

# Antihypertensive treatment in the elderly

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## Ageing and blood pressure

Hypertension is a major risk factor for cardiovascular disease, but it is also very prevalent in the community. These two factors combined prompted the World Health Organization (WHO) to report that high blood pressure is the first cause of death worldwide.<sup>1</sup> The prevalence of hypertension has been estimated to be approximately one in four, and this increases with age to such an extent that almost two-thirds of people over the age of 60 years have hypertension.<sup>2</sup>

The pattern of hypertension also changes with increasing age. People above the age of 50 years have an increasing rise in systolic blood pressure while the diastolic blood pressure tends to remain the same or even start to decrease, so that the prevalence of isolated systolic hypertension increases with increasing age. The pulse pressure also increases as a result of this pattern of blood pressure change.<sup>2</sup> The increase of systolic blood pressure is most probably due to an increase in stiffening of the large arteries, such as the aorta.

As a result of these changes, there is an increase in the prevalence of elevated systolic pressures in people above the age of 50 years of age. Since more than 75% of people with high blood pressure fall into this age group, the burden of disease is mainly due to systolic blood pressure.<sup>3</sup> The risk of cardiovascular disease increases progressively with increases in blood pressure, both systolic and diastolic, approximately doubling for every 20/10 mmHg increase in these respective blood pressures.<sup>4</sup> An increase of 20 mmHg in systolic blood pressure is associated with a more than twofold increase in the death rate, due to stroke and ischaemic heart disease.

Elevated systolic blood pressure is now understood conceptually as a more important risk factor for cardiovascular disease than diastolic blood pressure.<sup>5</sup> The Framingham Heart Study demonstrated that lower systolic blood pressure, fewer cigarettes smoked and higher forced vital capacity are associated with increased life expectancy, with survival to 75 years of age.<sup>6</sup>

## Types of hypertension in the elderly

- Classic systolic/diastolic hypertension: This is a common type of hypertension, even in older people. For example, in the STOP-Hypertension trial (n = 1 627 patients), the mean age was 75.7 years, the mean systolic blood pressure was 195 mmHg, and the mean diastolic pressure was 102 mmHg.<sup>7</sup>
- Classic isolated systolic hypertension: This type of hypertension is common, specifically in older people. For example, in the Syst-Eur trial, (n = 4 695 patients), the mean age was 70.2 years and the mean systolic blood pressure was 173.9 mmHg, while the mean diastolic blood pressure was 85.5 mmHg.<sup>8</sup>
- Pseudohypertension: In rare cases, the peripheral arteries of elderly patients can become so rigid that the blood pressure cuff measurement leads to an overestimate of the true blood pressure. Overtreatment in these cases will lead to postural hypotension.

## Differential diagnosis of isolated hypertension

Isolated systolic hypertension is diagnosed when the systolic blood pressure is measured as 140 mmHg or more, and the diastolic blood pressure is 90 mmHg or less. An identical blood pressure pattern can, however, be caused by aortic insufficiency and a number of conditions of increased

cardiac output, such as severe anaemia, hyperthyroidism, Paget's disease and arteriovenous fistula. These conditions should be excluded before diagnosing isolated systolic hypertension.

## Management of hypertension in the elderly

The general therapy and goals of treatment of hypertension is the same for the elderly as for all other people with hypertension. The goal of treatment is to reduce blood pressure to below 140/90 mmHg, and to below 130/80 mmHg for patients with diabetes and chronic renal disease.

### Lifestyle changes

Lifestyle modifications recommended in the elderly, including those with isolated systolic hypertension, are the same as for all other patients and types of hypertension. These lifestyle changes include salt restriction, weight reduction, a diet rich in fruit and vegetables but low in saturated fat, moderate alcohol intake (two drinks per day for men and one for women), and exercise.<sup>9</sup>

### Drug treatment

The major benefits of pharmacological treatment are related to the reduction of blood pressure, rather than to any specific type of drug or drug action. Five major classes of drugs, each shown in clinical trials to reduce events and mortality, are generally used, i.e. diuretics, angiotensin-converting enzyme inhibitors (ACE inhibitors), angiotensin-receptor blockers (ARBs), calcium-channel blockers, and beta blockers. All of these drugs have been tested in the elderly, and proven to be of benefit.<sup>9</sup>

Compelling indications for certain antihypertensive drugs are the same as for all other types of patients, e.g. an ACE inhibitor or beta blocker should be prescribed for survivors of myocardial infarction with concomitant hypertension.

