NAFLD and Liver Fibrosis Predict High Cardiovascular Risk in HIV Mono-infected Patients

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BACKGROUND

Non-alcoholic fatty liver disease (NAFLD) is strongly associated to cardiovascular disease (CVD) in the general population. In people living with HIV (PLWH), this association has not been investigated yet.

The aim of this study is to assess the impact of NAFLD and liver fibrosis on cardiovascular risk in PLWH.

METHODS

1410 HIV infected patients from three prospective cohorts (**LHIVPA in Palermo, LIVEHIV in Montreal, MHMC in Modena**) were evaluated with Transient Elastography (TE).

Exclusion criteria were:

- significant alcohol intake
- coinfection with hepatitis B or C virus
- failure of TE examinations defined as IQR value > 30%

NAFLD = controlled attenuation parameter (CAP) ≥ 288 dB/m

Significant liver fibrosis = liver stiffness measurement (LSM) >7 kPa

Cardiovascular risk was assessed with Atherosclerotic Cardiovascular Disease (ASCVD) Risk Estimator, according to ACC/AHA guidelines, in patients aged 40 – 75 years, and categorized as:

- ❑ **low** if < 5%
- ❑ **borderline** if 5 – 7.4%
- ❑ **intermediate** if 7.5 – 19.9%
- ❑ **high** if ≥ 20%. Patients with previous cardiovascular events were considered at high risk.

Predictors of intermediate/high cardiovascular (CV) risk were determined by multivariate logistic regression.

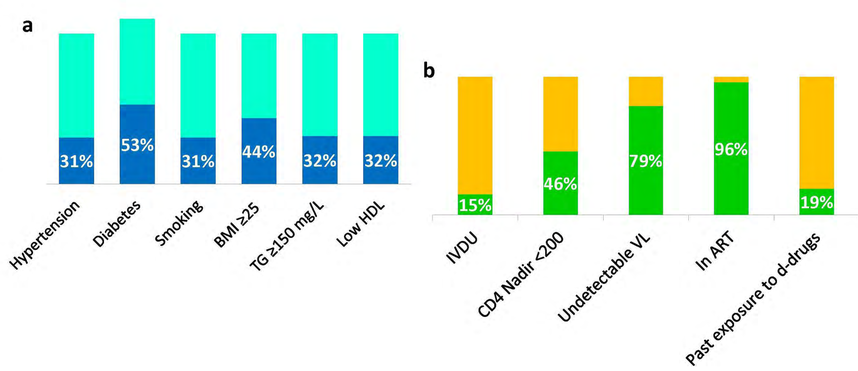
RESULTS

941 HIV mono-infected patients (mean age 53 years, 74% males, 98% on ART) were included. Characteristics of the study population are described in Figure 1 a-b.

423 (45%), 128 (13.6%), 260 (27.6%) and 130 (13.8%) patients were categorized at low, borderline, intermediate and high ASCVD risk, respectively (Figure 2a). Previous cardiovascular events were reported in 8.5%.

Prevalence of NAFLD and liver fibrosis were 20% and 17%, respectively (Figure 2b and 2c).

Figure 1. a) General characteristics of the study population; **b)** HIV-related characteristics of the study population.



The distribution of ASCVD risk categories by NAFLD and liver fibrosis status is shown in Figure 3a-b. Overall,

intermediate and high ASCVD risk were more frequent in patients with NAFLD (p < 0.001) and liver fibrosis (p < 0.05).

