HOW SHOULD ELDERLY HYPERTENSIVE PATIENTS BE TREATED?

T. Omae, A. Zanchetti (Eds.)

How Should Elderly Hypertensive Patients Be Treated?

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With 60 Figures

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Preface

The percentage of the population which is elderly has been increasing steadily in many countries in the world; and as this tendency continues, the question of how to treat the elderly rises in importance. The problem of how to manage hypertension in the elderly has become one of the most important issues in the prevention and treatment of cardiovascular disease. However, not many of the clinical studies performed so far to evaluate the effects of antihypertensive drug treatment have included the elderly. Many important problems remain unsolved. How much beneficial effect can be expected from active antihypertensive drug treatment in the elderly? How can isolated systolic hypertension, which is frequently encountered in the elderly, have better prognosis when treated? When is drug treatment indicated, to what level should blood pressure be reduced and maintained in the elderly, and how should drugs be selected?

The elderly also frequently bear other medical problems, either recognized or unrecognized, such as mental depression, respiratory problems, infection, malignant neoplasms, and water and electrolyte imbalances. The body's ability to eliminate drugs also decreases with age and necessitates modified dosage.

The 12th Scientific Meeting of the International Society of Hypertension held in Kyoto, Japan on May 22-26, 1988 included the satellite symposium. "How Should Elderly Hypertensive Patients Be Treated?" which focused on the pathophysiology and outcome of elderly hypertensive patients. Data presented there on the comparison of morbidity and mortality results in various therapeutic trials involving the elderly have been compiled here to provide a comprehensive guide of elderly hypertensive studies up to date.

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Panel Discussion

Session 1

Chairmen: C. Dollery (London)
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Morbidity and Mortality of Elderly Hypertensives: Results from the Long-Term Prospective Study in Hisayama, a Japanese Community

KAZUO UEDA[1, 2], TERUO OMAE[3], YUTAKA HASUO[1], and MASATOSHI FUJISHIMA[1]

Summary. The long-term prognosis and outcome study of elderly hypertensives was based on the 20-year prospective population survey conducted in a Japanese rural community, Hisayama; and the results were compared with those for younger subjects. The survival curves for the study population which were related to blood pressure levels decreased with the elevation of either systolic or diastolic pressure in both the younger and elderly groups. The survival curves decreased markedly beyond the 160 mmHg boundary for systolic pressure or the 100 mmHg boundary for diastolic pressure for those aged 40–59 years. There was however, no cut-off level for increased mortality in either systolic or diastolic pressure for those aged 60 or over. Mortality from stroke or heart disease was higher in diastolic or systolic hypertensives than in normotensives for the aged. However, the relative risk of death by stroke in either hypertensive group was attenuated compared to that for the younger subjects. Intracerebral hemorrhage and cerebral infarction occurred more frequently in diastolic hypertensives for both younger and elderly subjects, even though the imbalance of frequency in age, sex, electrocardiographic abnormalities and diabetes mellitus was corrected by Cox's Proportional hazard model. Systolic hypertension was strongly related to cerebral infarction in the aged and to myocardial infarction in both younger and elderly persons.

Key words: Elderly hypertension — Survival curves — Stroke — Myocardial infarction — Hisayama study

Introduction

To decide how elderly hypertensives should be treated, it is necessary to know the prognosis or outcome of different treatments of elderly persons in association with blood pressure levels. A long-term prognosis for hypertensives can be elucidated from several aspects. Firstly, an estimation of the life span for each individual in relation to blood pressure levels is a crucial procedure in determining the risk of hypertension. How hypertension influences an individual's survival should, however, be considered in proportion, since many factors might have an effect on life

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expectancy. Secondly, it is worth comparing morbidity and mortality from cardiovascular disease between hypertensives and nonhypertensives. Hypertension has long been recognised as a major precursor of cardiovascular disease. Many risk factors other than hypertension could be associated with the development of cardiovascular disease; thus, they must be taken into consideration together with hypertension. In addition, superimposed conditions due to various degenerative factors on the normal aging processes may have great impact on the prognoses for elderly subjects.

