



Abstract

Background: Polypharmacy is associated with older age, medication administration errors, increased hospitalizations, poorer adherence, and increases in drug-drug interactions. The efficacy, pharmacokinetics, adverse effects, and potential drug-drug interactions (DDIs) of ART in older adults have not been systematically studied. This study will investigate associations between polypharmacy and HIV virologic suppression and other outcomes in older HIV-infected adults.

Methods: This, IRB approved, retrospective cohort study evaluated outcomes in HIV-infected patients aged ≥ 50 years as of 6/1/2013, on ART and seen at least once at the Northwestern Infectious Disease Center between 6/1/2013-5/31/2015. Data was collected from the most recent encounter for each patient. Eligible patients were stratified by number of prescribed medications: ≥10 versus <10 medications. The primary outcome was detectable vs non-detectable plasma HIV RNA level (viral load; undetectable defined as at least one value <20 IU/mL). Secondary outcomes included DDIs, CD4+ T-lymphocyte count (cells/mm³, CD4), taking medications on the Beers List (potentially inappropriate medications for elderly patients), and patient reported adverse drug effects.

Results: One hundred patients were included (≤ 10 medications, n=65; >10 medications, n=35). Baseline characteristics were similar between groups. Patients taking >10 medications had lower median CD4 counts (351 vs 561 cells/mm³; p<0.01). Forty-eight patients taking ≤ 10 medications had a viral load <20 IU/mL compared to 21 participants on >10 medications (84.2% vs 67.7%, p=0.07). Patients taking >10 medications were more likely to report an adverse event (45.7% vs 26.5%, p=0.047), take medications on the Beers List (71.4% vs 41.5%; p<0.01), and report DDIs (94.3% vs 67.7%; p<0.01). All but one DDI was categorized as a “potential DDI” (79 of 80).

Conclusion: Patients taking > 10 medications were no less likely to achieve HIV suppression than persons taking ≤ 10 medications; however, they were more likely to report a medication-related adverse effect. Further studies are needed to evaluate the impact of overall medication burden upon clinical outcomes in older HIV-infected persons.

Introduction

- The U.S. HIV population ≥ 55 years old is estimated to grow to 50% of the total U.S. HIV population by the year 2020, up from 24% in 2012
- Multiple chronic conditions are to be expected along with medications to treat these comorbidities such as cardiovascular, kidney, and bone disease
- Along with polypharmacy there is increased risk for DDIs with ARTs
- The efficacy, pharmacokinetics, adverse effects, and potential DDIs of ART in older adults have not been systematically studied

Objective

- To investigate associations between polypharmacy and HIV virologic suppression and other outcomes in older HIV-infected adults

Methods

Study Design

- Retrospective, cohort study
- Patients with > 10 medications were compared to patients with ≤ 10 medications

Patient Selection

- HIV positive patients taking ART, age ≥ 50, and seen in the NMH ID Center between 6/03/2013 and 01/07/2014

Outcomes

- Primary: Viral load: detectable vs. non-detectable plasma HIV RNA level
- Secondary: Detectable VL: VL > 20 copies/mL (low level viremia [VL<200 copies/mL], high level viremia [VL >200 copies/mL]), adherence (as reported by attending physician), lipids at goal (LDL < 100 mg/dL), blood pressure at goal (< 140/80 mmHg), glucose at goal (<100 mg/dL), medications on Beer’s List, adverse effects (reported in chart by attending physician), number and type of DDIs

Statistical Analysis

- Chi-square, Fisher’s exact, Student’s T-test, and Wilcoxon Rank-sum were used in analyses as appropriate
- All statistical analyses were performed with Intercooled Stata, version 13 (Statacorp, College Station, TX)