Fig. 3a

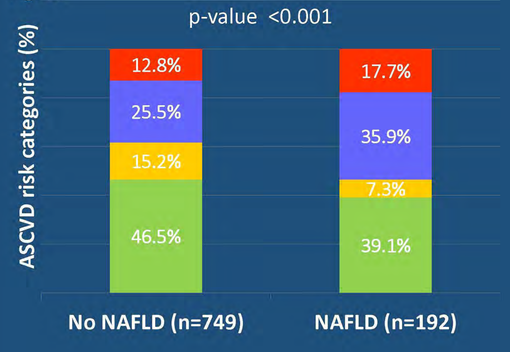
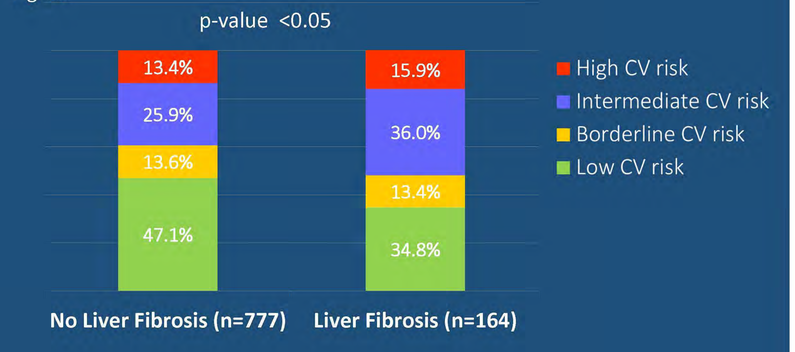


Fig. 3b

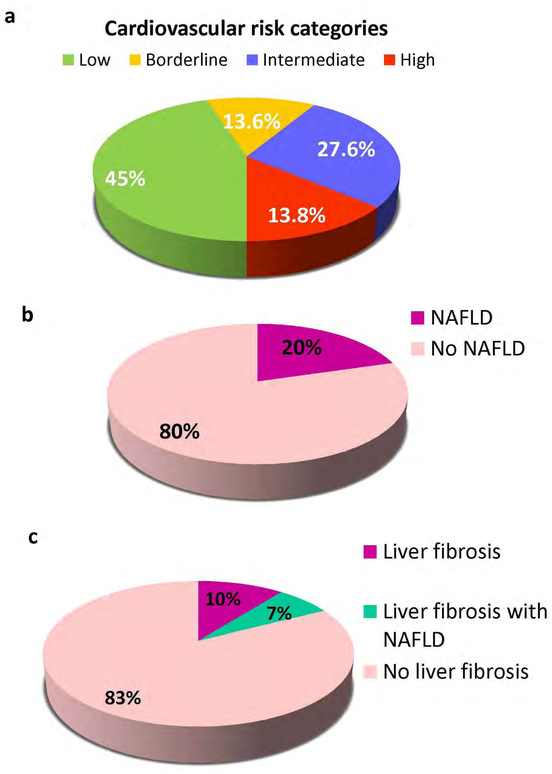


In multivariate logistic regression, **NAFLD** (OR 2.16, 95% CI 1.44 – 3.26), **liver fibrosis** (OR 1.75 , 95% CI 1.11 – 2.75) and **time to HIV diagnosis** (OR 1.04, 95% CI 1.02 – 1.06) were independently associated with intermediate/high cardiovascular risk (see Table).

Table. Multivariable analysis of predictors of intermediate/high cardiovascular risk in HIV mono-infected patients

	OR (95% CI)	aOR (95% CI)	P value
NAFLD	1.86 (1.34-2.60)	2.16 (1.44-3.26)	<0.001
Liver Fibrosis	1.66 (1.69-2.37)	1.75 (1.11-2.75)	0.015
BMI ≥ 30 Kg/m²	1.34 (0.86-2.10)	1.08 (0.68-1.71)	0.753
CD4 nadir <200/µL	1.40 (1.07-1.84)	1.21 (0.92-1.60)	0.181
Intravenous Drug Use	1.55 (1.06-2.27)	0.94 (0.62-1.43)	0.781
Duration of HIV (years)	1.04 (1.03-1.06)	1.04 (1.02-1.06)	<0.001
NAFLD * Liver fibrosis	-	0.45 (0.21-0.97)	0.040

Figure 2. a) Distribution of ASCVD risk categories; **b)** Prevalence of NAFLD; **c)** Prevalence of liver fibrosis



CONCLUSIONS

This study shed light on the predictive value of NAFLD and liver fibrosis on cardiovascular risk in people living with HIV.

HIV mono-infected patients with NAFLD and/or liver fibrosis should be always screened for cardiovascular risk, especially if longer HIV duration.

Conversely, NAFLD assessment should be proposed in all HIV-infected patients at intermediate/high cardiovascular risk.

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