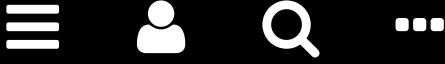


Hemodynamic patterns of age-related changes in blood pressure: the Framingham Heart Study.

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Hemodynamic Patterns of Age-Related Changes in Blood Pressure

The Framingham Heart Study

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[Article](#) [Figures & Tables](#) [Info & Metrics](#) [eLetters](#)

Jump to

[Article](#)

[Abstract](#)

[Methods](#)

○ **Results**

○ **Discussion**

○ **Selected Abbreviations and Acronyms**

○ **Acknowledgments**

○ **References**

○ **Figures & Tables**

○ **Info & Metrics**

○ **eLetters**

Abstract

Background We attempted to characterize age-related changes in blood pressure in both normotensive and untreated hypertensive subjects in a population-based cohort from the original Framingham Heart Study and to infer underlying hemodynamic mechanisms.

Methods and Results A total of 2036 participants were divided into four groups according to their systolic blood pressure (SBP) at biennial examination 10, 11, or 12. After excluding subjects receiving antihypertensive drug therapy, up to 30 years of data on normotensive and untreated hypertensive subjects from biennial examinations 2 through 16 were used. Regressions of blood pressure versus age within individual subjects produced slope and curvature estimates that were compared with the use of ANOVA among the four SBP groups. There was a linear rise in SBP from age 30 through 84 years and concurrent increases in diastolic blood pressure (DBP) and mean arterial pressure (MAP); after age 50 to 60 years, DBP declined, pulse pressure (PP) rose steeply, and MAP reached an asymptote. Neither the fall in DBP nor the rise in PP was influenced significantly by removal of subsequent deaths and subjects with nonfatal myocardial infarction or heart failure. Age-related linear increases in SBP, PP, and MAP, as well as the early rise and late fall in DBP, were greatest for subjects with the highest baseline SBP; this represents a divergent rather than parallel tracking pattern.

Conclusions The late fall in DBP after age 60 years, associated with a continual rise in SBP, cannot be explained by “burned out” diastolic hypertension or by “selective survivorship” but is consistent with increased large artery stiffness. Higher SBP, left untreated, may accelerate large artery stiffness and thus perpetuate a vicious cycle.

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[Next ▶](#)

This Issue

Circulation

July 1, 1997, Volume 96, Issue 1

[☰ Table of Contents](#)

[◀ Previous](#)

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