Poster #548

Condom failure does not explain increased risk of HIV seroconversion seen in uncircumcised men who have sex with men (MSM) practicing insertive anal sex

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Abstract

Background: Lack of circumcision and condom failure have independently predicted risk of HIV seroconversion in different prospective cohorts of MSM. We sought to determine whether condom failure explains the association between lack of circumcision and HIV risk for the insertive anal sex (IAS) partner when condoms are used. For this to be true, condom failure must be associated with both lack of circumcision and risk for HIV seroconversion of the insertive partner.

Methods: Condom failure (CF), defined as breakage and/or slippage during IAS, was assessed by circumcision status over 18 months of follow-up among 2,161 MSM in the NIAID-sponsored Vaccine Preparedness Study (VPS).

Results: Twelve percent of included participants reported being uncircumcised. Overall, these men reported CF in 1.7% of 12,021 IAS episodes, as compared to 1.5% of 74,160 among circumcised men. Using GEE binomial models to account for frequency of IAS, which was slightly higher among uncircumcised men, risk of CF was similar in the two groups (OR 1.11, 95% CI 0.81-1.51). Across 5,092 6-month participant follow-up periods where at least one episode of protected IAS was reported, 51 HIV seroconversions were detected. A mean of 11.7 (range 1-85, total 59,648) episodes of protected IAS were reported in these periods, while slippage and/or breakage was reported in an average of 0.16 IAS episodes (range 0-10, total 857). Using pooled logistic models for seroconversion, we found no evidence that condom slippage and/or breakage increased risk of HIV infection for the insertive partner (p = 0.29). Furthermore, controlling for slippage and/or breakage did not attenuate the increased risk among uncircumcised men previously reported from this cohort.

Conclusion: Similar CF rates in both circumcised and uncircumcised men, and the lack of an independent association between CF and HIV seroconversion for the insertive partner, suggest that increased CF does not explain nor mediate the increased risk of HIV seroconversion observed among uncircumcised MSM practicing insertive anal sex.

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Introduction

Background

- Three randomized controlled trials conducted in Africa have shown that adult male circumcision is an effective HIV prevention strategy for men acquiring HIV through penile-vaginal sex[1,2,3]; its utility as a prevention strategy for men practicing anal intercourse is unclear
- Observational data in MSM are conflicting
  - Cross sectional: One showed a protective effect[4]; three did not[5,6,7]
  - Longitudinal:
    - One US study (Vaccine Preparedness Study, VPS)[8] found MSM were at two-fold greater risk of acquiring HIV
    - One Australian study[9] found no association of circumcision with HIV seroconversion
- In exploring potential protective mechanisms of circumcision in VPS, there was no evidence of interaction between circumcision status and reported unprotected insertive anal sex (IAS), self-reported STD, race, city, and substance use[8]
- No data evaluating whether uncircumcised men experience higher condom failure (CF) rates than circumcised men
  - Other studies have found that condom failure during IAS is an independent predictor of HIV seroconversion[10] and STIs[11]

Objectives

- To determine the proportion of VPS male participants, by circumcision status, who reported insertive anal sex and who experienced condom failure
- To explore whether condom failure, defined as condom slippage or breakage, explains the association between being uncircumcised and HIV seroconversion in the NIAID VPS study

Methods

VPS Study Design

- Longitudinal study of risk factors for HIV among HIV negative MSM, women w/ sexual risk, IDU
- 3257 MSM enrolled in 6 US cities
  - Boston, Chicago, Denver, New York, San Francisco, Seattle
- Risk assessment q 6 months over 18 months f/u
  - Condom failure (slippage and/or breakage) with sexual partners assessed at these visits
  - HIV test results 1–2 weeks after risk assessment
- Self-reported circumcision status at baseline
- All received risk reduction counseling, linkage to prevention services

Data Analysis

- Earlier analysis in VPS found that uncircumcised MSM were twice as likely to HIV seroconvert—AOR 2.0 (95% CI 1.1–3.7)
- To determine whether condom failure confounded or mediated the relation between circumcision and HIV infection, we sought to explore the following questions:
  - Are there substantial differences in CF rates between circumcised and uncircumcised men practicing IAS?
  - Is there an independent association between CF and HIV seroconversion?
  - Is there an attenuation of the estimated OR for lack of circumcision and HIV infection when CF is taken into account?
- We utilized GEE binomial models accounting for frequency of IAS to assess if CF was different in circumcised and uncircumcised men
- Pooled logistic models for seroconversion were used to evaluate the association of visit, circumcision, and condom failure

Results

CF rates were similar in circumcised and uncircumcised (UC) men

- 2161/3257 (66%) reported insertive anal sex (IAS) at any time point during 18 months of follow-up
- 12% of included participants reported being uncircumcised

	% IAS episodes with Condom Failure	OR (95% CI)
Uncircumcised	1.7% of 12,021 IAS episodes	1.11 (0.81-1.51)
Circumcised	1.5% of 74,160 IAS episodes	

GEE binomial model in UC men practicing IAS and likelihood of experiencing condom failure

Visit	OR	95% CI	p
Baseline	1.40	0.9-2.3	0.17
6 months	1.24	0.8-2.0	0.41
12 months	0.88	0.5-1.5	0.64
18 months	0.55	0.3-1.1	0.09

Risk of seroconversion in VPS by visit, circumcision status in men having IAS, and CF

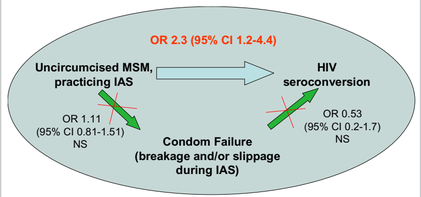
- Across 5,092 6 month participant follow-up periods where at least one episode of protected IAS was reported
  - 51 seroconversions were detected

	Model 1 Visit and UC men practicing IAS		Model 2 Visit, UC men practicing IAS, and condom failure	
Variable	OR (95% CI)	p	OR (95% CI)	p
Lack of circumcision	2.3 (1.2-4.4)	0.014	2.3 (1.2-4.4)	0.013
Condom failure	--	--	0.53 (0.2-1.7)	0.29

Limitations

- While VPS enrolled a large cohort of MSM, power may be limited due to the relatively small proportion of men who were uncircumcised
- Data reflect US sites only
- Circumcision status was self-reported and may be subject to misclassification

Conclusion



- Condom failure does not explain the association between being uncircumcised and HIV seroconversion found in MSM from the VPS cohort
  - Rates of condom failure were similar in circumcised and uncircumcised MSM practicing IAS
  - No independent association was detected in this cohort between condom failure and HIV seroconversion
  - The unadjusted effect in uncircumcised men seen here is virtually identical to the fully adjusted estimate reported previously (AOR 2.0; 95% CI, 1.1–3.7)[8] and is unchanged when CF is included in a pooled logistic model

Next steps

- The population attributable risk (PAR) associated with being uncircumcised from the VPS cohort was 10%[8]
  - PAR is likely more substantial in populations with low rates of male circumcision
- Additional data from large scale, prospective studies (e.g., STEP, HPTN 039) will help to clarify the association between circumcision status and risk of seroconversion for MSM

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