Co-Occurrence of MASLD and CKD Increased Cardiovascular Incidence Among Thai HIV Population

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Hay Mar Su Lwin[1], Tanakorn Apornpong[1], Win Min Han[1,2], Sivaporn Gatechompol[1], Siwat Thammapiwan[1], Porntep Amornritvanich[1], Stephen Kerr[3], Anchalee Avihingsanon[1]

[1] HIV-NAT, Thai Red Cross AIDS Research Centre, Bangkok, Thailand
[2] The Kirby Institute, University of New South Wales, Sydney, Australia
[3] Biostatistics Excellence Centre, Faculty of Medicine, Chulalongkorn University, Bangkok, Thailand

BACKGROUND

- Combination of Metabolic dysfunction Associated Steatotic Liver Disease (MASLD) and chronic kidney disease (CKD) are associated with cardiovascular diseases (CVDs)[1,2]
- However, this importance finding in people with HIV (PWH) is largely unknown.
- We investigated the effect of a combined diagnosis of MASLD and CKD on the incidence of CVDs.

METHODS

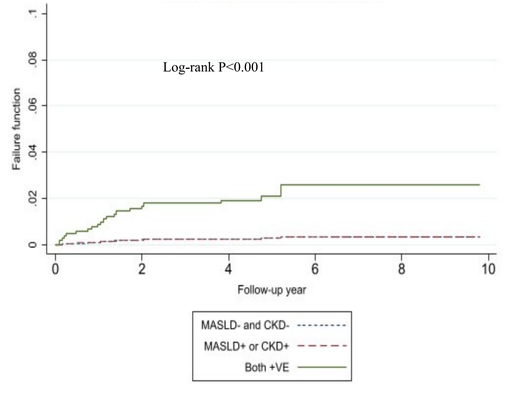
- All PWH starting ART in a prospective cohort in Bangkok, Thailand with available transient elastography or controlled attenuation parameter (CAP) and serum creatinine during June 2013 to July 2023 were included.
- **CKD** was defined as estimated glomerular filtration rate (eGFR) ≤60ml/min/1.73m^2 using the CKD Epidemiology Collaboration.
- **MASLD** was defined as steatotic liver disease (CAP ≥248dB/m) plus one of five cardiometabolic criteria: body mass index (BMI) ≥25 kg/m^2 or waist circumstance >94cm for males and >80cm for females; fasting glucose ≥100mg/dL or a diagnosis of diabetes mellitus; BP ≥130/85mmHg or a diagnosis of hypertension; triglyceride ≥150mg/dL or lipid lowering agents, and HDL ≤40mg/dL in males or ≤50mg/dL for females.
- **CVDs** included coronary diseases, stroke, peripheral arterial disease and aortic disease.
- Follow-up started at the first Firbroscan and eGFR measurement and ended at the first CVD diagnosis or most recent clinic visit, whichever occurred first.
- Multivariable Cox regression was used to evaluate the association between MASLD and/or CKD and CVDs development, adjusted for potential cofounders.

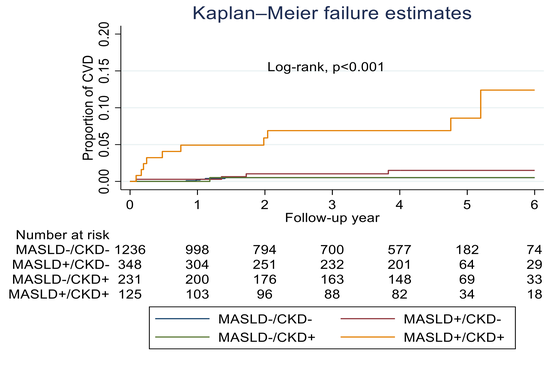
In a Thai cohort, the prevalence of individuals with a combined MASLD and CKD was 6.4%.
A combined diagnosis of MASLD with CKD was associated with an increased risk of new-onset cardiovascular disease event, but MASLD or CKD alone was not.

