Physical Activity And Arteriosclerotic Heart Disease

Statistical studies are needed to investigate the possibility, suggested by mortality figures for various occupations in England and Wales, that physical activity tends to protect the middle-aged from acute coronary occlusion.

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A POSSIBLE association between locomotory habits and arteriosclerotic heart disease has been suggested by results of studies of death rates in recent years, according to occupation, for coronary disease and for myocardial disease. Also, a rise in death rates for arteriosclerotic heart disease has accompanied an increasing use of the motorcar and has been noted particularly among those classes of men who use motorcars most and tend to walk least. I would suggest that statistical studies be planned in several countries aimed at obtaining more evidence to prove or disprove the hypothesis that lack of exercise may encourage the onset of coronary occlusion.

Recent research suggests that lipoid metabolism may be concerned in the etiology of atheroma. However, when atheroma is lethal it is usually because occlusion supervenes—and the determining factors for occlusion may have little to do with diet. It is not unreasonable to suppose that when the coronary arteries are atheromatous, it is the mechanics of the circulation rather than the chemistry of the blood which decides whether obstruction occurs in a large branch with resulting coronary crisis or in peripheral branches with more gradual myocardial degeneration as the outcome.

It has been observed that among men whose social conditions were most favorable, degenerative heart disease tended to express itself as coronary disease or angina pectoris, whereas at the other end of the social scale, where occupations involving hard physical work predominated, heart disease tended to take forms described on death certificates as myocardial degeneration (*1*). In 1951 I pointed out (*2*) that, although one-seventh of the 4,000 deaths attributed to coronary and myocardial diseases among navvies, coal hewers, dock laborers, and agricultural laborers were certified as due to coronary disease or a synonym of it, that proportion became greater with decreasing physical activity in the occupation. For example, the proportion of coronary to total myocardial and coronary disease was about one-quarter for metal machinists, printers, retail salesmen, sorters, and farmers, and nearly two-fifths for teachers, clerks, bankers, and administrative officials.

Morris and his associates (*3*) have now followed this up with a more detailed statistical study of the deaths in 1930–32 among 2½ million men aged 45–64 in social classes III to V, which comprise the skilled artisans, partly skilled workers, and unskilled workers. The occupations were classified into three groups, designated as physicially heavy, physically light, and intermediate or doubtful jobs

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within each social class. At each age period, 45–54 and 55–64, the coronary disease death rate was about twice as great for persons in physically light occupations as for those in the heavy occupations. For death rates from valvular, myocardial, and cerebral vascular lesions and arteriosclerosis without heart affection, no differences of importance were found between the physical activity groups. The same investigators also found from a careful study of early mortality rates from coronary disease during 1949–52 among bus conductors, bus drivers, postmen, and telephone operators working in the same areas of London that the death rate was lower among conductors than among drivers and lower among postmen than among telephonists. All this lent support to the hypothesis that in middle age physical activity tends in some way to protect the individual against coronary occlusion in an acute form.

Deaths Among Amputees

In 1951, an Advisory Committee on Cardiovascular Disorders and Mortality Rates in Amputees, appointed by the Ministry of Pensions in London, prepared an interim report on a statistical analysis of the subsequent histories of men who had lost one or more limbs in World War I.

In that study, for the 5 years 1945–49, the causes of death of a representative sample of more than a thousand men who had suffered a single lower limb amputation during World War I were compared with a control group of corresponding age distribution who had suffered from wounds without an amputation. The deaths attributed to coronary and myocardial disease combined formed practically the same percentage of all deaths in the two groups, but the ratio of coronary disease to myocardial disease within the combined total was higher among the amputees than among the controls. Although this was not generally accepted by the committee as having any significance, my personal opinion, expressed in an appendix to the report, was that there was probably a connection between these ratios and the restricted physical activity of amputees. The recent work of Morris and his co-workers (*3*) has not caused me to change that opinion.

It has been suggested that the long-continued physical and emotional stresses and privations such as were experienced in the First World War both by men in the services and by civilians might have been a factor in the subsequent increase in coronary disease mortality; but such an idea is not incompatible with a favorable effect of regular physical exercise which involves no nervous stress.

Deaths Among Athletes

A recent paper by Rook (*4*) gives the result of comparing the mortality experience of 772 Cambridge University students who had taken an active part in sports while at the university with that of 710 men who had not done so. No evidence emerged that the sportsmen died at an earlier age than the control group; in fact, if allowance is made for their rather higher proportion of deaths from violent causes, the reverse must have been the case with respect to death from natural causes. Out of 387 deaths from nonviolent causes at ages under 65, when the certified cause of death was known, 9.3 percent of the sportsmen were said to have died of a cardiovascular condition compared with 12.1 percent of 289 in the control group. Because many of the deaths occurred before 1920, no more precise division of the heart conditions could be made; but at least this finding is not incompatible with the hypothesis.

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