Assessment of the Patient With Diabetes for Coronary Heart Disease Risk: Review and Personal Reflection

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ABSTRACT

Diabetes increases the risk for coronary heart disease (CHD) 2- to 3-fold, and when patients with diabetes develop overt CHD, the prognosis is worse than it is for patients without diabetes. Consequently, there is a need to provide vascular protective measures for patients with diabetes at high risk for CHD events. Several guidelines committees have declared that diabetes is a CHD risk equivalent and that all patients with diabetes require full vascular protective measures, including the use of statins and angiotensin-converting enzyme inhibitors. Although a large proportion of patients with diabetes is indeed at high risk for CHD, it is apparent that some are not at such high risk and might be managed without pharmacological vascular protection. In this review, factors that determine CHD outcomes in patients with diabetes are discussed, and a possible risk stratification algorithm is presented to generate further discussion.

KEYWORDS

Coronary heart disease, prognosis

RÉSUMÉ

Le diabète multiplie par deux ou trois le risque de maladie coronarienne (MC) et lorsqu'un patient diabétique présente une MC avérée, le pronostic est plus sombre que chez les non-diabétiques. Par conséquent, il faut prendre des mesures de protection vasculaire chez les patients diabétiques à haut risque de MC. Plusieurs comités des lignes directrices ont déclaré que le diabète était un risque de MC équivalent et que tous les patients diabétiques avaient besoin de toutes les mesures de protection vasculaire possibles, y compris le traitement par une statine et un inhibiteur de l'enzyme de conversion de l'angiotensine. Cependant, même si une grande proportion des patients diabétiques est en effet à haut risque de MC, il semble que certains ne le soient pas et que leur état puisse être maîtrisé sans protection vasculaire pharmacologique. Dans cette analyse, il est question des facteurs qui déterminent les répercussions de la MC chez un patient diabétique et un algorithme possible de stratification des risques est présenté pour amorcer la discussion.

MOTS CLÉS

maladie coronarienne, pronostic

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INTRODUCTION

Diabetes increases the risk of developing coronary heart disease (CHD) 2- to 3-fold, compared with individuals without diabetes (1). Coronary heart and cerebrovascular disease are an important cause of morbidity and approximately 75% of patients with diabetes will die from a cardiovascular disease (CVD). To consider the problem of CVD in perspective, individuals with diabetes are 40 times more likely to have a major CVD event than to develop end stage renal failure(2). Most importantly, when a patient with diabetes has an acute coronary event, the mortality is 50% greater than in a patient without diabetes (3,4).

Vascular protective measures such as lower blood pressure (BP) targets, statins and angiotensin-converting enzyme (ACE) inhibitors are recommended for all patients at high risk for cardiovascular (CV) morbidity and mortality. "High risk" is defined as the level of risk for CHD events observed in patients with established CHD: that is, on average a 20% 10-year risk of cardiac death or nonfatal myocardial infarction (MI) (5,6). The risk for all CV events is not discussed here in order to keep the decision for pharmacological vascular protection consistent with the threshold for high risk in the lipid guidelines (5,6). For patients at intermediate risk for CHD events, pharmacological vasculoprotective measures may be recommended depending upon the severity of the risk factor (e.g. low-density lipoprotein [LDL-C] level) or presence of other risk factors, such as a family history of premature CHD. In contrast, a low-risk population has little absolute benefit from pharmacological vascular protection, as the hazards of treatment may exceed the benefits, and the treatment is unlikely to be cost effective.

This paper will identify patients with diabetes who are at high risk for CHD events in order to select those who might benefit most from both pharmacological vascular preventative strategies and specialized CV investigations to identify established CHD. In addition, it will:

- Define the CHD risk of patients with diabetes and discuss the following: Is diabetes a "CHD risk equivalent?" How do CHD risk factors interact with diabetes in the development of CHD events? How important are diabetes-specific risk factors in the development of CHD?
- Consider the role of detecting silent atherosclerotic vascular disease.
- Examine risk engines that determine the absolute risk for CHD in the patient with diabetes.
- Suggest a process for estimating CHD risk.

CHD RISK AND DIABETES: IS DIABETES A CARDIAC RISK EQUIVALENT?

In 2002, the National Cholesterol Education Program Adult Treatment Panel III (5) recommended that patients with diabetes and no clinical evidence of CVD still be considered to have the same risk for CHD events as a patient without diabetes but with established CHD. Consequently, patients with diabetes were determined to have a CHD risk equivalent that required vascular protective measures applied with the same intensity as in the patient with known CHD. This recommendation followed the publication of a study from Finland (7) that estimated the 7-year incidence of CV events among 890 patients with diabetes who had no history of MI and 69 patients without diabetes with a prior history of MI. The risk of death from CHD was not significantly different between the 2 groups, with an adjusted hazard ratio of 1.2 (95% CI 0.6–2.4). However, the study was underpowered to show a difference, and no confident conclusions can be made. Furthermore, patients with diabetes in this study were older (mean age 58 years), had a long history of diabetes (mean 8 years) and consequently were not representative of all persons with diabetes.

Indeed, more recent studies have indicated that not all patients with diabetes have a 10-year CHD risk of >20%. Evans et al (8) compared the risk of CV outcomes in both cross-sectional and cohort studies of patients with a history of MI to patients with diabetes but no CHD. They found that patients with a history of MI were at substantially greater risk than patients with type 2 diabetes and no history of CHD for death from all causes (RR 2.27, 95% CI 1.82–2.83) and hospital admission for MI (RR 1.33, 95% CI 1.14–1.55). Wannamethee et al (9) observed 10 000 men aged 52 to 74 years over a 10-year period and found that those with diabetes had an almost 3-fold increase in total mortality compared with those without diabetes. The risk for CHD death was similar for patients with angina and those with diabetes and no CHD, but was 50% greater for patients with a history of MI and no diabetes. Thus, the coronary risk equivalency of diabetes appears to depend on the CHD endpoint. The Dubbo study (10) followed elderly patients with diabetes (n=207) and without diabetes (n=2419) for 8 years. CHD presence at enrollment was defined as a positive response to an MI questionnaire or the Rose angina questionnaire or from diagnostic electrocardiographic changes. With this wide definition for CHD, diabetes was associated with an increased hazard of incident CHD events. However, the risk of CHD events in the patient with diabetes (but no CHD at enrollment) was still 40% less than in patients with CHD but no diabetes.

Over a range of age and racial groups, diabetes confers a 2- to 4-fold risk of CHD events compared with the population without diabetes. However, in most studies CHD event rates in patients with diabetes are lower than event rates in patients without diabetes and a prior history of CHD, especially MI.

HOW DO RISK FACTORS PREDICT CHD RISK IN THE PATIENT WITH DIABETES?
Age dependence of risk

Age is the most powerful overall predictor of CHD risk. By age 65, most men have a 20% risk of a CHD event within the next 10 years. A population cohort study from Ontario