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Review Article

Risk Factors in Ischemic Heart Disease

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Abstract

Introduction: Coronary artery disease is one of the main causes of mortality worldwide. An important role in the physiopathology of this disease is played by the development and progression of coronary atherosclerosis which is closely related to certain life habits and individual characteristics known as risk factors.

Objective: To provide the primary health care professionals with an updating on the risk factors of ischemic heart disease.

Method: A literature review including medical books and scientific articles from on line journals was made through the use of information searchers. It was possible to have access to several sources of information such as databases, electronic books, electronic journals, etc. from Informed and Internet. Finally, a critical analysis of the topic, supported on the findings of this literature, was made.

Discussion: The situation of cardiovascular diseases worldwide has undergone several phases according to the social and economic development of the nations and the increase of the incidence of a number of factors affecting in different ways the occurrence of ischemic heart disease.

Conclusions: It is important to know about the influence of each cardiovascular risk factor over the occurrence of ischemic heart disease in order to draw strategies for their control and to prevent the disease.

Keywords: *Ischemic Cardiopathy (IC); Coronary Atherosclerosis; Ischemic Heart Disease*

Introduction

Ischemic cardiopathy (IC) is an entity that groups together a set of diseases related to and consecutive to ischemia. Clinical presentations include silent ischemia, stable angina pectoris, unstable angina, acute myocardial infarction, heart failure and sudden death [1]. All share a common pathophysiological basis, where the progression or rupture of an atheromatous plaque is the main anatomopathological event in 50 to 70% of patients [2,3].

Coronary atherosclerosis is closely related to certain life habits and certain personal characteristics. These are the so-called risk factors, since their presence is associated with an increased probability of suffering said disease and its consequences. Among these factors are those that cannot be modified (genetic inheritance, age and sex) and modifiable ones (hypercholesterolemia, hypertension, diabetes mellitus, smoking, obesity, sedentary lifestyle and alcoholism) [3]. The most important aspect is that the favorable transformation of the modifiable factors is associated with a reduction in the number of ischemic events, whether it starts before the appearance of the first clinical manifestations (primary prevention), or later (secondary prevention) [4,5].

The situation of cardiovascular diseases in the world has gone through different phases, in correspondence with the socioeconomic development of the countries and the increase in the incidence of different risk factors. Although in the last decades mortality due to IC

has declined in developed countries, it still remains in the majority of these the first cause of death; it has also begun to grow in developing countries [6].

Since 1990 more people have died from coronary artery disease than from any other cause in the entire world. While genetic factors play an important role, at least 80% of these people had one or more of the major risk factors influenced by lifestyles [7].

Objective of the Study

The objective of this review is to provide essential and updated information to primary health care professionals about the risk factors of ischemic heart disease, as this level of medical care is the main link where primary prevention measures should be implemented.

Methods

An updated bibliographic review was made in medical books and scientific articles available in digital journals, through information searchers. Different sources of information were accessed, such as databases, e-books, electronic journals, etc. from informed and the internet. Then a critical analysis was made on the subject, supported by what was found in the literature consulted.

Developing

Risk factor's

Coronary atherosclerosis is, in practice, the underlying process responsible for the clinical manifestations of IC. Initially considered as a slow degenerative phenomenon of the arterial tree, we now know that it is an active process, characterized by a chronic inflammatory reaction accompanied by repair phenomena, which takes place in the highly specialized medium of the arterial wall. The etiology of this process is complex and multifactorial, considered as the result of the interaction between a predisposing genetic load and certain environmental factors.

These factors interact with each other, so that the sum of several of them has a multiplicative effect on the global risk. Some of these factors are not modifiable, but others are susceptible to be eliminated or modified, and should represent the main objective of the measures of primary or secondary prevention of ischemic heart disease [3].

Non-modifiable risk factors

Genetic heritage

He family history of ischemic heart disease is one of the main determinants of coronary risk, and its effect is independent of the presence of other major risk factors such as hypertension, smoking, diabetes mellitus and hypercholesterolemia. The risk in siblings of patients with manifestations.

Age

Advanced age is associated with a high risk of suffering from IC, with age sympathetic activity increases and baroreceptor sensitivity decreases and regulatory capacity of systems decreases, systolic blood pressure increases and all markers of atherosclerosis and arterial stiffness and pulse pressure, among other metabolic, involutional and apoptotic effects. This type of patient has certain characteristics, so the older they are, the greater the chances of suffering from associated diseases [9].

When coronary disease is premature, it mainly affects males and shows a high prevalence of some very specific cardiovascular risk factors, such as a family history of ischemic heart disease, hyperlipidemia or habitual consumption of tobacco [10].

Cardiovascular prevention measures should begin with changes in lifestyle from an early age when life is not healthy [11].

Modifiable risk factors and related to life habits

Dyslipidemia

The variability of blood lipids is determined by endogenous factors related to the metabolism of the individual, and by exogenous or environmental factors whose main element is diet, intervening in the etiopathogenesis of various lipid metabolism alterations related to an increased risk of disease atherosclerotic [3].

