

The level of BP control in Ireland is worsening and innovative efforts must be made to combat this

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# BP control not a reality for most

**STROKE AND COGNITIVE** impairment constitute a major economic and societal burden in Ireland. Ireland is being swept along in the global epidemic of hypertension. Worldwide, the estimated number of adults with hypertension was 972 million in 2000; by 2025, the total number is expected to increase to 1.56 billion.<sup>1</sup> Poor control of high blood pressure (BP) is now recognised as the major cause of stroke – the most catastrophic consequence of hypertension.<sup>1-3</sup>

However, recently the role of poorly controlled BP in the elderly has been shown to be a major cause of cognitive impairment leading ultimately to dementia in the older population.<sup>4,5</sup> Elevated BP is the most significant factor in causing deterioration of performance in the ageing brain, and reduction of BP to normal levels in the elderly would reverse cognitive impairment and prevent stroke, which are rightly looked upon with dread by ageing members of society and their families.

Over the past decade there have been some 85,000 strokes in Ireland. Stroke is the third most common cause of death in Ireland. Approximately 10,000 acute strokes are admitted to hospital in the Republic of Ireland each year and of these, 30% die within one year. Approximately 2,000 people die from stroke each year, accounting for more deaths than breast cancer, lung cancer and bowel cancer combined.

For those who survive – some 30,000 people – only half make a complete recovery, leaving the remainder with the problems of coping with serious disability and in need of support to cope with the

activities of daily life – all of which places a severe burden on the health services and causes immense distress to the victims of stroke and their families.<sup>6,7</sup>

In mid-life age groups, the presence of elevated systolic BP accounts for up to 11% of the variance in cognitive performance, which suggests that in community-dwelling hypertensive individuals who do not have overt dementia, elevated BP may account for one-tenth of cognitive impairment and thus for an increased risk for dementia.<sup>5</sup>

Moreover, cognitive impairment may also be associated with excessive lowering of BP in the elderly, an occurrence that makes it essential to ensure that treatment gives smooth reduction of pressure over 24-hours without excessive lowering leading to hypotension.<sup>8,9</sup>

## Increased longevity

As the age of the Irish population increases, the prevalence of these conditions is rising. In Ireland, high BP affects more than 50% of the population over the age of 60 years; this rises to 70% in those aged 70 years and over. Less than 40% will have adequate control of BP over 24 hours.<sup>10-12</sup>

If high BP was properly controlled, stroke would be reduced by at least 50%<sup>13</sup> and it can be reasoned that cognitive impairment could be ameliorated leading to a reduction in the onset of dementia. (See *Table 1* for initiation of antihypertensive treatment).

## Control of BP

There is a large range of drugs available for the effective lowering of BP, yet in real life only about one-third of people

with high BP in Ireland are known to be adequately controlled despite having medication prescribed.<sup>13,14</sup>

Lack of BP control is the main cause for the unacceptable increase in stroke and cognitive impairment in the ageing population. Part of the problem is that patients do not appreciate the need to continue taking medication in the mistaken belief that hypertension is a disease that can be cured, and they stop or reduce medication when BP levels fall.

As a *Lancet* editorial put it recently: "Physicians need to convey the message that hypertension is the first, and easily measurable, irreversible sign that many organs in the body are under attack."<sup>11</sup>

Elevation of BP, though only one component of a number of risk factors that may affect the ageing brain (others being smoking, excessive salt, elevated cholesterol, diabetes and obesity), is the single most important risk contributing to 60% of all cardiovascular deaths.<sup>15</sup>

Recent evidence shows that although prescribing of BP-lowering drugs has increased, BP control has not improved. It is now known that prescribing alone is not the answer – the drugs prescribed must bring BP down to normal not only during the day but also at night.<sup>16</sup>

## Importance of BP control

There can be no dispute about the benefit of BP-lowering. Improved BP control in the elderly could have a major impact on the quality of life by preventing cognitive impairment and prevention of debilitating incapacity as a result of stroke and dementia. The viewpoint once expressed that hypertension is an inevitable consequence

