Incidence of curable sexually transmitted infections among South African women recently infected with HIV

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Background

- Curable sexually transmitted infections (STIs), including chlamydia (CT), gonorrhea (GC), and trichomoniasis (TV) are common among HIV infected women in Africa; however, data are limited for women recently infected with HIV
- We assessed the incidence of and risk factors for CT, GC and TV among South African women who acquired HIV while participating in VOICE, a phase IIB randomized trial of daily oral and vaginal chemoprophylaxis for HIV prevention in Ugandan, South African, and Zimbabwean women

Methods

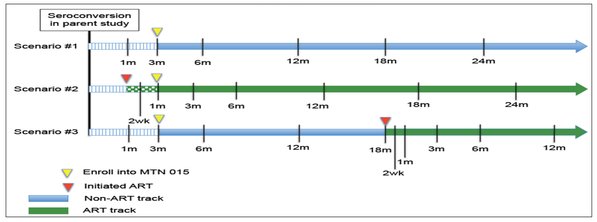
Study design & data collection

- Women who acquired HIV during VOICE (MTN-003) were invited to enroll in MTN-015, an ongoing multi-site, prospective cohort study of women who become HIV-infected in Microbicide Trials Network studies
- Demographic and sexual behavior data were collected via face-to-face interviews
- Participants were tested for STIs (CT/GC using nucleic acid amplification tests and TV using rapid tests) at enrollment, annual visits and when clinically indicated (see figure below); STI treatment was provided at the study sites according to WHO guidelines

VOICE study sites



MTN-015 visit schedule

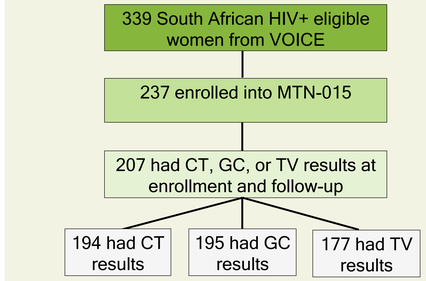


Statistical analysis

- Due to small numbers of enrollees into MTN-015 from Uganda (n=11) and Zimbabwe (n=7) and hypothesized differences in STI incidence by country, the present analysis was limited women enrolled at the 11 South African sites and includes follow-up through October 14, 2013
- Cox proportional hazards models stratified by site were used to assess baseline correlates of first CT, GC or TV infection during follow-up, each as separate outcomes
- Multivariable models were adjusted for *a priori* factors (age, baseline STI) and other factors that were associated with STI acquisition in univariate models ($p \leq 0.1$); all statistical tests were assessed using a 2-sided α of 0.05 and were conducted using SAS version 9.2

Results

Figure 1. Analysis population



- Median time from testing HIV+ in VOICE to MTN-015 enrollment:
  - 2.3 months (interquartile range [IQR] 1.3, 3.8)
- Median duration of follow-up in MTN-015:
  - 1.4 years (IQR 0.8, 1.8)

Table 1. Characteristics at enrollment into MTN-015

	N=207 *N (%) or median (IQR)*
Demographic characteristics	
Age <25 years	128 (61.8)
Currently has male sex partner	190 (91.8)
Living with husband or partner	20 (9.7)
Number of live births	
None	29 (14.0)
1	111 (53.6)
More than 1	67 (32.4)
Clinical characteristics	
CD4 count (cells/mm^3)	577 (422, 711)
Viral load (log_{10})	4.3 (3.6, 5.1)
On ART at enrollment	2 (1.0)
Curable STI detected in VOICE[1]	92 (44.4)
CT detected in VOICE[2]	54 (26.1)
GC detected in VOICE[2]	31 (15.0)
TV detected in VOICE[2]	38 (18.4)
Sexual behaviors and partner characteristics	
# sex partners in the last 3 months	
None	21 (10.1)
1	181 (87.4)
More than 1	5 (2.4)
Condom used during last sex act	179 (87.3)
Primary partner has other partners	27 (14.3)