Total serum cholesterol (TC) and low density lipoprotein cholesterol (LDL-C) are associated independently, strongly and continuously with the risk of ischemic heart disease, even in young people and in populations with low coronary risk. In addition, the authors describe that low levels of low-density lipoprotein cholesterol (HDL-C) (< 40 mg/dl) are also independently associated with the diagnosis of Acute Coronary Syndrome (ACS) [14].

Knowing the magnitude and management of blood lipids is useful to identify opportunities for reducing cardiovascular risk, as well as individuals who can benefit most. Only a few countries have population-based national studies on the distribution and management of cholesterol, especially LDL-C and triglycerides (TGC), which are the lipid fractions used as therapeutic targets [14-16].

Smoking

It is estimated that between 20 and 30% of all deaths from coronary heart disease in the United States are attributable to tobacco use and the risk is strongly related to the dose [3].

A study conducted in Spain where the presence of cardiovascular risk factors in the premature onset of acute myocardial infarction (patients younger than 45 years) was analyzed, identified a high prevalence in tobacco consumption. The role of the lifestyle of the young population, in terms of the consumption of toxic substances and that influence the appearance of a premature infarction, seems to be determinant [10].

An acute coronary event is anticipated approximately 10 years in smokers compared to non-smokers. The cessation of smoking decreases the risk of cardiovascular morbidity and mortality [17].

Two substances related to the development of cardiovascular pathology, carbon monoxide and nicotine have been identified. Both favor the development of the disease through its action on the autonomic nervous system, with release of catecholamines, increased platelet aggregation, lipid alterations and endothelial dysfunction. In addition, tobacco decreases the effectiveness of some antihypertensive drugs, which contributes to the lack of control of hypertension [10].

Arterial hypertension

High blood pressure is a key risk factor in the incidence of cardiovascular disease. A report by the International Society of Hypertension estimated that 7,6 million premature deaths due to HBP occur annually and that 47% of new cases of ischemic heart disease are attributable to it [18].

Blood pressure is a biological parameter with marked variability, in any case, the cardiovascular risk progressively increases from the lowest figure. For individuals between 40 and 70 years, each increase of 20 mmHg of systolic blood pressure (SBP) or 10 mmHg of diastolic blood pressure (DBP), doubles the risk of cardiovascular disease in the entire range from 115/75 to 185/115 mmHg [19].

HBP causes structural and functional alterations of the heart that affect the atrial, ventricular myocardium and the epicardial and intramural coronary arteries [19].

Diabetes mellitus (DM)

The state of chronic hyperglycemia caused by DM exerts toxic effects at cellular and organic level, causing micro and macrovascular complications. Lipid alterations in type 1 DM are related to metabolic control and insulin deficit. In type 2 DM Lipid alterations are more complex. In the liver, lipogenesis increases due to hyperglycemia, and hyperinsulinism causes an increase in the synthesis of triglycerides

and very low density lipoproteins (VLDL). This disorder is accompanied by accumulation of plasma lipoproteins containing Apo B and intermediate density lipoproteins (IDL), insulin resistance, obesity, hypertension, and hyperuricemia. A part of the LDL-C is glycosylated and is more susceptible to oxidation and atherogenesis [19].

Certainly in DM and probably also in the context of the metabolic syndrome, vascular disease and atherosclerotic coronary disease occur, to a greater extent than it explains, the accumulation of other associated risk factors [20].

Other risk factors

There are other risk factors that predispose the individual to suffer a coronary disease, among them is the disorder called homocysteinemia, in which free sulfhydryl groups of said amino acid can mediate the formation of free radicals and contribute to the cytotoxicity and oxidation of the LDL. Homocysteine appears to activate coagulation factor VII [3].

Various abnormalities in the coagulation system have been linked to an increased risk of IC. Factors such as: platelet hyperreactivity, elevated levels of hemostatic proteins (fibrinogen and factor VII), defects in fibrinolysis and blood hyperviscosity have been implicated [3].

The changes originated in the arterial wall by atherosclerosis progress slowly in a long subclinical period, characterized by endothelial damage and diffuse thickening of the arterial intima. These initial phases of the disease can be diagnosed by ultrasound with the measurement of intima-media thickness, especially at the carotid level. This thickness is the risk factor most associated with cardiovascular disease compared to other traditional risk factors, and predicts the occurrence of stroke and acute myocardial infarction [21].

Chronic renal failure is associated with a significant increase in the risk of cardiovascular morbidity and mortality, regardless of the presence of traditional cardiovascular risk factors (CVRF), to the point that it is considered independent CVRF, according to the National Kidney Foundation, the American Heart Association and the Seventh Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure [22].

Conclusions

The growth of coronary heart disease is due, in large part, to significant changes in lifestyle, associated with the growth of urbanization and economic development, which bring about an increase in the risk factors of cardiovascular diseases.

The estimation of cardiovascular risk is the most reasonable and cost-effective way to determine the priorities of prevention of cardiovascular diseases in asymptomatic persons, and allows allocating resources and creating strategies according to the needs.

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