CLINICAL PROGRESS

Symposium: Advances in Detection of Coronary Artery Disease

Introduction: The Recognition of Coronary Artery Disease

By Richard J. Bing, M.D.

It can be said that simple and accurate means for the recognition of ischemic heart disease are not yet available. This statement is particularly applicable to the group often referred to as the covert, or coronary-prone group. Into this category belong patients in whom the risk factors of coronary artery disease, as described in the Framingham or similar studies, are present but who have not developed any overt symptoms of the disease. Opinions are divided on the relative importance of these risk factors. There is general agreement on the significance of blood cholesterol levels, whereas the role played by height of the blood pressure, by personality factors, the levels of triglycerides or free fatty acids, the caloric intake, or by body build is not yet properly defined. Genetic factors certainly are important. According to the Framingham study, the lipid indices in blood furnish no more additional information than plasma cholesterol alone. Electrocardiographic changes alone without the presence of a history of coronary artery disease are also often misleading, and their uncritical interpretation either leads to undue anxiety or to false confidence.

It has been sufficiently established that a false-positive diagnosis of coronary artery disease is less frequently made than a false-negative one. Everyone is familiar with the patient who is reassured by his physician in his office only to suffer a myocardial infarction soon afterward. Clinically, the absence of angina pectoris or of prolonged pain appears to be the most important factor in missing the diagnosis of coronary artery disease. Often a breakdown in the coronary circulation must occur, leading to angina pectoris, myocardial infarction, heart failure, or marked electrocardiographic changes before the diagnosis of coronary artery disease is made. It is evident, therefore, that when one assumes an incidence of coronary artery disease in about 10 million middle-aged American men, the coronary-prone group represents a sizable fraction of the population.

The electrocardiogram has been frequently used in the detection of this group. However, Hinkle and associates have pointed out that those individuals with unreactive and stable electrocardiographic patterns may be at least as susceptible to acute myocardial infarction as those with more labile patterns. Masters has stressed that no single feature, including the electrocardiogram during rest is definitive in the differential diagnosis of coronary artery disease. The exercise electrocardiographic tests appear more promising, but the criteria for establishment of coronary ischemia are still disputed. For these reasons, many modifications of the exercise test have been proposed. Coronary arteriography, as standardized by Sones and Shirey represents probably the
most objective method. Yet, despite its low mortality rate of 0.29 per cent (Sones), the method can only be carried out in centers by an experienced team.

It is for these reasons that the attack has to be pressed to open new technics in the recognition of coronary artery disease. This is particularly urgent in the coronary-prone group of patients, and in those individuals in whom the history and physical findings leave both the physician and the patient doubtful and anxious.

In this Symposium, four different approaches to this problem will be discussed. Sheffield, Holt, and Reeves describe the electrocardiographic results obtained with an exercise test, based on graded heart rates. This standardization results in fewer false-negative and fewer false-positive findings. The paper by Ross and Friesinger is a quantitative approach to the measurement of coronary flow in man, based on clearance of radioactive material by the heart, injected directly into a coronary artery through a catheter. Although this technic has so far not proved useful in the separation of normal individuals from those with ischemic heart disease at rest, the method has been of value in evaluating sudden changes of the coronary circulation induced by exercise or by drugs. The work of Eddleman represents a summary of the accomplishments of the Birmingham group by the recording of kinecardiographic changes in ischemic heart disease. He describes definitive alterations in the recorded tracings in individuals with coronary disease. Cohen and his co-workers, using rubidium-84, a positron emitter, have now been able to quantitate the measurement of coronary flow. They have demonstrated that it may be possible to recognize coronary artery disease by the altered response of the coronary circulation to nitroglycerin.

The papers describe newly developed methods concerned with the understanding of coronary circulation in man and with a utilization of knowledge in the recognition of coronary artery disease in man. These two aims, one physiologic and the other diagnostic, are closely related. New clinical diagnostic procedures will in all likelihood originate from physiologic studies applied to man.

References