Prevention of Acute Coronary Events through the Mediterranean Diet

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"…relatively simple dietary changes achieved greater reductions in risk of all-cancer and coronary heart disease mortality in a secondary prevention trial than any of the cholesterol-lowering studies to date." A. Leaf [1]

In 1950, Ancel Keys was the first to try to determine why the incidence of death resulting from coronary heart disease varied so much in different countries [2]. By that time he had already developed the hypothesis that cholesterol accounted for this difference. His classical study, the Seven Countries study, which began in 1958, examined a population of 12,723 men for 5, 10, and 25 years, with 1,500 coronary deaths [3]. It was then clear that, in some countries, mean cholesterolemia of the population was much lower than that in the USA; in addition, the coronary mortality rate in general was not only considerably lower in these countries but, for the same level of cholesterolemia, the coronary mortality rate was also lower.

The USA was undoubtedly the first to study this problem, controlling risk factors and conducting population campaigns to stimulate a healthier diet, resulting in a significant reduction in the coronary mortality rate between the '60s and the '80s.

The fact that equal levels of cholesterolemia resulted in much higher mortality in the USA than in France or Japan made the researchers investigate which other factors might influence the harmful role of cholesterol.

Zupten, a small town in Holland, was one of the places included in the study by Keys [2], where the patients were followed up until 1980. Twenty per cent of the population of that town did not eat fish and, in the remaining population, fish consumption varied from 1 gram to 307 grams per day.

The diet of each participant was estimated through a careful study conducted by nutritionists, who, following up this population, compared the accuracy of the history-diet method using chemical analyses of samples of the food. Other risk factors, such as cholesterol, blood pressure, smoking, physical activity, anthropometric measurements, and occupation, were also assessed. During 20 years of follow-up, there were 132 deaths due to cancer, 140 due to coronary heart disease, and 33 due to stroke. The deaths were divided into 5 categories according to the daily consumption of fish; a statistically significant reverse relationship occurred between fish consumption and mortality due to coronary heart disease, when considering the 20-year follow-up. Coronary mortality was 2.5 times higher in the lowest quintile of consumption as compared with the highest quintile of consumption [3,4]. No relation occurred between fish consumption and cholesterolemia.

A study carried out in Chicago [5] with 2,107 employees of a company followed up for 30 years also corroborated the significant inverse relation between fish consumption and coronary death, especially sudden death.

Recently, Lorgeril et al [6] published a study that was extremely important for the world of cardiology. It was a randomized study of secondary prevention aiming to check whether the Mediterranean diet had an influence on the evolution of the patient after a myocardial infarction. The first report of this study was published in the Lancet in 1994 [7] after the Committee on Science and Ethics stopped the 5-year study after only 27 months. The experimental group was receiving very clear benefits from the study treatment. A 70% reduction in global mortality resulted from a reduction in coronary mortality. The patients, however, were instructed to continue the diet, which they did, allowing a mean follow-up of 4 years.

All patients were under 70 years of age and had survived an acute myocardial infarction. They were divided into 2 groups as follows: the experimental group, following a Mediterranean diet, and the control group, following a careful diet prescribed by their cardiologists.

The total number of cardiac deaths and nonfatal acute myocardial infarctions was 44 in the control group and 14 in the experimental group, a reduction of 72% (p=0.0001). When secondary end-points (unstable angina, heart failure, pulmonary or peripheral embolism, stroke) were added to those two end-points, the total number of cardiovascular events was 90 in the control group and 27 in the experimental group, a difference of 67% (p=0.0001).

The reduction in cardiovascular events in the group following the Mediterranean diet was, therefore, extremely significant; this reduction was greater than that reported in the studies with statins. Lipid levels at the end of the study, however, were the same for both groups with no difference in total cholesterol, HDL, LDL, and triglyceride levels. One could not attribute, therefore, this great benefit obtained in the experimental group to the effects of lipid lowering.

