CONCEPTS IN HYPERTENSION

A Journal Article-Based Approach to Understanding the Clinical Aspects of Hypertension

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Article of Interest

D'Agostino R, et al. General Cardiovascular Risk Profile for Use in Primary Care: The Framingham Heart Study. Circulation. 2008. (Click to Access)

Context and Study Objective

While more intensive SPRINT-like blood pressure (BP) targets result in improved cardiovascular (CV) outcomes, achieving these readings without side-effects is challenging. Because BP is only one of several variables that contributes to CV morbidity, "risk calculators" that incorporate additional factors (eg dyslipidemia, tobacco use) are more accurate. They also enable one to address the most influential risk factors (eg cholesterol, smoking) rather than exclusively focusing on a single parameter (eg BP). In this paper, D'Agostino sought to develop an algorithm that predicted an individual's risk of suffering a CV event in the coming 10 years.

Design, Setting, Participants

Data for the creation of the model was drawn from CV events that arose during the Framingham Heart and Offspring studies. Participants aged 30-74 who underwent examination between 1968-87 were studied. All were free of CV disease. Outcomes of interest included vascular disease of the coronary (fatal/non-fatal myocardial infarction, angina, heart failure), cerebral (fatal/nonfatal stroke, transient ischemic attack) and peripheral (claudication) circulation.

Results

-8500 individuals were analyzed. Mean age: 49; 53% were women. 100% were Caucasian.
-A model including the following variables (tables) was most predictive of the 10 year risk of suffering a CV event.
-Among all criteria, age and systolic BP disproportionately contributed to the risk of experiencing an atherosclerotic event.
-This 74 year old (top table) woman has a treated BP of 130 systolic and an untreated LDL of 95 mg/dl. She has a 14% risk of experiencing an event in the next decade. If her BP is lowered from 130 to 120 mm Hg (bottom table, left), her event rate will decline to 11.3%. Alternatively, if she is started on a medium dose statin instead (bottom table, right), her risk will fall to 11.2%.

10 Year Cardiovascular Event Rate Before Intervention	
Age & Gender	74 Lady
Tobacco or Diabetes	No
Systolic BP (mm Hg) on Therapy	130
HDL & Total Cholesterol (mg/dl)	50 & 180
10 Year Event Rate (%)	14

Clinical Perspective

-We often lose sight of the purpose of achieving a given BP target. The reading in and of itself is meaningless. Its value derives from the association between a given BP and CV event rates. However hypertension is but one precipitant of atherosclerotic sequelae.
-Predictive models that incorporate multiple variables (eg tobacco use, diabetes) are more accurate. They also reveal which risk factor may be disproportionately contributing to a patient's risk profile and thus identify the most important target for therapy.
-In the above vignette, the prescriber could have lowered the patient's BP to the guideline recommended level of 120 systolic. With the assistance of a risk calculator, one quickly appreciates that her LDL of 95 mg/dl is unexpectedly contributing more to her CV risk than her current degree of hypertension. Because a moderate-intensity statin is often better tolerated than a reduction of BP from 130 to 120 mm Hg, it is the intervention of choice should optimization of both parameters be prohibitive.
-This calculator can be found online. I prefer this simplified printed version which permits the patient and me to jointly explore how tobacco use or aging impacts CV event rates.
-Study Shortcomings: This risk calculator was derived from a white population with a maximum age of 74. While it performs well in black populations, more accurate risk models exist for other groups.
-Disclosures: I have no conflicts to declare.

10 Year Cardiovascular Event Rate After BP or Cholesterol Reduction		
Age & Gender	74 Lady	
Tobacco or Diabetes	No	
Systolic BP (mm Hg) on Therapy	120	130
HDL & Total Cholesterol (mg/dl)	50 & 180	50 & 150
10 Year Event Rate (%)	11	11

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