cepheid Xpert); HDV antibody (Launch Diagnostics) and HDV RNA load (Micropathology, UK)
- Analysis:** Factors associated with CAP values were analysed by liner regression; variables were included for multivariable adjustment using stepwise selection (p<0.2 for model entry and exit)

DEFINITIONS

- Steatosis** (dB/m) S0 <248, S1 248-268, S2 268-280, S3 >280
- Fibrosis** (kPa)
HBsAg pos.: F0-F1 <5.9, F2 5.9-7.6, F3 7.7-9.4, F4 ≥9.5
HBsAg neg.: F0-F1 <7.1, F2 7.2-9.4, F3 9.5-14.0, F4 ≥14.0
- Hypertension** (mmHg) grade 1 140-159/90-99 or normal on treatment; grade 2 160-179/100-109, grade 3 ≥180/110
- Dyslipidaemias** (mmol/l) Total cholesterol: grade 1 5.2-6.1, grade 2 6.2-7.8, grade 3 >7.8; LDL grade 1 3.4-4.0, grade 2 4.1-4.9, grade 3 >4.9; triglycerides grade 1 1.7-3.4, grade 2 3.4-5.7, grade 3 5.7-11.4, grade 4 >11.4
- Glucose dysregulation** HbA1c 42-47
Diabetes HbA1c ≥48 mmol/mol
- Metabolic syndrome** According to the International Diabetes Federation definition

RESULTS

- Table 1** shows the characteristics of the study population

Table 1. Patient characteristics			
Participants, n (%)		330 (100)	
Gender (female), n (%)		239 (72)	
Regular alcohol use, n (%)		6 (2)	
Cigarette smoking, n (%)		20 (6)	
Herbal or traditional remedies, n (%)		11 (3)	
BMI, n (%)	overweight	91 (28)	
	obese	41 (12)	
Central obesity, n (%)		198 (60)	
Hypertension, n (%)	grade 1	80 (24)	
	grade 2	34 (10)	
	grade 3	27 (8)	
Total cholesterol, n (%)	grade 1	79 (24)	
	grade 2	27 (8)	
	grade 3	6 (2)	
LDL, n (%)	grade 1	55 (17)	
	grade 2	18 (6)	
	grade 3	9 (3)	
Triglycerides, n (%)	grade 1	56 (17)	
	grade 2	10 (3)	
	grade 3	2 (1)	
	grade 4	0 (0)	
Glucose regulation, n (%)	Impaired	15 (5)	
	Diabetes	17 (5)	
Metabolic syndrome, n (%)		79 (24)	

RESULTS

HBV, HDV, HCV, and HIV status

- HBsAg positive** 90/330 (27%)
- HBV DNA** median 1244 IU/ml (IQR 216-71920)
- HDV seropositive** 4/90 (4%) **HDV RNA positive** 0/4
- HCV RNA** positive 1/330 (0.3%)
- HIV-1 RNA** >40 copies/ml 160/330 (49%)
- Median CD4 count 620 cells/mm³ (IQR 359-830)
- Median time on ART: 8.9 years (IQR 5.7-11.3)

- Factors associated with CAP values are shown in **Table 2**
- Variable considered for inclusion in the multivariable model: gender, cumulative exposure to stavudine, HIV-1 RNA load, CD4 cell count, metabolic syndrome*
- After adjustment, increasing CAP values were independently associated with:
 - Metabolic syndrome
 - Longer cumulative exposure to stavudine
- No association was observed between CAP values and HBsAg status
- There was a trend for a liner association between CAP values and liver stiffness values

*cumulative exposure to nevirapine not included due to collinearity with stavudine exposure; metabolic syndrome was chosen over its individual components and total and LDL cholesterol; platelet count and liver stiffness were not included in the model

RESULTS

Table 3. Steatosis and fibrosis grade according to HBsAg status

		Total	HBsAg negative	HBsAg positive	p
Steatosis grade, n (%)	S0	261 (79)	190 (79)	71 (79)	0.92
	S1	26 (8)	20 (8)	6 (7)	
	S2	20 (6)	14 (7)	6 (7)	
	S3	23 (7)	16 (7)	7 (8)	
Fibrosis grade, n (%)	F0-F1	274 (83)	217 (90)	57 (63)	<0.01
	F2	38 (12)	17 (7)	21 (23)	
	F3	12 (4)	4 (2)	8 (9)	
	F4	5 (2)	1 (0.4)	4 (4)	
	NA	1 (0.3)	1 (0.4)	0 (0)	

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