Sexually Transmitted Infections among Persons Living with HIV Infection and Receiving Care in the District of Columbia: Time with Viral Load above 1500 as Proxy for Risk of Transmission

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1. Introduction

• The District of Columbia (DC) has one of the highest HIV prevalence rates, currently 1.9%, as well as recent increases in the incidence of sexually transmitted infections (STIs).

• The DC Cohort is a prospective observational cohort study of patients receiving HIV care at 14 clinical sites in Washington, DC.

• We previously demonstrated a high frequency of detectable HIV viral load (VL) close to the time of STI diagnosis, 41.8%, and found that 14.6% of patients had a viral load>1500 (Lucar 2018).

• An STI diagnosis predicts ongoing high risk behaviors.

• Therefore, we seek measures of HIV transmission over time among those with incident STIs.

2. Objectives

• Determine the rates of three major STIs by risk group.

• Examine percentage of time with VL above 1500 among individuals with HIV infection and STI diagnosis.

3. Methods

• Conducted a retrospective cohort analysis measuring STI incidence (including syphilis, gonorrhea, and chlamydia) among all individuals in the DC Cohort from January 2011 – March 2018.

• Calculated incidence rates per 100 person-years (P/Y) of observation, using Rothman/Greenland estimation for 95% CIs (Table 1).

• Compared incident rates by demographic subgroups using univariable Poisson regression (Figure 1).

• Estimated number of days with HIV VL>1500 copies/mL, relative to the total number of days of observation, among those with one or more incident STI over the period of observation (Figure 2) (Quinn 2000, Marks 2015).

4. Case Definitions

A. Gonorrhea

• Incident case*

  a. Positive nucleic acid amplification test (NAAT) or culture on urogenital or extra-genital specimens

  b. If a test is positive =>3 weeks after previous positive result = new case

B. Chlamydia

• Incident case*

  a. Positive nucleic acid amplification test (NAAT) on urogenital or extra-genital specimens

  b. If a test is positive =>3 weeks after previous positive result = new case

C. Syphilis

• Incident case*

  a. Positive non-treponemal test (NT) titer ≥ 1:8 with a previous non-reactive NT, OR

  b. Four-fold increase in the NT titer from the previous test, OR

  c. Positive treponemal test (TP) if a NT titer was ≥ 1:8 and the previous TP test was negative.

*Participants newly diagnosed with chlamydia, gonorrhea, and syphilis more than 30 days after study enrollment

**STI episode: any combination of chlamydia, gonorrhea, and syphilis diagnosed on the same date

5. Results

• Median follow up of 3.4 years, 786 with incident STI (47.5% were 18-34 year olds, 45.4% were 35-54 year olds, 88% were male, 66.8% were non-Hispanic Black, and 75.6% were MSM)

• 769 with incident STI and at least 2 incident STIs observed in 2011-2018

• 40% had two or more STIs

• 33.8% spent any time with a VL >1500, 31.4% with one STI and 37.4% with 2 or more STIs

Table 1. Baseline characteristics of adult DC Cohort participants by incident STIs, 2011-2018

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Overall</th>
<th>Age (18-34)</th>
<th>Age (35-54)</th>
<th>Age (55+)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (Female)</td>
<td>53.2%</td>
<td>51.2%</td>
<td>57.2%</td>
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</tr>
<tr>
<td>Race/Ethnicity</td>
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<td>66.6%</td>
<td>71.1%</td>
<td>70.4%</td>
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<tr>
<td>Hispanic</td>
<td>45.5%</td>
<td>43.3%</td>
<td>52.2%</td>
<td>49.2%</td>
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<tr>
<td>Non-Hispanic</td>
<td>54.5%</td>
<td>56.7%</td>
<td>47.8%</td>
<td>50.8%</td>
</tr>
<tr>
<td>% of Individuals</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Figure 1. Incidence Rates for Any STI by Demographic Subgroups, 2011-2018

Figure 2. Percent of all individuals with 1 STI or 2 or more STIs spending time with VL above 1500 over the period of observation by quartile.

5. Conclusions

• Among persons living with HIV (PLWH) with incident STIs, approximately one-third spent considerable time with a VL >1500 copies/mL, placing them at increased risk of transmitting HIV to others.

• Public health interventions should focus on the risk of secondary transmission among PLWH, particularly among those engaging in risky behaviors as indicated by incident STIs.