De novo liver steatosis among people with HIV on contemporary antiretroviral therapy

SWISS HIV COHORT STUDY

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BACKGROUND

- Liver steatosis affects close to 50% of people with HIV (PWH) in high-income countries
- Longitudinal data on steatosis in PWH are lacking
- We investigated the incidence and determinants of de novo steatosis and described the progression to steatohepatitis with significant fibrosis in the Swiss HIV Cohort Study (SHCS)

METHODS

- We enrolled SHCS participants at Bern University Hospital into a prospective observational study between November 2019 and October 2022
- Individuals with viral hepatitis co-infection and pregnant women were excluded
- We performed serial liver assessments using vibration controlled transient elastography (VCTE) and considered the first and last one for this analysis
- Liver steatosis was defined as controlled attenuation parameter (CAP) ≥248 dB/m[1]
- The Fibroscan-AST (FAST) score was calculated based on liver stiffness measurement (LSM), CAP and AST; a FAST score >0.67 indicated steatohepatitis with significant fibrosis

Table 1. Participants characteristics at time of first VCTE

Characteristics	**n= 368**
Median age, years (IQR)	52 (43-49)
Female sex (%)	105 (28.5)
Region of origin (%)	
Europe	261 (70.9)
Africa	76 (20.7)
Other	31 (8.4)
HIV transmission group (%)	
MSM	179 (48.6)
Other	189 (51.4)
Body mass index ≥25 kg m² (%)	193 (53.3)
Diabetes (%)	41 (11.1)
Dyslipidemia (%)	145 (39.4)
Hypertension (%)	117 (31.8)
Hazardous alcohol consumption (%)	77 (22.8)
Median CD4+ count, cells/µl (IQR)	728 (547-939)
ART duration, years (IQR)	11 (6-19)
Exposed to TAF (%)	202(54.9)
Exposed to InSTI (%)	266 (72.3)

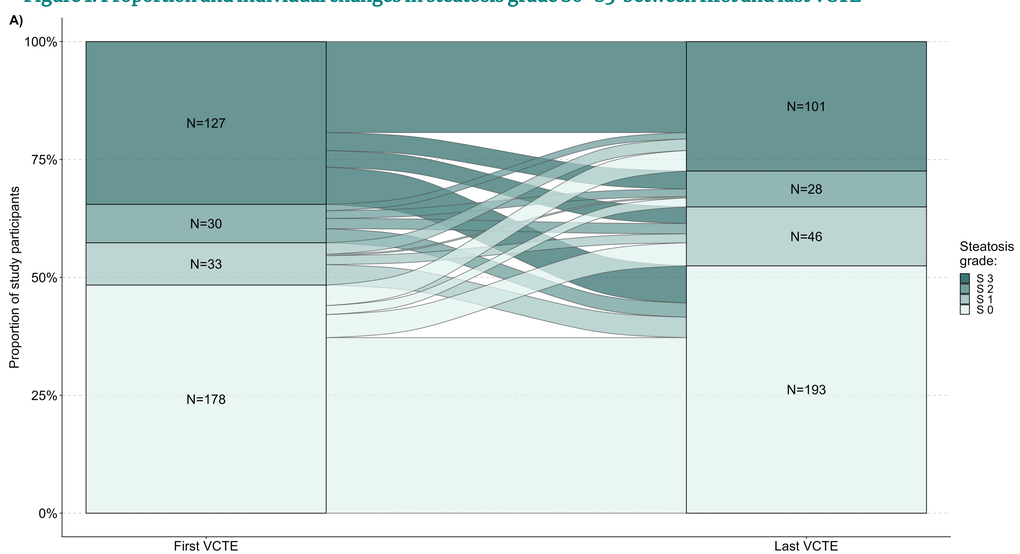
Abbreviations: VCTE, vibration controlled attenuation parameter; IQR, interquartile range; MSM, men who have sex with men; BMI, body mass index; ART, antiretroviral therapy; TAF, tenofovir alafenamide InSTI , integrase strand transfer inhibitor.

