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REVIEW

Screening for coronary artery disease in asymptomatic individuals: Why and how?

Pourquoi et comment dépister la maladie coronaire chez le sujet asymptomatique ?

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Summary Cardiovascular disease is still the main cause of death in the world, and coronary artery disease is the largest contributor. Screening asymptomatic individuals for coronary artery disease in view of preventive treatment is therefore of crucial interest. Apart from established risk scores based on traditional risk factors such as the Framingham or SCORE risk scores, new biomarkers and imaging methods have emerged (high-sensitivity C-reactive protein, lipoprotein-associated phospholipase A2 and secretory phospholipase A2, coronary artery calcium score,

carotid intima-media thickness and ankle-brachial index). Their added value on top of the classic risk scores varies considerably and the most convincing evidence exists for coronary artery calcium score in intermediate-risk asymptomatic individuals.

MOTS CLÉS
Risque cardiovasculaire ;
Maladie coronaire ;
Score calcique ;
Dépistage ;
Prévention

Résumé   Les maladies cardiovasculaires représentent toujours la première cause de mortalité dans le monde, et la coronaropathie en constitue la majeure partie. Le dépistage de la maladie coronaire chez les sujets asymptomatiques dans le but d'instaurer un traitement préventif présente donc un intérêt majeur. À côté des scores de risque établis basés sur les facteurs de risque traditionnels, comme le score de Framingham ou la méthode SCORE, de nouveaux biomarqueurs ou méthodes d'imagerie ont fait leur apparition (la protéine C-réactive ultra-sensible, la phospholipase A2 associée aux lipoprotéines et la phospholipase A2 sécrétoire, le score calcique, l'épaisseur intima-media carotidienne et l'index de pression systolique). Leur valeur ajoutée aux scores de risque classiques varie fortement en fonction du marqueur utilisé. Les preuves les plus solides existent pour le score calcique chez les sujets asymptomatiques à risque intermédiaire.

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Coronary heart disease: the leading cause of death worldwide

Despite an important reduction in cardiovascular mortality in western countries [1,2], cardiovascular diseases are still the main causes of mortality in the world. In 2010, one in four deaths was attributable to ischaemic heart disease or stroke, compared to one in five in 1990 [3]. Likewise, in Europe, cardiovascular diseases were responsible for more than half of deaths in women and 42% of deaths in men, mainly due to coronary heart disease [4]. Data are similar in low-income countries, with more than 12 million deaths related to cardiovascular causes [5].

Why should we screen asymptomatic individuals for cardiovascular disease?

Atherosclerosis is a slowly progressing disease, characterized by a long asymptomatic period of several decades. Lipid-rich plaques develop in the arterial vessel walls and may be revealed by typical symptoms, such as angina pectoris or intermittent claudication, in stable patients. However, the disease can also be revealed by an acute event, such as an acute coronary syndrome or stroke, without any preceding symptoms and, in the worst case, by sudden death. It is therefore crucial to develop a screening strategy in asymptomatic individuals before potentially fatal events occur.

Cardiovascular screening in asymptomatic individuals aims at the identification of intermediate- or high-risk individuals. The objective is to initiate strategies that would reduce their incidence of ischaemic events (including myocardial infarction) and ultimately cardiovascular death. Different preventive strategies have been proposed.

First, cardiovascular risk can be reduced by optimal risk factor management and lifestyle changes. Smoking cessation is a cornerstone of cardiovascular disease prevention and represents a public health problem because of the effect of passive smoking [6]. All smokers should be encouraged to quit smoking by various smoking-cessation therapies [7]. Furthermore, a healthy diet and regular exercise are part of the general cardiovascular prevention measures applicable to the entire population [8,9]. Thus, around half of the reduction in deaths from coronary heart disease is attributable to better management of cardiovascular risk factors and the other half to advances in medical treatments [10].

Second, a preventive medical treatment can be considered before an acute cardiovascular event occurs. However, in a low-risk population, further risk assessment using novel biomarkers is not cost-effective. Furthermore, in a high-risk population, pharmacological treatment is usually mandatory for the majority of the patients and further risk assessment will not change this strategy. Conversely, in intermediate-risk individuals, further risk assessment by novel risk markers could refine cardiovascular risk and, in case of positive screening, indicate preventive pharmacological treatment. The effectiveness of statin treatment for primary prevention in a population with cardiovascular risk factors has been shown in large meta-analyses [11,12]. Statins reduce mortality and the risk of major cardiovascular and cerebrovascular events in people without known cardiovascular disease. Similarly, the effect of blood pressure reduction by antihypertensive drugs on cardiovascular disease prevention in a population without established cardiovascular disease has been demonstrated extensively, irrespective of the class of blood pressure lowering drugs used [13].

Another, more invasive, strategy could be 'preventive' coronary revascularization. However, most acute myocardial