Results

Table 1. Outcomes and DDIs

	≤10 medications n=65	>10 medications n=35	p-value
Viral load undetectable (n,%)	48 (84.2) n=57	21 (67.7) n=31	0.07
If viral load detectable, low level viremia (n,%)	8 (88.9) n=9	6 (60) n=10	0.30
Viral load (median, IQR)	20 (20-20) Range: <20 – 185,831	20 (20-32) Range: <20 – 80,611	0.07
Adherence (n,%)			0.25
Yes	42 (64.6)	17 (48.6)	
No	8 (12.3)	5 (14.3)	
Not documented	15 (23.1)	13 (37.1)	
Lipids at goal (n,%)	23 (56.1)	8 (53.3)	0.85
Blood pressure at goal (n,%)	42 (72.4)	23 (67.7)	0.63
Glucose at goal (n,%)	40 (80)	15 (57.7)	0.040
Medications on Beer’s List (n,%)	27 (41.5)	25 (71.4)	<0.01
Adverse effect (n,%)	17 (26.2)	16 (45.7)	0.047
Drug interactions (n,%)	44 (67.7)	33 (94.3)	<0.01
Number of DDIs (median, IQR)	1 (0-3)	7 (2-13)	<0.01
Category of DDI (n,%)			<0.01
None	19 (29.2)	1 (2.9)	
Potential	46 (70.8)	33 (94.3)	
Do not co-administer	0 (0)	1 (2.9)	

Results (continued)

Table 2. Patient Demographics

	≤10 medications n=65	>10 medications n=35	p-value
Age, years (median, IQR)	57 (54-62)	61 (55-66)	0.040
Gender, male (n,%)	56 (86.2)	31 (88.6)	0.99
Race (n,%)			0.62
Caucasian	35 (53.4)	22 (62.9)	
African American	25 (38.5)	10 (28.6)	
Other	5 (7.7)	3 (8.6)	
Number of clinic visits (median, IQR)	4 (1-5)	4 (1-7)	0.30
Duration of HIV infection, years (median, IQR)	15 (6-22)	19.5 (12.5-23)	0.11
CD4 count (median, IQR)	561 (307-723)	351 (204-441)	0.01
CD4 count <200 (n,%)	6 (11.3)	7 (24.1)	0.13
Meds with ARVS (median, IQR)	6 (4-8)	14 (11-17)	<0.01
Meds without ARVS (median, IQR)	4 (2-6)	12 (8-15)	<0.01

Table 3. Comorbidities and Medications

	≤10 medications n=65	>10 medications n=35	p-value
Organ transplant (n,%)	0 (0)	1 (2.9)	0.35
History of OIs (n,%)	10 (15.4)	9 (25.7)	0.21
HBV (n,%)	6 (9.2)	1 (2.9)	0.42
HCV (n,%)	6 (9.2)	7 (20)	0.13
Diabetes (n,%)	6 (9.2)	8 (22.9)	0.06
Hyperlipidemia (n,%)	14 (21.5)	12 (34.3)	0.17
CVD (n,%)	29 (44.6)	24 (68.6)	0.02
Pulmonary Disease (n,%)	5 (7.7)	6 (17.1)	0.19
CKD (n,%)	6 (9.2)	8 (22.9)	0.06
Dialysis (n,%)	2 (3.1)	4 (11.4)	0.18
GERD (n,%)	6 (9.2)	6 (17.1)	0.25
Mental Health Disease (n,%)	18 (27.7)	15 (42.9)	0.12
Osteoporosis (n,%)	1 (1.5)	3 (8.6)	0.12
Obesity (n,%)	15 (23.4)	8 (22.9)	0.95
ED medications (n,%)	11 (16.9)	4 (11.4)	0.57
Statin medications (n,%)	22 (33.9)	17 (48.6)	0.15
HTN medications (n,%)	34 (52.3)	26 (74.3)	0.03

Conclusions

- Patients on > 10 medications do not appear more likely to have a detectable viral load compared to those on ≤ 10 medications
- Significant differences, among those on > 10 medications, which may affect patient outcomes include: lower CD4 count, higher incidence of CVD, more reported AEs, medications on the Beer’s List, and more DDIs