In this paper, a long-term prognosis of elderly hypertensives is made on the basis of the prospective population survey conducted in the Japanese rural community, Hisayama. We initially examined the influence of systolic or diastolic pressure on total or cardiovascular mortality (taking other relevant risk factors into account), and then compared the results between those age 40–59 years and those 60 years or over. Secondly, the risk of death or the occurrence of cerebral stroke or heart disease is compared among blood pressure groups (diastolic, systolic, borderline hypertensive, and normotensive) in both the younger and elderly subjects.

Materials and Methods

The Hisayama prospective population study was initiated in 1961 to explore the epidemiology of cardiovascular disease in a general population sample of 1 621 men and women age 40 years or older at entry. The subjects comprised about 90% of all the residents in this age group in the town of Hisayama. At entry, the following information was collected: medical or life history, a physical examination including anthropometric and blood pressure measurements, urinalysis for protein and sugar, electrocardiogram (ECG), findings of ocular fundi, and serum total cholesterol determination. In addition, the oral glucose tolerance test was performed on subjects who were found to have glycosuria, and consequently persons with diabetes mellitus (DM) were identified according to defined criteria [1]. Blood pressures were measured 4 times in supine position of the standard sphygmomanometer after 5 min rest. The average value of the 3 consecutive readings from second to fourth was taken as an individual's blood pressure, on account of the variability of the first measurement.

Follow-up was complete, with only 0.1% of the sample lost during the 20-year period of follow-up. An outstanding feature of this study was that causes of death were verified by autopsy in more than 80% of the deceased. The autopsy rate for 20 years was 82.4%. Details of methods of examination and follow-up have been described elsewhere [1–5].

During the course of the prospective study, subjects who died of any cause, those who died of cardiovascular disease, and those who suffered cerebral stroke or myocardial infarction were analyzed in relation to blood pressure at the initial examination. Cardiovascular diseases included all types of cerebral, stroke, coronary heart disease (CHD), congestive heart failure (CHF), and atherosclerotic disease, such as ruptured aortic aneurysum or intermittent claudication. The definition of systolic hypertension is diastolic pressure less than 95 mmHg and systolic pressure 160 mmHg or greater; diastolic pressure greater than or equal to 95 mmHg constitutes

diastolic hypertension. In addition, subjects whose systolic pressure between 90 and 94 mmHg were defined as borderline hypertensives. The remainder were considered normotensives (WHO criteria [6]). To elucidate the net effect of hypertension while taking other relevant risk factors into account, Cox's proportional hazard model [7] was used to assess the relative influence of high blood pressure on the time-to-response incidence or mortality from cardiovascular disease, in which a couple of variables other than blood pressure components were controlled. The comparison among blood pressure groups with respect to the frequency of risk factors was tested by Mantel-Haenszel's chi-squared test, taking the imbalance in age and sex distribution into account [8].

Results

Survival curves for the cohort population according to systolic pressure levels were studied by Cox's proportional hazard model for those aged 40–59 and for those 60 or over. Subjects were divided into 5 groups at 20 mmHg intervals of systolic pressure, and the survival rate for each group was calculated after age and sex were controlled. Survival curves by each systolic pressure level for those 40–59 years are depicted in Fig. 1, and for those 60 years or over in Fig. 2. Survival curves tended to drop with the elevation of systolic pressure irrespective of age. However, there was a slight difference between the younger and elderly groups. For those aged 40–59, a clear distinction in decreasing survival rates was observed between those with systolic pressure over 160 mmHg and those below, especially in the later period of the follow-up (Fig. 1). On the other hand, the survival curve for those with systolic pressure of 140