## Initiation of antihypertensive treatment

Other risk factors, OD or disease	BP (mmHg)				
	Normal SBP 120-129 or DBP 80-84	High normal SBP 130-139 or DBP 85-89	Grade 1 HT SBP 140-159 or DBP 90-99	Grade 2 HT SBP 160-197 or DBP 100-109	Grade 3 HT SBP > 180 or DBP > 110
No other risk factors	No BP interventions	No BP interventions	Lifestyle changes for several months, then drug treatment if BP uncontrolled	Lifestyle changes for several weeks, then drug treatment if BP uncontrolled	Lifestyle changes and immediate drug treatment
One to two risk factors	Lifestyle changes	Lifestyle changes	Lifestyle changes for several weeks, then drug treatment if BP uncontrolled	Lifestyle changes for several weeks, then drug treatment if BP uncontrolled	Lifestyle changes and immediate drug treatment
Three or more risk factors, MS or OD	Lifestyle changes	Lifestyle changes and consider drug treatment	Lifestyle changes and drug treatment	Lifestyle changes and drug treatment	Lifestyle changes and immediate drug treatment
Diabetes	Lifestyle treatment	Lifestyle changes and drug treatment			
Established CV or renal failure	Lifestyle changes and immediate drug treatment	Lifestyle changes and immediate drug treatment	Lifestyle changes and immediate drug treatment	Lifestyle changes and immediate drug treatment	Lifestyle changes and immediate drug treatment

Adapted from: 2007 Guidelines for the management of arterial hypertension. The Task Force for the Management of Arterial Hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). *Eur Heart J* 2007; 28: 1462-1536

of the ageing process that should, therefore, be left untreated, especially in the very elderly, has been finally shown to be scientifically untenable, with recent evidence showing that even treating people older than 80 years reduces cardiovascular mortality.<sup>17</sup>

A meta-analysis of eight placebo-controlled trials in 15,693 elderly patients followed for four years showed that active antihypertensive treatment reduced coronary events by 23%, strokes by 30%, cardiovascular deaths by 18%, and total deaths by 13%, with the benefit being greatest in patients older than 70 years.<sup>18</sup> However, 'treatment' is more than merely prescribing drugs.

Hypertensive patients in whom BP is uncontrolled by treatment have a cardiovascular risk only modestly less than that of untreated individuals,<sup>19</sup> which leads to the conclusion that in practice, BP-lowering drugs are prescribed inappropriately without achieving optimal control, or put another way, "patients are frequently not barely but badly controlled".<sup>16</sup>

This therapeutic inertia whereby the prescribing of medication is seen

as constituting an end in itself in that some good will be achieved must now be replaced by a clinical *modus operandi* recognising that the efficacy of medication will ultimately determine the fate of the patient with hypertension (see *Table 2* for preferred drugs in antihypertensive treatment).

Efficacy, however, can only be gauged by the achievement of evidence-based target levels of BP, which in turn demands accurate measurement of BP that should also be capable of indicating that treatment is resulting in control over the 24-hour period.<sup>3</sup>

### Measurement of BP

One of the most important explanations for the failure of medical management is that the technique of BP measurement used in practice (which is over 100 years old) is inaccurate and cannot give an estimate of BP control over 24 hours.

A number of studies have now clearly demonstrated that nocturnal hypertension is a major risk for the development of stroke and other cardiovascular events.<sup>20</sup> There is also evidence that night-time BP may be an important determinant of

cognitive impairment.<sup>21</sup> This important component of the 24-hour BP profile can only be measured by ambulatory BP measurement (ABPM), which provides the profile of BP not only during the day but also at night.<sup>3</sup>

It has been estimated that the conventional technique of measurement used in most general practices today is leading to incorrect readings in as many as a third of all patients attending for routine BP measurement.<sup>22</sup> It follows, therefore, that assessing BP control is seriously flawed and moreover the technique does not allow the response to treatment to be assessed over the 24-hour period. Because of this and the proven cost-effectiveness of the technique,<sup>23</sup> clinical use of ABPM has been increasing rapidly throughout the world,<sup>24</sup> but its availability to patients with high BP in the Irish community remains low and much under-utilised.

With conventional measurement, the doctor is provided with only one, or at best, a few measurements, obtained under artificial circumstances that are subject to the white coat reaction and which bear no relationship to the variability of BP over

## Antihypertensive treatment: preferred drugs

The presence of subclinical organ damage, clinical cardiovascular disease, renal disease or diabetes may be more favourably treated by some drugs than others

### Subclinical organ damage

LVH	ACE inhibitor, calcium antagonists, angiotensin receptor antagonists
Asymptomatic atherosclerosis	Calcium antagonists, ACE inhibitor
Microalbuminuria	ACE inhibitor, angiotensin receptor antagonists
Renal dysfunction	ACE inhibitor, angiotensin receptor antagonists

