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INCIDENCE OF METABOLIC SYNDROME IN PEOPLE WITH HIV IN ITALY WHO STARTED ART SINCE 2008: DATA FROM THE ICONA COHORT

E. Bruzzesi[1]*, A. Tavelli[2,3], R. Salpini[4], A. Carraro[5], M. Camici[6], C. Papalini[7], GE Recchia [8], C. Santoro[9], M.V. Cossu[10], A. Guida [11], A. Mondi[6], G. Marchetti[12], G. Guaraldi[13], A. d'Arminio Monforte[2], S. Nozza[1, 14] on behalf of Icona Foundation Study Group.

1. 1 Infectious Diseases Unit, Vita-Salute San Raffaele University, Milan, Italy. 2 ICONA Foundation, Milan, Italy. 3 National PhD Programme in One Health approaches to infectious diseases and life science research, Department of Public Health, Experimental and Forensic Medicine, University of Pavia, Pavia, 27100, Italy. 4 Department of Biology, University of Rome Tor Vergata, Rome, Italy. 5 Infectious Diseases Unit, SM Goretti Hospital, Sapienza University of Rome, Latina, Italy. 6 Clinical and Research Infectious Diseases Department, national Institute for Infectious Diseases Lazzaro Spallanzani IRCCS, Rome, Italy. 7 Infectious Diseases Clinic, Santa Maria della Misericordia Hospital, Università degli Studi di Perugia, Perugia, Italy. 8 Department of Public Health and Infectious Diseases, Sapienza University of Rome, Rome, Italy. 9 Infectious Diseases Clinic, University of Bari, Bari, Italy. 10 Department of Infectious Diseases, ASST Fatebenefratelli Sacco University Hospital, Milan, Italy. 11 Infectious Diseases and Gender Medicine Unit, Cotugno Hospital, AO dei Colli. 12 Clinic of Infectious Diseases, ASST Santi Paolo e Carlo, Department of Health Sciences, University of Milan, Milan, Italy.13 Department of Surgical, Medical, Dental and Morphological Sciences, University of Modena, Modena, Italy. 14 Infectious Diseases Unit, IRCCS San Raffaele Scientific Institute, Milan, Italy.

Background

Prevalence of metabolic syndrome (MetS) in people with HIV (PWH) on ART is higher than in general population; age, BMI, and certain ART regimen have been identified as predictors. Nevertheless, the role of CD4 count at diagnosis has not been investigated yet.

Aim

To estimate the incidence of MetS in PWH enrolled in ICONA cohort who started ART when recently HIV infected (**RHI**), or when chronically infected with CD4 count above (**CHI**) or below 200 cells/mm3 (advanced HIV disease, **AHI**).

Materials & Methods

Study population

PWH enrolled in ICONA who started ART from 2008 and excluded those with MetS or MACE before ART.

Definitions

RHI as reporting acute/primary infection and having started ART within 100 days since diagnosis *and* those with a negative HIV test done within 1 year that have started ART within 6 months since the estimated time of infection.

Metabolic syndrome as defined by modified NCEP ATP III criteria or, when missing waist circumference, we used the following equations:

for men, waist circumference (cm) =31.2 + 2.4 × BMI (kg/m2)

for women, waist circumference (cm) = 33.2 + 2.1 × BMI (kg/m2)

Statistical analysis

- Retrospective cohort study
- Incidence rates (IRs) of MetS were calculated as the number of events per 100-person-years-of-FU (PYFU) with 95% confidence intervals (95%CIs)
- Kaplan-Meier curves estimated cumulative probabilities of the first incident metabolic syndrome on ART
- Univariable and multivariable Cox proportional hazard models were applied to estimate factors associated with the event, adjusting for age, year of ART start, sex, risk factor for HIV acquisition, ethnicity, HCV and HBV coinfection, ART class of the first line, HIV-RNA and CD8 count at ART initiation.

Results

Population characteristics

- Among 13,034 PWH starting ART after 2008 enrolled in ICONA, 11,137 were included in the analysis after excluding those with a diagnosis of MetS (974, 7.47%) or MACE (63, 0.48%) and those lost-to-follow up.

