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O313 Relation between adverse effects of ARV treatment and underlying risk in number needed to treat to harm (NNTH) – 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 illustrate methodology of the number needed to treat to harm (NNTH) using the recent findings from the D:A:D study (90% increased relative risk, RR = 1.90, of myocardial infarction [MI] in patients on abacavir compared with patients not receiving abacavir) [1]. We assume this RR remains constant across the range of underlying risk of MI. NNTH was calculated as 1/[(underlying risk of MI × 1.90) – underlying risk of MI], where the underlying risk of MI is calculated for the next 5 years using a parametric statistical model based on the Framingham score [2]http://www.cphiv.dk/TOOLS/tabid/282/Default.aspx.

Summary of results

The relationship between NNTH and underlying risk of MI is exponential whereas the relationship between absolute risk increase and underlying risk of MI is linear (Figure 1). The NNTH shows a steep decrease from 185 to 5 when the underlying risk of MI increases from 0.6% to 20%. The lowest NNTH values are observed in the high

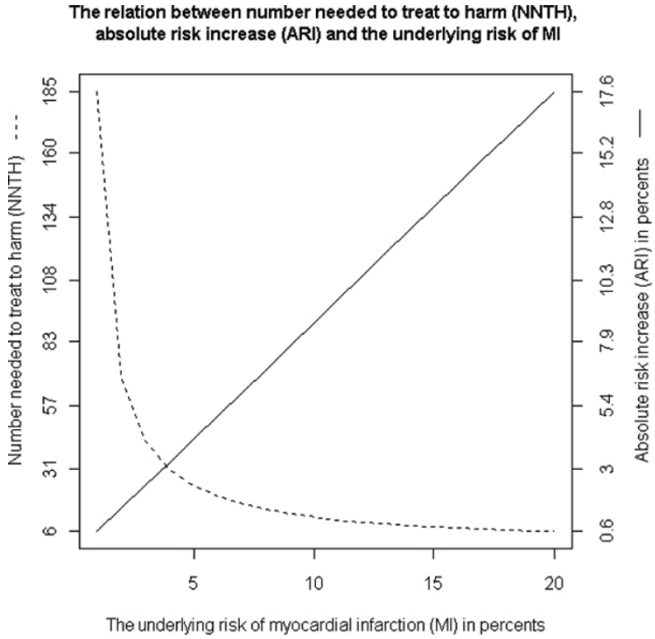

Figure 1
The relation between number needed to treat to harm (NNTH), absolute risk increase (ARI) and the underlying risk of MI.

Table 1:

Change in factors contributing to underlying risk	Underlying risk of MI in 5 years (%)	NNTH
Example low risk profile (described in text)	0.1	1111
If total cholesterol 240 mg/dL (6.2 mmol/L)	0.2	555
If diabetes	0.2	555
If ECG-LVH	0.2	555
If sBP 160 mmHg	0.3	370
If HDL 35 mg/dL (0.9 mmol/L)	0.3	370
If smoking	0.4	277
If HDL and total cholesterol unfavourable	0.8	138
If smoking and diabetes	1.1	101
If smoking and total cholesterol unfavourable	1.0	111
If smoking and sBP 160 mmHg	1.3	85
If smoking and HDL unfavourable	1.6	69
If smoking and lipids unfavourable	3.1	35
If all unfavourable combined (excluding ECG-LVH)	10.1	11
If all unfavourable combined (including ECG-LVH)	15.0	7

risk group, while the most dynamic changes in NNTH is in the low risk group.

A low risk profile was used to illustrate the relationship between NNTH and underlying risk of MI in clinical terms; a male, aged 40, non-smoker with no diabetes, no ECG-left ventricle hypertrophy (ECG-LVH), systolic blood pressure (sBP) of 120 mmHg, total cholesterol (TC) of 170 mg/dL (4.4 mmol/L) and HDL of 60 mg/dL (1.5 mmol/L). For this profile, underlying risk of MI is 0.1% and NNTH = 1,111. The NNTH drops from 1,111 to 555 if diabetes, ECG-LVH or TC = 240 mg/dl (6.2 mmol/L) is diagnosed (Table 1). The NNTH drops further to 370 for sBP = 160 mmHg or HDL = 35 mg/dl (0.9 mmol/L) and to 277 for smoking. When two risk components are unfavourable at the same time the NNTH drops from 1,111 to around 100 for most pairs, except smoking and unfavourable HDL, for which NNTH = 69. The NNTH becomes 7 and the underlying risk of MI 15% when all risk factors are unfavourable. Practical tools (including 3D graphs) to explore these relations and guide interventions for individual patients have been developed.

Conclusion

It is possible to increase NNTH values for any group of patients on abacavir by decreasing the underlying risk of MI. Therefore, if underlying risk of MI can be reduced, the NNTH for a given therapy will increase, meaning that the therapy can be administered to more people without causing additional harm.

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