

Estimation of cardiovascular risk in hypertensive patients in primary care

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SUMMARY

Assessment of absolute cardiovascular risk is a rational method of managing hypertension. General practitioners and practice nurses were asked to estimate absolute risk in a group of elderly hypertensive patients during clinical practice. Risk was correctly estimated in 21% of patients, underestimated in 63% of patients, and overestimated in 16% of patients. Unless primary health care professionals use cardiovascular risk charts or tables, treatment decisions in primary care may not be made against realistic estimates of patients' susceptibility to cardiovascular disease.

Keywords: cardiovascular risk; hypertension; elderly care.

Introduction

It is now recognised that rational decision-making and subsequent management of hypertension should be based on absolute risk rather than blood pressure alone.¹ Previous studies have shown that estimation of absolute risk of cardiovascular disease is not necessarily easy to accomplish.²⁻⁴ These studies were based on either simulated patients^{2,3} or used real patients' notes, but not in a clinical setting.⁴ The aim of this study was to compare estimates of absolute risk, made by general practitioners (GPs) and practice nurses (PNs) in the process of clinical practice, against a 'gold standard' absolute risk calculated using patient data and a Framingham risk equation in a group of elderly hypertensive patients.

Method

Individual patient data were collected as part of a randomised controlled trial of computerised and card versions of the Framingham-based New Zealand risk tables that took place between 1996 and 1998.⁵ Of 96 practices in Avon that use either EMIS or AAH Meditel computing systems, 27 agreed to participate in the study.

Thirty patients aged 60–79 years, diagnosed as hypertensive and taking medication to lower blood pressure, were randomly selected from each practice list. After excluding patients with recent major illness or surgery and those unable to visit the prac-

tice, the remainder were invited to attend the surgery for a blood pressure check.

The five-year risk of a patient suffering a fatal or non-fatal cardiovascular event (newly diagnosed angina, myocardial infarction, coronary heart disease, stroke, or transient ischaemic attack) was estimated by either a GP or PN, depending on procedures for management of hypertensive patients within each practice. Risk estimates were based on health professionals' knowledge of individual patients, as well as family history and presence of risk factors recorded in the patients' notes. Risk was estimated in one of seven categories (Table 1) before being recorded in the patients' notes.

The following data were collected from each patient's notes and entered into Stata Statistical Software to allow the calculation of a five-year risk of a cardiovascular event: age, sex, systolic blood pressure, smoking status, diabetes, total and high density lipoprotein (HDL) cholesterol, and left ventricular hypertrophy. The only data missing in those patients for whom a risk estimate was obtained were total cholesterol (missing $n = 159$) and HDL cholesterol (missing $n = 370$). These missing data were managed conservatively; that is, health professionals were instructed to assume a total cholesterol of 4 mmol/l and a HDL cholesterol of 1 mmol/l (the lowest possible values contributing to the New Zealand hypertension guidelines). The same values were used in calculation of the 'gold standard' risk. The 'gold standard' absolute risk of a cardiovascular event was calculated using the individual patient data and a single equation derived from Framingham Study data.⁶ For comparison, this calculated 'gold standard' absolute risk was then recoded into the same seven categories as the estimated risk.

Overall agreement between estimated and 'gold standard' absolute risk was calculated using unweighted and weighted kappas. Unweighted kappas measure agreement in excess of that expected by chance. For weighted kappas, differences between estimated and 'gold standard' absolute risk of either one or two risk categories represent partial agreement (contributing fractionally to the weighted kappa), whereas differences of three or more categories are taken as fully discordant.

Results

Of the 810 patients selected for the main trial, 715 fulfilled the inclusion criteria.⁵ Of the 614 who attended the baseline consultation, absolute risk estimates were obtained for 397. Estimates of risk were made by 69 GPs (214 patients) and 11 PNs (183 patients). There were no systematic differences between risk estimates made by GPs and PNs.

The percentage of correct estimates by health professionals varied significantly across the categories of absolute risk (Table 1). Absolute risk of a cardiovascular event was correctly estimated in 21% of patients (Table 2). Nearly two-thirds of patients had their absolute risk underestimated and 16% had their risk overestimated (Table 2). The kappa and weighted kappa measures of overall agreement between estimated and 'gold standard' absolute risk were 0.05 and 0.18 respectively.

Discussion

In clinical practice it appears that health professionals do not

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Table 1. Number and percentage of correct estimates compared with the 'gold standard' within each risk category.

Absolute risk (%)	'Gold standard' (n)	Number correctly estimated	Percentage correctly estimated ^a
<5	4	1	25.0
5–5.9	52	23	44.2
10–14.9	101	22	21.8
15–19.9	84	13	15.5
20–39.9	149	24	16.1
40–59.9	7	2	28.6
≥60	0	0	0.0
Total	397	85	21.4

^a χ^2 on 3 degrees of freedom (combining the two lowest and three highest absolute risk categories) = 11.0; P = 0.012.

Table 2. Magnitude and direction (in terms of number of risk categories in Table 1) of general practitioner/practice nurse estimate misclassification compared with 'gold standard' absolute risk.

Estimated risk compared with 'gold standard'	Number	Percentage
Under by 3 or more	56	14.1
Under by 2	85	21.4
Under by 1	106	26.7
Agree	85	21.4
Over by 1	40	10.1
Over by 2	18	4.5
Over by 3 or more	7	1.8
Total	397	100

assess absolute risk of a cardiovascular event in treated hypertensive patients with any degree of accuracy in comparison with the 'gold standard' considered here. These data confirm findings from previous studies²⁻⁴ in which physicians were not consistent in either the direction or the magnitude of misclassification of absolute risk.

Risk of a cardiovascular event is dependent on a number of factors, of which high blood pressure is one. An inability to accurately estimate absolute risk thus has implications for the management of cardiovascular risk in hypertensive patients. First, treatment decisions may not be made against a realistic estimate of an individual's susceptibility to fatal and non-fatal cardiovascular disease. Secondly, the consequent risk:benefit ratio of antihypertensive treatment cannot be accurately assessed. This means that communication of risk and benefit of treatment to patients is likely to be misleading in the majority of cases.

Aids to absolute risk assessment are available.^{7,8} This study has shown that, without these risk tables and charts, health professionals are unable to correctly estimate absolute risk in elderly hypertensive patients and management of hypertension in the community is unlikely to be based on realistic estimates of either benefit or harm.

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