Table. Baseline characteristics by MASLD and CKD status

Characteristics	*MASLD-/CKD-*	*MASLD+/CKD-*	*MASLD-/CKD+*	*MASLD+/CKD+*	*P-value*
Number of participants	1,236	348	231	125	
Age, years	39 (29-46)	45 (36-51)	51 (45-56)	53 (48-57)	<0.001
Male	894 (72.33)	245 (70.4)	152 (65.8)	83 (66.4)	0.145
BMI	21.7 (19.8-23.7)	25.5 (23.2-28.2)	22.4 (20.7-24.3)	25.1 (23.4-27.2)	<0.001
Waist	78 (73-84)	89 (83-95)	81 (76-87)	88 (84-94)	<0.001
Current smoking	168 (18.03)	47 (17.67)	36 (19.46)	14 (13.21)	0.591
Comorbidity					
Hypertension	433 (35.03)	218 (62.64)	138 (59.74)	92 (73.6)	<0.001
Diabetes mellitus	147 (11.89)	117 (33.62)	56 (24.24)	63 (50.4)	<0.001
CAP>248 dB/m	34 (2.75)	348 (100)	1 (0.43)	125 (100)	<0.001
CKD	0 (0)	0 (0)	231 (100)	125 (100)	<0.001
Biochemistry data					
eGFR (mL/min/1.73m^2)	77.1 (68.8-89.4)	74.4 (67.6-85.9)	53.3 (47.1-56.2)	53.7 (49.5-57.7)	<0.001
Glucose (mg/dL)	89 (84-95)	94 (87-103)	91 (85-97)	97 (89-111)	<0.001
ALT (U/L)	29 (21-43)	36 (26-59)	27 (20-36)	35 (25-53)	<0.001
AST (U/L)	25 (20-32)	26 (21-35)	25 (21-31)	27 (21-36)	0.058
Cholesterol (mg/dL)	187 (163-213)	204 (179-230)	198 (166-222)	202 (177-236)	<0.001
LDL (mg/dL)	116 (93-137)	124 (102-146)	115 (91-143)	124 (96-148)	0.0014
HDL (mg/dL)	48 (40-56)	44 (37-51)	47 (39-54)	42 (36-49)	<0.001
Triglyceride (mg/dL)	99 (75-139)	152 (107-211)	120 (86-185)	163 (119-244)	<0.001
HIV-related data					
CD4 cells/dl	508 (351-679)	625 (447-841)	590 (440-771)	637 (513-761)	<0.001
HIV-1 RNA<50 copies/ml	997 (83.71)	315 (92.65)	220 (95.24)	120 (96.00)	<0.001
Duration on ART, years	4.4 (0.3-12.7)	10.5 (2.3-17.6)	14.9 (6.4-20.3)	16.0 (7.9-19.4)	<0.001
ASCVD*	0.7 (0.3-2.1)	2.6 (1.0-6.3)	3.7 (1.6-8.6)	5.7 (2.8-15)	<0.001
10-year ASCVD risk score					<0.001
<7.5%	1059 (92.09)	263 (78.04)	162 (71.68)	71 (57.72)	
≥7.5%	91 (7.91)	74 (21.96)	64 (28.32)	52 (42.28)	

Figure: Probability of CVDs in the presence or absence of MASLD and CKD at baseline





RESULTS

- A total of **1940** PWH (70.8% male), median age 43 [interquartile range (IQR): 32-50] years; BMI 22.5 (IQR: 20.6-24.9); current smoker 18% (n=265) ; abacavir exposure 7.5% (n=143) were included.
- of 50% of **MASLD+/CKD+** had **diabetes** and 73% had **hypertension**. And **higher BMI** in MASLD group.
- The prevalence of **MASLD+/CKD+** at baseline was **6.4%** (n=125). During a median 4.1 years of follow-up, **20** participants developed new-onset CVDs.
- Multivariable Cox regression adjusting for age, sex, smoking, ART duration and protease inhibitors use showed that PWH with a combined diagnosis of MAFLD and CKD at baseline was associated with a significantly increased risk of developing CVD [adjusted hazard ratio [aHR] **7.9,** 95% CI 2.5-24.7, p<0.001, but the presence of either comorbidity alone did not significantly increase the risk (aHR 1.04, 95% CI 0.3 – 3.7; P=0.96).

CONCLUSIONS

- **MASLD together with CKD** was associated with a significantly increased risk of new-onset **CVDs**, but MASLD or CKD alone was not.
- Further studies to understand the mechanisms for the increased risk are warranted for the prevention of CVDs in this group.

REFERENCES

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ADDITIONAL INFORMATION

Presenting author: Hay Mar Su Lwin, MD, MCTM

104 Ratchadamri Road, Pathum Wan, Bangkok, Thailand

Email: hay.m@hivnat.org ; Tel: +66-2 652 3040