

Clinical, electrocardiographic, and echocardiographic characteristics associated with normal aging

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Background: With the increase in the aged population, knowing the physiologic changes associated with aging and distinguishing it from pathologic changes become more crucial. Based on this knowledge, accurate diagnosis of cardiovascular disease, as the leading cause of mortality in the elderly, becomes more feasible.

Methods: The study population was randomly selected from eye surgery candidates aged 65-110 years who were referred for cardiac consultation at the Farabi Eye Hospital, Tehran University of Medical Sciences. All participants were physically active with no history of cardiovascular disease, hypertension, or diabetes mellitus. The studied subjects underwent a comprehensive cardiovascular examination, blood pressure measurement, standard 12-lead electrocardiogram (ECG), and M-mode, two-dimensional, and Doppler echocardiography performed by an experienced cardiologist.

Results: In the present study, 223 healthy elderly aged 65-110 years (75 ± 6) were investigated. These included 134 males (60.1%) and 89 females (39.9%). Mean systolic and diastolic blood pressures were 131.5 ± 13.2 and 81.37 ± 5.3 mmHg, respectively. Systolic blood pressure ≥ 140 and diastolic blood pressure ≥ 90 mmHg were detected in 30.9% and 14% of participants, respectively. The majority of participants were found to have systolic (64.1%) and diastolic (80.7%) blood pressures in the prehypertension category. In heart auscultation, the fourth heart sound was audible in 74.8% of participants. The most prevalent ECG findings were left axis deviation (29.6%), bradycardia (14.8%), right bundle branch block (5.8%), premature ventricular contraction (4.5%), premature atrial contraction (3.6%), and first-degree atrioventricular block (2.7%). The latter was identified in 6.7% of subjects 80 years and older. On echocardiographic examination, diastolic dysfunction, based on the Doppler transmitral flow velocity profile, was identified in 94.6% of participants. Mean left ventricular ejection fraction (LVEF) was 65.4 ± 9.6 , with only 2.2% having LVEF less than 45%. Increased LV mass was detected in 71.3% of participants which was significantly correlated with body mass index ($P < 0.001$), but not with systolic blood pressure ($P = 0.07$). Aortic root and left atrial dilations were noticed in 78% and 13.9% of participants.

Conclusion: Increased systolic blood pressure, LV mass, and aortic root dilation are common findings in the healthy elderly. More important, diastolic dysfunction, with preserved systolic function, is a common age-associated change in cardiac structure and function.

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