Evolution of HIV-1 drug resistance mutations in NSW

Angie Pinto | 17th September 2015

Background

No statewide drug resistance surveillance
- NSW has greatest burden of HIV in Australia (52%)
- In 2014, 9140 people living with HIV in NSW were on ART
- HIV drug resistance peaked in mid-1990s then stabilised
- Since 2007 drug resistance testing at baseline recommended by WHO as standard of care

Aims

To define rates of HIV-1 resistance mutations
- overall rates of prevalent drug resistance
- transmitted drug resistance (TDR): seroconverters, naive
- acquired drug resistance (ADR): treatment experienced

Methods

Retrospective statewide analysis 2004-2013
- Viral genotypes from plasma viral RNA – 3 assays used
- Reformatted, deidentified database
- Sequence analysis: Stanford HIVdb 7.0
- WHO SDRM (surveillance drug resistance mutations) classification
- Prevalence of mutations calculated yearly
  - Inclusion:
    - Single sequence/ individual per year
  - Exclusion:
    - Duplicates within year
    - Integrase resistance mutations

Genotypic antiretroviral resistance testing (GART)

1. SydPath
2. RPA
3. ICPMR

- Lacks clinical data
- Ancillary testing
- Coded identifiers
- Repeat testing

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Results

Number of GART performed

7639
- All resistance tests in NSW 2004-2013

6901
- Excluded 738 duplicates within year

922
- Treatment history available

Baseline demographics

<table>
<thead>
<tr>
<th>Gender, n(%)</th>
<th>5028 (90%)</th>
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</thead>
<tbody>
<tr>
<td>Age years, (range, SD)</td>
<td>41 (0-90, 11)</td>
</tr>
<tr>
<td>SydPath, n(%)</td>
<td>3342 (48.43)</td>
</tr>
<tr>
<td>RPA, n(%)</td>
<td>2782 (40.31)</td>
</tr>
<tr>
<td>ICPMR, n(%)</td>
<td>777 (11.26)</td>
</tr>
<tr>
<td>Subtype B, n(%)</td>
<td>5895 (85.42)</td>
</tr>
<tr>
<td>Treatment data available, n(%)</td>
<td>922 (13.36)</td>
</tr>
</tbody>
</table>

Age and subtype distribution

Rates of SDRM over time

SDRM prevalence overall (2009-2013)

ASHM guidelines recommend GART
GART & MBS funded

SDRM prevalence (%)
Results

Transmitted drug resistance - seroconverters

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Drug resistance in treatment naive

Drug resistance in treatment experienced

Limitations

- Retrospective
- Changing testing paradigms
- Limited clinical data
- Incomplete dataset – treatment cascade
Conclusions

First statewide database of SDRM

• Decreased overall acquired drug resistance over 5 years
• Low rates of transmitted drug resistance
• Need for prospective surveillance of SDRM

Future directions

Prospective study proposal

• Partnership grant substudy proposal 2015-2020
• Data linkage with HIV notifications database and laboratory resistance database
• Evaluate impact of NSW HIV strategy and treatment guidelines on drug resistant mutations

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- AMR: Phillip Cunningham
- RPA: Hanan Salem, Roger Garsia
- ICPMR: Kiran Thapa, Dominic Dwyer
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