The relationship between an adverse effect of antiretroviral treatment and underlying risk illustrated by number needed to treat to harm (NNTH). Risk of myocardial infarction and abacavir use.

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BACKGROUND

- With potentially life-long treatment of patients with HIV it is crucial to ensure antiretroviral treatment is used in such a way that adverse effects are reduced as much as possible.

METHODS

- We illustrated the methodology of the number needed to treat to harm (NNTH) using the recent findings from the DAD study (90% increased relative risk, RR=1.90, of myocardial infarction (MI) in patients on abacavir compared with patients not receiving abacavir). We assumed this RR remains constant across the range of underlying risk of MI.
- NNTH was calculated as 1/[underlying risk of MI x 1.90] – underlying risk of MI. The underlying risk of MI was calculated for 5 years using Framingham score (2).
- All NNTH values represent the number of patients who need to be treated with abacavir for 5 years to observe an MI in one additional patient as a consequence of this treatment.

RESULTS

- The relationship between absolute risk increase and underlying risk of MI is linear (figure 1, green line) whereas the relationship between NNTH and underlying risk of MI is exponential (figure 1, red line). The NNTH decreases from 1111 to 7 with different risk components modified in a way that reflects possible clinical interventions e.g. smoking cessation or lipid lowering intervention.
- For the medium and high risk group (underlying risk of MI 15%) decrease in underlying risk is accompanied by a small increase in NNTH relative to the large increase in low risk group (underlying risk of MI 15%).
- These trends are not possible to observe when absolute risk increase (ARI) is related to underlying risk of MI.
- NNTHs were calculated with different risk assumptions and for two different time periods. A low risk profile representing underlying risk of MI of 0.1% and NNTH=1111 was chosen. The NNTH drops from 1111 to 7 with different risk components of 5-year risk of MI combined and from 370 to as low as 4 for 10-year risk of MI (table 1).
- Figure 2 presents a series of 3D graphs relating NNTH to any possible age and systolic blood pressure, and categorizes it according to smoking status and two chosen lipid profiles. Colours reflect ranges of NNTH (as described in the figure) and enables quick identification of high or low NNTH.
- For example, red (Graph D) shifts to orange and yellow if the risk factor of smoking is removed (Graph C) and further to green and blue if lipids change to normal (Graph A).
- Exploring the graphs in this way helps to understand the relation between the NNTH and particular risk components modified in a way that reflects possible clinical interventions e.g. smoking cessation or lipid lowering intervention.

CONCLUSIONS

- It is possible to increase NNTH values for any group of patients on abacavir by decreasing the underlying risk of MI.
- Individual assessment of underlying risk may play an important role in decreasing the risk of adverse effect of cART.

Table 1

<table>
<thead>
<tr>
<th>Factors contributing to the underlying risk</th>
<th>MI underlying risk (5 years)</th>
<th>NNTH</th>
<th>MI underlying risk (10 years)</th>
<th>NNTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCHOL = 240 mg/dl (6.2 mmol/l), TCHOL or diabetes or ECG-LVH</td>
<td>0.7%</td>
<td>170</td>
<td>138</td>
<td></td>
</tr>
<tr>
<td>Smoking and TCHOL</td>
<td>0.8%</td>
<td>141</td>
<td>3.9</td>
<td></td>
</tr>
<tr>
<td>Smoking and diabetes</td>
<td>0.9%</td>
<td>107</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td>Smoking and HDL</td>
<td>1.1%</td>
<td>125</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>Smoking and HDL and TCHOL</td>
<td>1.6%</td>
<td>69</td>
<td>4.3</td>
<td></td>
</tr>
<tr>
<td>All unfavourable</td>
<td>1.7%</td>
<td>35</td>
<td>7.5</td>
<td></td>
</tr>
</tbody>
</table>

References:

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