- Changes in steatosis grades were frequent among PWH: 23.0% developed steatosis and in 29.5% steatosis resolved
- Obesity and dyslipidemia were the most important predictors for de novo steatosis
- The progression of liver steatosis to steatohepatitis with significant fibrosis was rare

RESULTS

- Of 457 consecutively enrolled patients, 368 (80.5%) with ≥2 valid VCTE measurements were included
- Over a median follow-up of 30 months (IQR 23-37), the median number of VCTE was 2 per person (IQR 2-3)
- At first VCTE, 190 participants (51.6%) had liver steatosis, of whom 6 (3.2%) showed steatohepatitis with significant fibrosis (Fig. 1)
- Of 178 participants who did not have steatosis at their first assessment, 41 (23.0%) developed liver steatosis during follow-up (Fig. 1)
- Among 190 participants with steatosis at first VCTE, 6 (3.1%) developed steatohepatitis with significant fibrosis during follow-up
- Of 190 participants with steatosis at first VCTE, it resolved in 56 (29.5%) during follow-up

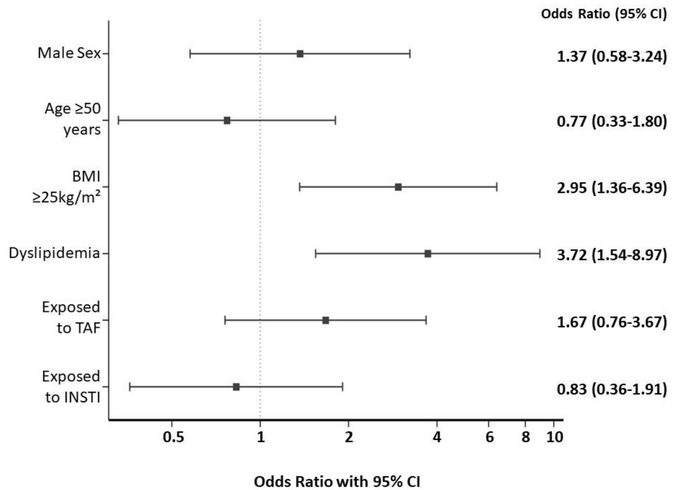
Figure 1. Proportion and individual changes in steatosis grade S0-S3 between first and last VCTE



Definitions: So (no steatosis) if controlled attenuation parameter (CAP) <248; S1 (mild steatosis) if CAP 248–267 dB/m; S2 (moderate steatosis) if CAP 268–279 dB/m; S3 (severe steatosis) if CAP ≥280 dB/m. Abbreviations: VCTE, vibration controlled attenuation parameter.

RESULTS (cont.)

Figure 2. Multivariable analysis of factors associated with the development of liver steatosis



We evaluated the association between de novo liver steatosis and the following covariates: BMI, sex, age, ethnicity, HIV transmission, CD4 nadir, diabetes, dyslipidemia, arterial hypertension, hazardous alcohol consumption, current exposure to TAF, InSTI, protease inhibitors. Factors that were associated with de novo liver steatosis (P <.05) in univariable analyses as well as predefined variables were included in the multivariable model. Abbreviations: BMI, body mass index; CI, confidence interval; INSTI, integrase-strand transfer inhibitor; OR, odds ratio; TAF; tenofovir alafenamide.

CONCLUSION

- During three years of follow-up, nearly one in four PWH developed liver steatosis
- BMI ≥25 kg/m² and dyslipidemia were associated with the development of steatosis, while sex, age, and specific ART components showed no significant association
- Less than 5% of participants with liver steatosis developed steatohepatitis with significant fibrosis

References

[1] Karlas T, Petroff D, Sasso M, et al. Individual patient data meta-analysis of controlled attenuation parameter (CAP) technology for assessing steatosis. J Hepatol 2017

ADDITIONAL KEY INFORMATION

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