The use of beta blockers as first-line monotherapy has also been questioned, as it has been when prescribed as monotherapy for all other types of hypertension. Adding a beta blocker to other antihypertensive drugs, either for a compelling indication or as a combination to control blood pressure to goal, is still acceptable.

### Areas of uncertainty

- How low should the pressure go?<sup>9</sup>  
The reduction of diastolic blood pressure in isolated systolic hypertension is not difficult to achieve. What is not adequately known is whether harm can be caused by lowering diastolic blood pressure excessively, and at

what level of diastolic blood pressure this harm will occur. Diastolic pressure below 60 mmHg (i.e. the pressure needed to perfuse the myocardium) is considered to be possibly harmful, and could lead to an increase in cardiovascular events, the so-called J-curve effect. More research is needed in this area.

- Treatment of the very old:  
Will the very old (> 80 years) also benefit from the treatment of hypertension? In the HYVET trial (HYpertension in the Very Elderly Trial) (n = 3 845 patients), the participants with a mean age of 83.6 years were treated with a diuretic (indapamide) to which an ACE inhibitor, perindopril, could be added for blood pressure control. The results demonstrated that cardiovascular events could be significantly reduced after only an average of 1.8 years of treatment.<sup>10</sup> There is, therefore, benefit, even for the very old.
- Effect of treatment on dementia:  
The true effect of antihypertensive therapy on dementia is still uncertain. In the Syst-Eur trial, the incidence of dementia was approximately 50% lower among the drug-treated group of patients when compared to those that were not treated. In many other trials, no deterioration of mental function was noted. Studies are still ongoing.

## Blood pressure reduction in people of different ages

Is there a difference in the benefit seen in younger people and older people? Recently, the Blood Pressure Lowering Treatment Trialists' Collaboration (BPLTTC) published a meta-analysis of 31 trials conducted in more than 190 000 randomised patients.<sup>11</sup> This analysis showed that the relative risk reduction of cardiovascular events with control of blood pressure occurred irrespective of the age of the patient. An arbitrary cut-off point of 65 years of age was used to distinguish between younger and older patients. As the absolute risk in the elderly is higher than in younger patients due to age alone, it implies that, if the relative risk reduction is the same regardless of age, then older patients will have more absolute benefit and smaller numbers needed to treat to prevent an event.

## Approach to treatment

The British guidelines propose that, in people below 55 years of age, treatment be initiated with a renin-angiotensin system (RAS) blocker, such as an ACE inhibitor or an ARB. For those older than 55 years of age, treatment should be started with a diuretic or calcium-channel antagonist.<sup>12</sup> If there is a compelling indication for another drug, that

should be prescribed. For isolated systolic hypertension, a thiazide-like diuretic should be started. To control blood pressure, a RAS blocker and/or calcium-channel blocker can be added.<sup>9</sup> This is the recommendation of at least two different opinion leaders.

### How effective is the treatment?

In a Cochrane review of 15 trials with 24 055 healthy patients older than 60 years of age, mortality was significantly reduced, from 116 events per 1 000 to 104 events per 1 000 (hazard ratio 0.90, 95% CI 0.84-0.97). Morbid cardiac events were reduced from 149 per 1 000 to 106 per 1 000 (hazard ratio 0.70, 95% CI 0.68-0.77). In three trials restricted to isolated systolic hypertension, the benefits were similar. In the very elderly (> 80 years of age), the benefits were similar, but there was no reduction in mortality.<sup>13</sup>

### Conclusion

Early and aggressive management of hypertension, to reach goal blood pressure, is what is called for, regardless of age.

Treating people of 60 years and older with moderate to severe systolic and/or diastolic hypertension, including isolated systolic hypertension, reduces cardiovascular morbidity and mortality. The decrease in mortality is limited to persons 60 to 80 years of age.

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\* Erratum (*Lancet* 2003;361:1060): Two-thirds of people over the age of 60 years have hypertension.