### Clinical event

Previous stroke	Any BP-lowering agent
Previous MI	Beta-blockers, ACE inhibitor, angiotensin receptor antagonists
Angina pectoris	Beta-blockers, calcium antagonists
Heart failure	Diuretics, beta-blockers, ACE inhibitor, angiotensin receptor antagonists, anti-aldosterone agents
Recurrent atrial fibrillation	Angiotensin receptor antagonists, ACE inhibitor
Permanent atrial fibrillation	Beta-blockers, non-dihydropyridine calcium antagonists
Renal failure/proteinuria	ACE inhibitor, angiotensin receptor antagonists, loop diuretics
Peripheral artery disease	Calcium antagonists

### Condition

Isolated systolic hypertension	Diuretics, calcium antagonists
Metabolic syndrome	ACE inhibitor, angiotensin receptor antagonists, calcium antagonists
Diabetes mellitus	ACE inhibitor, angiotensin receptor antagonists
Pregnancy	Calcium antagonists, methyldopa, beta-blockers

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the 24-hour period. On the other hand, ABPM provides detailed information of an individual's BP response in the medical environment while the device is being fitted during the first hour – the “white coat window”, during daytime activity, during sleep and in the matinal window before awakening when extreme rises in BP may herald the onset of stroke.<sup>25</sup>

In the light of the evidence available on the societal and financial consequences of uncontrolled hypertension, the cost of equipment becomes relatively insignificant; every patient suspected of having hypertension should have ABPM to confirm or refute the diagnosis, and every patient with uncontrolled hypertension should have ABPM repeated as necessary until 24-hour control of BP is achieved.<sup>22</sup>

### ABPM in primary care

ABPM is a feasible, albeit under-used technique in primary care. One of the first studies of ABPM in primary care – the RAMBLER I study – performed primarily in Ireland, showed that only 12% of patients achieved target BP with conventional office measurement compared to over one-third of patients with ABPM. Furthermore, 38% of patients had a change in their medication as a result of ABPM; 32% had a new medication started and 14% of untreated patients with elevated office BP, who were candidates for drug treatment, were not commenced on medication because ABPM was normal.<sup>26</sup>

The largest study to date on ABPM in primary care comes from Spain where a nationwide project to promote the use of ABPM in primary care settings is being established. In this large cohort of some 20,000 patients, office BPs were approximately 16/9mmHg higher than ABPM in patients categorised as being at low to moderate added risk with a greater difference (23/23mmHg) in those categorised as being at high risk in spite of receiving much more antihypertensive treatment. Moreover, high-risk hypertensive patients showed a high prevalence of circadian rhythm abnormalities on ABPM, with the prevalence of a non-dipping pattern being almost 60%, and in patients with the lowest ABPM levels, high-risk patients showed a higher prevalence of non-dipping nocturnal BP than lower-risk cases. An editorial commentary on this study urges the wider use of ABPM to gain more accurate risk categorisation of patients in the community as well as being able to obtain a more accurate estimate of the community control of BP.

As in the Irish study, BP control was better when assessed by ABPM than

by office BPs, indicating that the white coat effect with office BP is leading to an underestimation of BP control in the community. BP control was underestimated in over a third of patients and overestimated in some 5% by office BP as compared to ABPM. Notably, BP was uncontrolled by both methods of measurement in 43% of patients. High-risk patients showed poorer ABPM control than low-to-moderate risk patients in spite of receiving much more antihypertensive treatment.<sup>10-12</sup>

### RAMBLER II study

Until recently, the interpretation of ABPM was complex because computerised techniques and electronic transmission of data were not utilised to make the procedure more accessible to doctors and their patients. The dabl ABPM system used in the RAMBLER I has been developed to provide a number of facilities that will be utilised in the RAMBLER II study.<sup>3,27</sup>

### Conclusion

Despite having an array of drugs capable of achieving effective BP-lowering, the

reality is that less than half of patients with hypertension have adequate control of blood pressure.

The major consequences of uncontrolled BP in the elderly are cognitive impairment and stroke. It is estimated that if BP was controlled in Ireland, some 5,000 strokes could be prevented annually. The level of BP control in the Irish population is worsening rather than improving and if increased longevity is not to be blighted by disability, innovative efforts to achieve BP control must be initiated. Previous practice methods have clearly failed. Utilising ABPM linked to electronic technology provides an innovative approach based on sound evidence, which can alter the outlook for the aged by protecting the ageing brain from the cardiovascular consequences of uncontrolled hypertension.

*References on request*