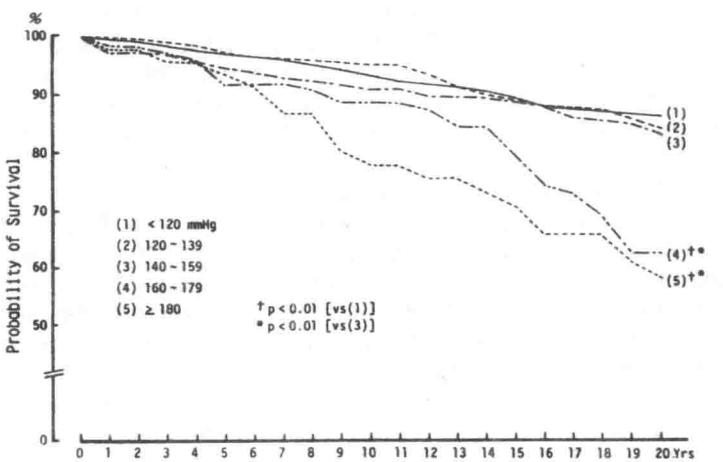

Fig. 1. Survival rate by systolic blood pressure levels using Cox's proportional hazard model (M and F; 40–50 years) in Hisayama

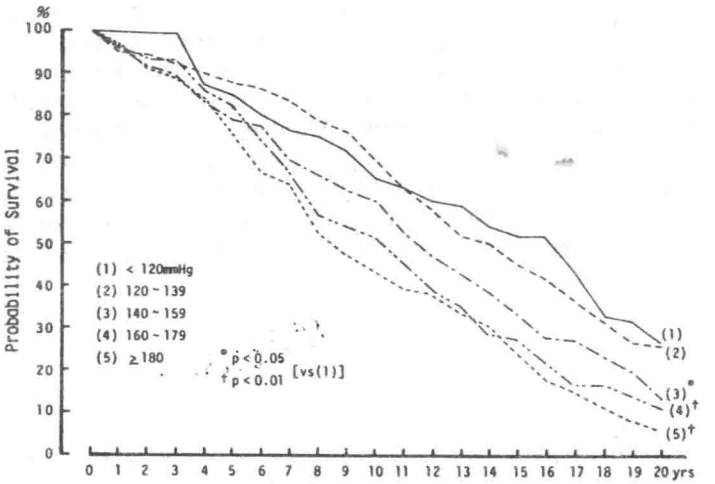

Fig. 2. Survival rate by systolic blood pressure levels using Cox's proportional hazard model (M and F; ≥60 years) in Hisayama

mmHg or over dropped significantly compared to that for those with systolic pressure of less than 120 mmHg. However, there was no cutoff point of systolic pressure beyond which survival curves dropped remarkably in the elderly group (Fig. 2).

A similar analysis was applied to diastolic pressure levels with a 10 mmHg interval. For the younger subjects, aged 40–59, survival curves for those with diastolic pressure of 100 mmHg or more fell significantly compared to those for subjects with diastolic pressure below 80 mmHg (Fig. 3). This seemed to point to a boundary of reduction in survival rates between diastolic pressures over 100 mmHg and below. Survival rates in the group aged 60 or over decreased with elevation of diastolic pressure, but there was no clear turning point among the diastolic pressure levels (Fig. 4). It is thought that high blood pressure for both systolic and diastolic has a greater impact on total mortality in younger subjects than in the elderly.

Subjects were divided into 4 blood pressure groups by WHO criteria. Because of the small number of subjects with systolic pressure greater than 159 mmHg and diastolic pressure less than 90 mmHg (isolated systolic hypertension), they were included in those with systolic pressure greater than 159 mmHg and diastolic pressure between 90 and 94 mmHg as systolic hypertensives (systolic pressure ≥ 160 mmHg and diastolic pressure < 95 mmHg).

Table 1 demonstrates sex-and age-adjusted frequencies in various risk factors associated with cardiovascular diseases according to blood pressure groups. The prevalence of ECG abnormalities (Minnesota code III_1 and/or VI_{1-3}) and obesity increased progressively in the order of normotension, borderline, systolic, and diastolic hypertension for those aged 40–59. The frequency of DM also tended to