Improved Testing for Chronic Disease Among Long-Acting Injectable Versus Daily Oral Antiretroviral Therapy Users in the OPERA Cohort

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OPERA® The Longitudinal Cohort

Background

- PWH develop more chronic illnesses at younger ages
- Screening is often suboptimal despite clear guidelines for primary and preventive healthcare for PWH[1]
- Frequent healthcare interactions can help with early detection and management of chronic disease

Objective

Describe the potential ancillary benefits of increased patient engagement associated with LA ART injection visits

Methods

Study Population

- OPERA® cohort: Routine clinical data from EHRs in the US, prospectively captured
- Inclusion criteria
  - Treatment-experienced PWH, aged ≥ 18 years
  - Initiated **CAB+RPV LA** injections or new **oral ART** between 21JAN2021 and 30JUN2022
  - Virologically suppressed (VL < 50 copies/mL)

Study Design

- Each PWH initiating **CAB+RPV LA** injections was matched to 1-3 PWH initiating new **oral ART** on:
  - Age (18-29, 30-49, 50-64, ≥ 65 years)
  - Sex (male, female)
  - Location (same state within same healthcare system)
- Matched groups were followed until the first of:
  - Regimen discontinuation
    - CAB+RPV LA: > 69 days (monthly) or > 127 days (every 2 months) without injection
    - Oral ART: > 45 days without ART or switch to CAB+RPV LA injections
  - Loss to follow-up (12 months after last contact)
  - Death
  - End of study (30JUN2023)

Descriptive Analyses

- Baseline: Start date of ART regimen of interest
- Proportions of PWH receiving metabolic testing and risk score calculations (ASCVD, FIB-4, eGFR, VACS Mortality Index) over follow-up were calculated

Results

Table 1. Baseline demographic and clinical characteristics, by ART group

Baseline Characteristic	CAB+RPV LA n = 730	Oral ART n = 2,178
Age in years, median (IQR)	40 (33, 53)	42 (33, 53)
Female sex, n (%)	117 (16)	348 (16)
Black race, n (%)	289 (40)	869 (40)
Hispanic ethnicity, n (%)	207 (28)	594 (27)
US geographic region South, n (%)	421 (58)	1,275 (59)
Years since HIV diagnosis, median (IQR)	7 (4, 14)	8 (4, 16)
Years since first OPERA visit, median (IQR)	4 (2, 7)	5 (3, 8)
VACS score, median (IQR)	10 (0, 18)	10 (0, 18)
History of an AIDS-defining event, n (%)	193 (26)	661 (30)
Any comorbid condition[a], n (%)	589 (81)	1,775 (82)
Cardiovascular disease[b], n (%)	57 (8)	168 (8)
Hypertension, n (%)	232 (32)	759 (35)
Endocrine disorders[c], n (%)	364 (50)	1,130 (52)
Liver disease[d], n (%)	35 (5)	108 (5)
Renal disease[e], n (%)	90 (12)	352 (16)