Table1. Main characteristics of PWH with MetS

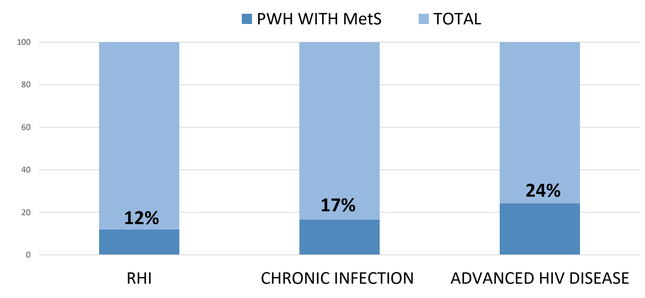
	CHI N=7,253 (65.1%)	AHI N=3,199 (28.7%)	RHI N=685 (6.2%)	Total N=11,137 (100.0%)	p-value
Male sex	5,942 (81.9%)	2,493 (77.9%)	649 (94.7%)	9,084 (81.6%)	<0.001
Age	38 [30-46]	43[35-51]	34 [27-43]	39 [31-47]	<0.001
Transmission mode					<0.001
Hetero	2,507 (34.6%)	1,629 (50.9%)	115 (16.8%)	4,251 (38.2%)	
IDU	472 (6.5%)	215 (6.7%)	31 (4.5%)	718 (6.4%)	
MSM	3,805 (52.5%)	1,049 (32.8%)	506 (73.9%)	5,360 (48.1%)	
Ethnicity					<0.001
Asian	82 (1.1%)	60 (1.9%)	7 (1.0%)	149 (1.3%)	
Black	619 (8.5%)	398 (12.4%)	36 (5.3%)	1,053 (9.5%)	
Caucasian	6,087 (83.9%)	2,533 (79.2%)	609 (88.9%)	9,229 (82.9%)	
Hispanic/Latino	401 (5.5%)	183 (5.7%)	27 (3.9%)	611 (5.5%)	
Positive HCV status	687 (10.1%)	291 (9.8%)	43 (6.6%)	1,021 (9.8%)	0.019
Positive HBsAg status	325 (5.0%)	170 (5.9%)	18 (2.9%)	513 (5.1%)	0.007
Year^	2015 [2012-2018]	2016 [2012- 2018]	2017 [2015-2019]	2015 [2012-2018]	<0.001
Months to ART start	7.8 [2.5-60.9]	1.9 [1.0-4.0]	1.6 [0.7-3.2]	4.0 [1.6-29.9]	<0.001
AIDS	208 (2.9%)	1,032 (32.3%)	17 (2.5%)	1,257 (11.3%)	<0.001
Log HIVRNA >5log ^	1,941 (26.9%)	2,113 (67.3%)	353 (52.3%)	4,407 (40.0%)	<0.001
CD4 count ^	413 [313-554]	73 [30-136]	484 [347-646]	335 [165-492]	<0.001
<200	0 (0.0%)	3,199 (100.0%)	45 (6.6%)	3,244 (29.1%)	
200-350	2,466 (34.0%)	0 (0.0%)	130 (19.0%)	2,596 (23.3%)	
350-500	2,428 (33.5%)	0 (0.0%)	183 (26.7%)	2,611 (23.4%)	
>500	2,359 (32.5%)	0 (0.0%)	327 (47.7%)	2,686 (24.1%)	
Abacavir exposure	1,638 (22.6%)	815 (25.5%)	140 (20.4%)	2,593 (23.3%)	0.001
Same anchor drug					
INSTI	2,538 (35.0%)	1,246 (39%)	308 (45.0%)	4,092 (36.7%)	<0.001
NNRTI	1,429 (19.7%)	171 (5.3%)	54 (7.9%)	1,654 (14.9%)	<0.001
PI	466 (14.6%)	625 (8.6%)	29 (4.2%)	1,120 (10.1%)	<0.001
Years of follow-up	5.4 [2.4-8.4]	4.8 [1.9-8.2]	4.2 [2.0-6.5]	5.1 [2.2-8.2]	<0.001

^ Demographic and immuno-virological characteristics at ART start

Incidence and prevalence of MetS

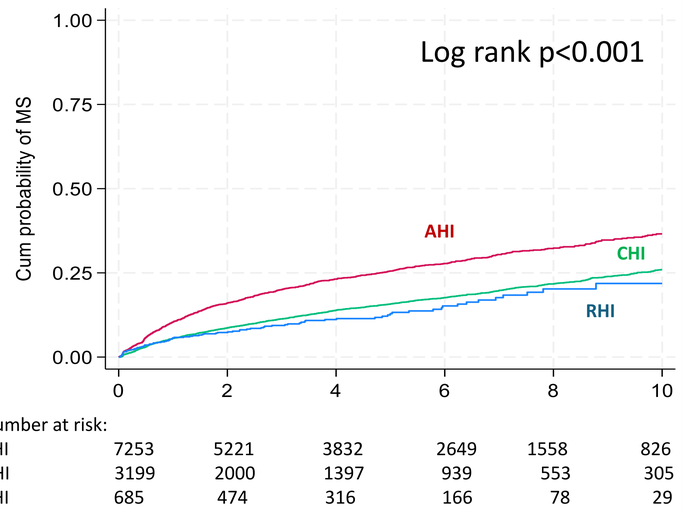
- Overall, 2,058 MetS diagnosis after ART start: prevalence of 18.5% (95%CI 17.8-19.2)
- IR of MetS was 3.96 x 100 PYFU (95%CI: 3.8 - 4.1)
- Diagnoses of MetS were more frequent in advanced HIV infection than in RHI and CHI (p < 0.001)

Figure 1. Prevalence of MetS among PWH who started ART in RHI, AHI and CHI



- Cumulative probability of MetS was significantly higher in advanced HIV infection than in CHI and RHI (p<.001)

Figure 2. Probability of MetS by KM curve



MetS associated with advanced HIV infection

- Higher aHR of MetS was found for advanced HIV disease vs CHI at multivariable analysis (Figure3)
- No difference was observed when comparing calendar period 2008-2015 to 2016-2023 (p-value for interaction= 0.420)

Figure 3. Hazard Ratio (HR) and adjusted Hazarad Ratio (aHR) of MetS

	HR	95% CI	p-value	aHR	95%CI	p-value
CHI	1			1		
AHI	1.67	1.52-1.83	<.001	1.39	1.23-1.57	<.001
RHI	0.83	0.67-1.04	0.111	1.00	0.77-1.29	0.994

those starting with CD4 count>200 cells/mm3

Conclusions

- IR of MetS after ART start was 3.96 x 100 PYFU
- PWH who start ART with CD4 count < 200 cell/mm3 are at higher risk of developing MetS, as compared to CHI and RHI
- Risk was independent of calendar period, unlikely to be mediated by first-line ART regimen

Acknowledgements

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