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What does this Mediterranean diet consist of? What is the difference between the Mediterranean diet and that recommended by the American Heart Association (AHA) and followed worldwide? The Mediterranean diet consists of the following items: reduction in the total lipid fraction to less than 30% (similar to 30% according to the AHA); reduction in saturated fats to 7-8% (10% according to the AHA); reduction in the polyunsaturated fats to 4-6% (10% according to the AHA); increase in the monounsaturated fats to 13-15% (10% according to the AHA); increase in the alpha-linolenic acid to 0.8% (not mentioned by the AHA); maintenance of a protein intake of approximately 17% (not mentioned by the AHA); increase in the ingestion of natural antioxidants; to assure the ingestion of great amounts of vitamins indispensable to the energetic metabolism of the myocardium.

Basically, the alimentary plan for the patients was as follows: 1) no butter or cream permitted (to avoid food containing them); 2) cheese allowed in moderate amounts; 3) to use only olive or canola oil; 4) no other oil, margarine or cream; 5) to eat fish instead of meat (once to three times a week); to eat white meat and to avoid pork, bovine, lamb, and rabbit meat; 6) to base the meal on bread, cereals and vegetables (fresh or dried); 7) to eat many fresh or dried fruits, including avocado; 8) to drink, moderately, red wine during meals[8].

The authors [8,9] state that the prohibition of innocent products is not recommended because this makes the diet unpalatable. Some examples of food that should not be forbidden: bread, wine, cheeses, oleaginous fruits, tropical oily or apparently oily vegetables and fruits (avocado), crustaceans and shrimps (because they are rich in cholesterol), and eggs (due to the same reason).

The omega-3 polyunsaturated fatty acids of plant or animal (fish) origin, the linolenic acid, and the oleic acid constitute the protective basis of this diet.

The authors[9] have noted that the impact of the food on coronary atherosclerosis is multiple, especially on the lipid infiltration of the intima, thrombogenesis, arrhythmogenesis, and heart failure. Vulnerable plaques are inflammatory lesions and the omega-3 fatty acids have an anti-inflammatory action because they act on the metabolism of prostaglandins, leukotrienes, and platelet activating factor.

The vulnerable plaques are slightly fibrous and the omega-3 fatty acids are incorporated into the plaques causing an *in situ* inhibition of the inflammatory cells [9].

Knowing how difficult it is to perform a rigorous scientific assessment of a dietary trial, which for obvious reasons cannot be double blind, the authors published the article just to explain how they controlled biases in their study [10]. Both randomized groups had similar prognoses in regard to all variables. Medications used in the two groups were not significantly different and all other possible biases were analyzed.

Therefore, there are two possible ways of preventing acute coronary events: diet or use of medications that lower lipids, especially statins, or a combination of both. The 4S study was the first to clearly and conclusively demonstrate this benefit[11] and nobody can currently deny the fundamental role played by statins in the treatment and also in the prevention of coronary heart disease. The other way to prevent acute coronary events was shown, also conclusively, by Lorgeril et al [5] with the Mediterranean diet, without the aid of drugs to reduce blood lipids.

It is obvious that in addition to following the Mediterranean diet, if the patient also uses statin, the result may be much better because we will be acting simultaneously upon lipids, upon the platelet antiaggregating mechanism, and upon the antithrombotic mechanism provided by this diet.

Diet and medication that reduces lipidemia, however, should be maintained during the patient's whole life. Some studies show that the reduction in myocardial ischemia caused by the reduction in cholesterol levels disappears 60 days after discontinuation of the treatment [12].

I believe that only a small proportion of the patients to whom a statin has been prescribed takes it regularly. One of the reasons for this discontinuation is the high cost of the drug, which is prohibitive for a large number of those who could benefit from it.

Secondary prevention almost always happens after retirement or during incapacity resulting from an infarction, exactly at the moment when one has a lower income and consequently a smaller ability to pay for a monthly prescription of a statin.

The Mediterranean diet opens a second path to prevention because it is easy to follow, practically without any additional cost to the patient and it also leads to a significant reduction in acute coronary events.

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