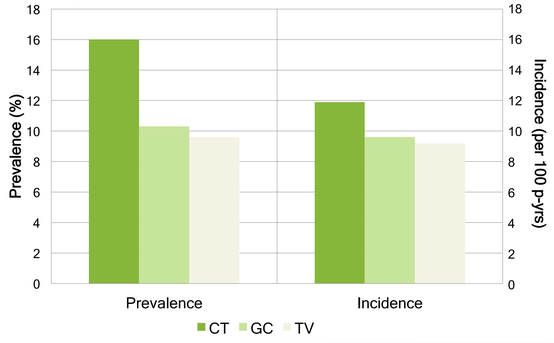
[1] CT, GC, or TV detected at any time post-enrollment in VOICE
[2]STI of interest detected at any time post-enrollment in VOICE
ART = antiretroviral therapy

Table 2. Incidence and correlates of CT, GC and TV during MTN-015*

	# of infections	Person-years	Incidence per 100 person-years (95% CI)		HR[1] (95% CI)		aHR[1] (95% CI)	
Incident CT								
Age								
< 25 years	24	163.8	14.6	(9.4, 21.8)	2.5	(1.0, 5.9)	2.0	(0.8, 4.9)
≥ 25 years	8	105.5	7.6	(3.3, 14.9)	1.0	---	1.0	---
CT detected in VOICE								
Yes	18	66.4	27.1	(16.1, 42.9)	4.8	(2.1, 10.9)	3.7	(1.5, 9.3)
No	14	203.0	6.9	(3.8, 11.6)	1.0	---	1.0	---
Baseline CT in MTN-015								
Yes	11	45.0	24.4	(12.2, 43.7)	3.5	(1.4, 8.8)	1.6	(0.6, 4.6)
No	21	224.3	9.4	(5.8, 14.3)	1.0	---	1.0	---
Incident GC								
Age								
< 25 years	20	163.8	12.2	(7.5, 18.9)	2.1	(0.8, 5.4)	2.1	(0.8, 5.4)
≥ 25 years	6	107.7	5.6	(2.0, 12.1)	1.0	---	1.0	---
Baseline GC in MTN-015								
Yes	4	30.4	13.1	(3.6, 33.7)	1.0	(0.3, 3.1)	0.9	(0.3, 2.8)
No	22	241.1	9.1	(5.7, 13.8)	1.0	---	1.0	---
Incident TV								
Age								
< 25 years	16	141.9	11.3	(6.4, 18.3)	1.6	(0.6, 4.1)	1.1	(0.4, 3.2)
≥ 25 years	6	97.6	6.2	(2.3, 13.4)	1.0	---	1.0	---
Currently has male sex partner								
Yes	17	221.5	7.7	(4.5, 12.3)	0.2	(0.1, 0.7)	0.2	(0.1, 0.7)
No	5	17.9	27.9	(9.0, 65.0)	1.0	---	1.0	---
Curable STI in VOICE[2]								
Yes	16	96.9	16.5	(9.4, 26.8)	4.7	(1.7, 13.2)	5.6	(1.7, 18.4)
No	6	142.6	4.2	(1.5, 9.2)	1.0	---	1.0	---
Baseline TV in MTN-015								
Yes	5	22.9	21.8	(7.1, 51.0)	2.8	(0.9, 8.1)	1.4	(0.4, 4.4)
No	17	216.6	7.8	(4.6, 12.6)	1.0	---	1.0	---

*No other demographic, clinical or behavioral factors were associated with incident CT, GC, or TV infection.
[1]Confidence interval; HR=Hazard ratio; aHR=adjusted HR controlling for all other factors in the table for the STI of interest. All models stratified by site.
[2]CT, GC, or TV detected at any time post-enrollment in VOICE

Figure 2. Prevalence and incidence of CT, GC and TV



Key findings

- High prevalence and incidence of CT, GC and TV
- CT in VOICE was associated with a 3.7-fold increased risk of incident CT in MTN-015
- Having a curable STI in VOICE was associated with a 5.6-fold increased risk of incident TV in MTN-015
- No factors were associated with incident GC
- Results were similar when excluding participants with the STI of interest at enrollment from each analysis

Conclusions

- Curable STI incidence was high among South African women recently infected with HIV, especially among women who had a recent STI
- The majority of participants were not on ART; therefore, the HIV transmission probability may be higher due to increases in HIV genital shedding associated with STI infection
- New strategies for STI prevention counseling, screening, and treatment of women with recent HIV infection and their partners are needed to reduce the burden of STIs among women in this region and subsequently reduce HIV transmission risk to uninfected partners

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