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SHORT REPORTS

Cardiovascular health in the tenth decade

Death from ischaemic heart disease is the most important single killer in western societies, and several so-called coronary risk factors have been delineated. Although numerous studies have been performed on the association between those factors and death from ischaemic heart disease, remarkably little is known about the inverse relationship: have people who nowadays live unusually long in apparently good health shown few coronary risk factors during life? Or is their longevity determined familiarly? We therefore studied a group of elderly healthy people (90 years or older).¹

Patients, methods, and results

A total of 100 apparently healthy Dutch nonagenarians, 50 men and 50 women, was randomly recruited from two Amsterdam homes for the aged. The study consisted of a detailed biographical, medical, and nutritional interview; physical examination; ECG; chest roentgenogram; and blood biochemical tests. To exclude familial factors the authenticated life span of their parents was compared with that of the parents of a control group, born in the same period and taken at random from the Amsterdam birth registers.

The occupational history showed that most of them had worked vigorously for over 55 years and that they belonged to the lower social class. Hypertension had been diagnosed in 19%, mostly in the past ten years and in the great majority because of a raised systolic blood pressure. Diabetes mellitus was present in eight people, two of whom received insulin. Their smoking habits were most remarkable: only 2% had smoked more than the occasional cigarette; generally the women had never smoked and the men only a few cigars a day. Serious overweight (more than 30% above ideal weight) was also infrequent, especially among the men. Cardiovascular disease was found in 28 subjects: seven had had myocardial infarction, four had angina pectoris, 14 had had symptoms of congestive heart failure, and three had an artificial pacemaker because of chronic atrioventricular block. Analysis of their diets showed that they had all eaten relatively little, but had taken the same relative amounts of proteins, carbohydrates, total fat, polyunsaturated fat, and cholesterol as the total Dutch population.

The difference between the life span of the nonagenarians' parents and that of the controls' parents was not significant (Wilcoxon's distribution free test for survival tables $P > 0.10$). Some data on their current health are given in the table. The ECG was abnormal in 87%, conduction disturbances being present in half.

Comment

Longevity may result either from nature or from nurture. Our genealogical findings did not show a major familial influence: there was only a weak positive relationship between the parents' age at death and the current age of their children, a result similar to that found in more extensive studies.² Where the role of nature seems small the role of nurture has attracted much interest, and among nonagenarians one would expect an absence of coronary risk factors, which are associated with a large part of all causes of death.

Hypertension had been diagnosed frequently in the histories of many of the subjects, but the criteria were not clear and probably

Some physical and biochemical data in 50 men and 50 women who were healthy nonagenarians

	Total (n = 100)	Men (n = 50)	Women (n = 50)
Height (cm)	160	167	153
Weight (kg)	60.3	64.4	56.1
Weight (kg)/Height (cm) ² × 10 ³ (Quetelet's index)	234	228	240
Mean blood pressure (mm Hg):			
Systolic	167	158	176
Diastolic	86	83	89
No with systolic blood pressure ≥ 160 mm Hg	64	26	38
No with systolic blood pressure ≥ 200 mm Hg	17	5	12
No with diastolic blood pressure ≥ 105 mm Hg	15	6	9
No with diastolic blood pressure ≥ 120 mm Hg	2	1	1
Serum total cholesterol (mmol/l)*	5.0	4.7	5.3
Serum HDL-cholesterol (mmol/l)	1.31	1.23	1.38
Fasting serum triglycerides (mmol/l)	1.19	1.04	1.34
Fasting blood glucose (mmol/l)	5.52	5.54	5.50

*Determined according to Abell-Kendall's method.

Conversion: SI to traditional units—Cholesterol: 1 mmol/l ≈ 38.6 mg/100 ml. Triglycerides: 1 mmol/l ≈ 88.5 mg/100 ml. Glucose: 1 mmol/l ≈ 18 mg/100 ml.

merely a rise in systolic pressure had usually led to the diagnosis. On examination the mean systolic pressure was raised, but the diastolic pressure equalled that reported in most population studies of western middle-aged people. Few people smoked, even given their social and cultural background.³ Unfortunately we could trace no data on lipid values in previous years but the current total cholesterol concentration was very low, especially in men; high density lipoprotein (HDL) cholesterol was normal—that is, in the same range as in several population studies.⁴ A low total cholesterol and a normal HDL cholesterol give a high HDL:total cholesterol ratio, an interesting finding in view of a possible anti-atherogenic role of HDL.⁵ One of the key questions that arises is whether the lipid pattern found in these people is the result of aging or represents selection—the survival of people with favourable lipid values. Only longitudinal follow-up of large series of people living to a great age can answer this.

Despite the shortcomings of a small and retrospective study such as this, we conclude that in many respects the coronary risk profile of these apparently healthy nonagenarians represents the mirror image of that of the contemporary coronary-prone middle-aged adult.

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