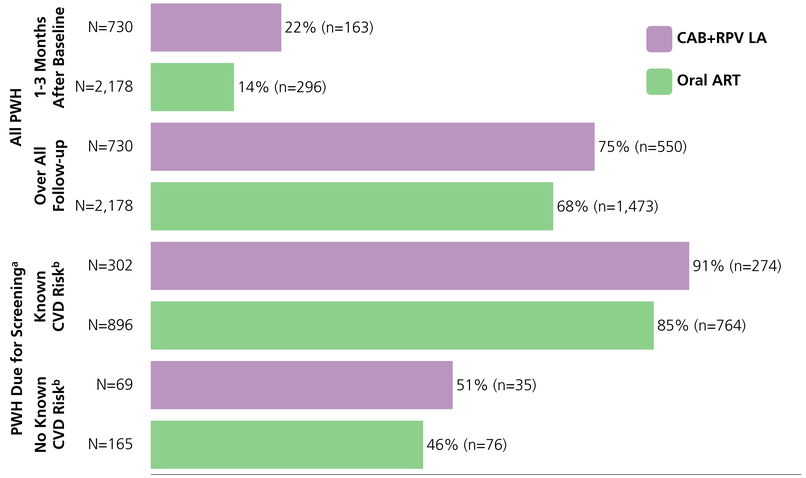
[a] Includes comorbidity categories listed in table as well as invasive cancer, mental health conditions (anxiety disorder, dissociative and conversion disorders, dementia, other psychoses, mood disorders, somatoform disorders, pervasive developmental disorders, suicidality), bone disorders (osteopenia, osteoporosis), and substance use disorders (alcohol or drug abuse/dependence disorder); the median (IQR) number of comorbid categories met was 2 (1, 3) in both groups.
[b] Cardiovascular disease: Myocardial infarction, angina, transient ischemic attack, stroke, other/unspecified CHD, occlusion/stenosis of precerebral arteries, cerebral blood volume disease, peripheral arterial disease, abdominal aortic aneurysm
[c] Endocrine disorders: Diabetes mellitus, hyperlipidemia, hypothyroidism, hyperthyroidism
[d] Liver disease: Non-alcoholic fatty liver disease, non-alcoholic steatohepatitis, cirrhosis, steatohepatitis, hepatitis E, hepatitis, hepatopathy
[e] Renal disease: Diagnosis of kidney disease, kidney failure, kidney injury, chronic kidney disease, renal insufficiency, end stage renal disease

Table 2. Calculations of risk score composites over follow-up, by ART group

Risk Score Calculations[a]		CAB+RPV LA n = 730	Oral ART n = 2,178
ASCVD[b]	Received ≥ 1 calculation, n (%)	496 (68)	1,427 (66)
	Months between baseline and 1st calculation over follow-up, median (IQR)	1.05 (0.00, 3.19)	1.97 (0.00, 4.11)
VACS[c]	Received ≥ 1 calculation, n (%)	654 (90)	1,718 (79)
	Months between baseline and 1st calculation over follow-up, median (IQR)	1.46 (0.92, 3.06)	2.89 (0.95, 4.57)
FIB-4[d]	Received ≥ 1 calculation, n (%)	704 (96)	1,869 (86)
	Months between baseline and 1st calculation over follow-up, median (IQR)	1.12 (0.72, 2.68)	2.43 (0.62, 3.91)
eGFR[e]	Received ≥ 1 calculation, n (%)	677 (93)	1,801 (83)
	Months between baseline and 1st calculation over follow-up, median (IQR)	1.15 (0.82, 2.79)	2.53 (0.69, 4.07)

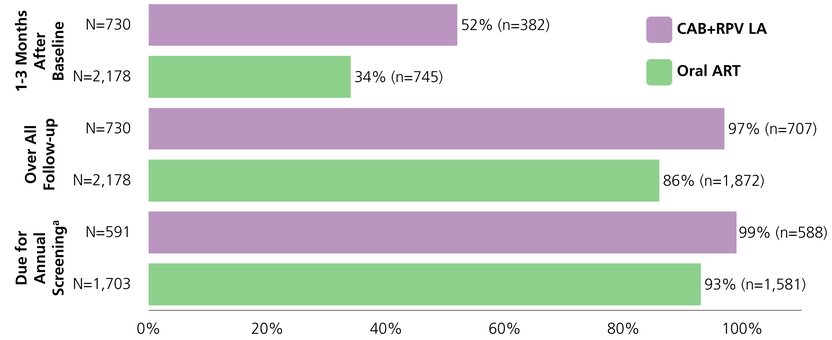
[a] Risk scores are calculated on each date a risk score component (e.g., a lab value) is updated; all other components look back a maximum of 365 days
[b] ASCVD: 10-year risk for a first atherosclerotic cardiovascular disease event; includes age, systolic blood pressure, high-density lipoprotein, and total cholesterol
[c] VACS: Risk of 5-year all-cause mortality in patients with HIV; includes age, CD4 cell count, HIV viral load, hemoglobin, platelets, aspartate aminotransferase, alanine transaminase, creatinine, and hepatitis C virus infection
[d] FIB-4: Estimate the amount of scarring in the liver; includes age, aspartate aminotransferase, platelets, and alanine transaminase
[e] eGFR: How well the kidneys are filtering; includes creatinine, age, and sex

Figure 1. Proportions of PWH who received lipid testing over follow-up, by ART group



[a] Lipid testing is recommended annually among PWH with known risk of CVD and every five years among PWH without known risk of CVD. Individuals due for their regular lipid testing include (a) PWH with a test in OPERA prior to baseline who were due for lipid testing prior to or over follow-up and (b) PWH without a prior test in OPERA for whom timing of testing is unknown but might be due for lipid testing over follow-up.
[b] PWH with known risk of CVD had at least one of the following diagnoses as of baseline: myocardial infarction, angina, transient ischemic attack, stroke, other/unspecified coronary heart disease, occlusion/stenosis of precerebral arteries, cerebral blood volume disease, peripheral arterial disease, abdominal aortic aneurysm, dyslipidemia, hyperlipidemia, hypercholesterolemia, or hypertriglyceridemia.

Figure 2. Proportions of PWH who received serum glucose testing over follow-up, by ART group



[a] Individuals due for their annual serum glucose testing include (a) PWH with a test in OPERA prior to baseline who were due for serum glucose testing prior to or over follow-up and (b) PWH without a prior test in OPERA for whom timing of testing is unknown but might be due for serum testing over follow-up.

Abbreviations

AIDS, acquired immune-deficiency syndrome; **ART**, antiretroviral therapy; **ASCVD**, atherosclerotic cardiovascular disease; **CAB+RPV LA**, cabotegravir plus rilpivirine long-acting; **CVD**, cardiovascular disease; **eGFR**, estimated glomerular filtration rate; **EHR**, electronic health record; **FIB-4**, Fibrosis-4; **HIV**, human immunodeficiency virus; **IQR**, interquartile range; **mL**, milliliter; **n**, number; **PWH**, people with HIV; **US**, United States; **VACS**, Veterans Aging Cohort Study; **VL**, viral load

Discussion

- Baseline demographic and clinical characteristics were similar between the ART groups (**Table 1**)
  - The study population was relatively young, but 81% of PWH had ≥ 1 comorbidity; the median ages at baseline were 40 (CAB+RPV LA) and 42 (oral ART) years
- A greater proportion of PWH on CAB+RPV LA than oral ART received lipid (**Figure 1**) and serum glucose (**Figure 2**) testing:
  - Within 1-3 months of regimen start (lipids: 22% vs. 14%; glucose: 52% vs. 34%)
  - Over follow-up (lipids: 75% vs. 68%; glucose: 97% vs. 86%)
- Testing was similarly higher among PWH due for their regular testing on CAB+RPV LA than oral ART (lipids: 83% vs. 79%; glucose: 99% vs. 93%) (**Figures 1 & 2**)
  - Most PWH (87%) with known CVD risk received lipid testing compared to 47% with no known CVD risk
- Risk scores were able to be calculated among a greater proportion of CAB+RPV LA users (68-96%) than oral ART users (66-86%), usually because lab values were updated sooner after baseline (**Table 2**)

Key Findings

- A greater proportion of PWH receiving CAB+RPV LA than oral ART received:
  - Recommended lipid and serum glucose testing
  - Risk score calculations related to mortality, CVD, and liver and renal health; calculations also occurred sooner after baseline
- These findings suggest that ancillary benefits of increased interactions with the healthcare system for PWH on CAB+RPV LA have the potential to lead to earlier detection and management of chronic health conditions

Reference

1. Thompson MA, Horberg MA, Agwu AL, et al. Primary Care Guidance for Persons With Human Immunodeficiency Virus: 2020 Update by the HIV Medicine Association of the Infectious Diseases Society of America. Clin Infect Dis. 2021;73(11):e3572-e605.

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