Hypertension or high blood pressure is common and the prevalence increases with age. It is important that staff in residential and care homes are aware of this condition and its assessment, classification and management as Katherine Potts explains.

Hypertension in older people: assessment and management

It is estimated that at least a quarter of adults are hypertensive, with this number increasing to more than half of those over the age of 60 (National Institute for Health and Care Excellence (NICE), 2011). Predictions are that 1.56 billion people globally will have a diagnosis of hypertension in 2025 (Joffres et al, 2013). It is one of the preventable causes of premature death in the UK due to it being a major risk factor for stroke, myocardial infarction, heart failure, chronic kidney disease and cognitive decline (NICE, 2011). Hypertension is also a major risk factor for vascular cognitive impairment including Alzheimer’s disease and dementia (Faraco and Iadecola, 2013). Drug treatment for hypertension accounts for a large proportion of the drug costs in primary care, with the figure estimated at £1 billion (NICE, 2011). Treatment with drug therapy and also lifestyle interventions are key to provide protection against the adverse outcomes that are associated with hypertension.

What is hypertension?

Hypertension is elevated blood pressure, with the elevation being of systolic readings, diastolic readings or both readings. Systolic blood pressure is the pressure in the artery during systole or when the heart is contracting. Diastolic blood pressure is the pressure in the arteries during diastole or when the heart is relaxing and filling with blood. Elevation in diastolic blood pressure is more common in the under 50 age group, while elevation of systolic blood pressure is more common in the elderly population (NICE, 2011). The elevation in systolic blood pressure is due to stiffening of the arteries, which leads to a loss of compliance in the arteries and in turn a rising systolic pressure. The elevation in diastolic blood pressure is due to an increase in peripheral vascular resistance, which is resistance to the blood flow as it flows through the peripheral arteries.

Classification and assessment

Hypertension is defined as a blood pressure of >140 mmHg systolic and/or >90 mmHg diastolic (Mancia et al, 2013). Hypertension can be further classified according to the level of the readings obtained (Box 1). It is classified according to the highest of the readings obtained, whether it be the systolic or diastolic reading.

It is important to follow recommendations for measurement of blood pressure, and any device whether a manual or automatic machine should be validated and calibrated to check for accuracy. It is important to note that an irregular, rapid or slow heart rate renders automated blood pressure machines less accurate, and if one of these is suspected a manual recording should therefore be undertaken.

The European Society of Cardiology hypertension guidelines recommend that in older patients who are diabetic or with orthostatic hypotension, which is discussed later in the article, blood pressure should be measured sitting and also once standing after 1 minute and 3 minutes (Mancia et al, 2013). When measuring blood pressure a heart rate should also always be measured and documented as a faster resting heart rate. Evidence of an irregular heart beat may warrant further investigations and can indicate a higher risk of untoward events. Other good practice for blood pressure measurement as recommended by international guidelines, such as the European guidance (Mancia et al, 2013) as it is more up-to-date than the NICE (2011) guidance, is listed in Box 2.

Hypertension and older people

It is important to remember that there will be two groups of older hypertensive patients: those that have grown old with a diagnosis of hypertension, and those that are diagnosed as hypertensive at an older age. However, careful monitoring is needed in both groups and the treatment and considerations should be the same.
The Framingham Heart Study showed that even if an individual had normal blood pressure readings at the age of 65 there was a 90% lifetime risk of developing systolic hypertension by the age of 80–85 years (Franklin, 2012). Therefore, with an ageing population and life expectancy increasing, hypertension in older people will be even more common and health professionals need to be aware of this condition, its diagnosis and management. Hypertension is very common among care home residents, who are commonly treated with anti-hypertensive medication (Welsh, et al, 2013).

The pathophysiology for hypertension in older people is due to a number of factors but primarily due to wear and tear of the aorta and its branches, which causes a stiffness of the large arteries. This means that the heart has to pump harder against this increased stiffness and this results in higher pressures (Franklin, 2012). The other factors that are different in hypertension in the elderly are that it is mainly a problem with an increased systolic blood pressure and there are also greater fluctuations in blood pressure readings. There is also a high incidence of orthostatic and postprandial hypotension, which are drops in blood pressure on standing and after eating, and this is mainly due to the arterial stiffness (Wei et al, 2013).

Orthostatic hypotension or drop in blood pressure on standing or stretching is a problem and a concern in older people. Finding a balance between safety and optimal blood pressure control can be difficult. Orthostatic hypotension is defined as a difference in blood pressure on standing with a reduction in the systolic blood pressure of >20 mmHg or a drop in diastolic blood pressure of > 10 mmHg that occurs within 3 minutes of standing (Mancia et al, 2013). This is more common in older people as there are changes to the autonomic nervous system with age. This means that this system does not work correctly, causing an abnormal response with a drop in blood pressure on standing and a delayed time for the blood pressure to recover.

Initiating treatment
It has been shown that older people have a high rate of adverse events if the hypertension is left untreated as compared to a younger age group (Wei et al, 2013). Older people also benefit more in risk reduction from lowering of blood pressure (Franklin, 2012). Effective blood pressure control drops the risk of stroke by one third for every 10 mmHg reduction in systolic blood pressure (Faraco and Iadecola, 2013). Daskalopoulou et al (2012) state that a reduction of blood pressure in older people, with a systolic reduction by 20 mmHg and a diastolic reduction by 10 mmHg, has a risk reduction for stroke of 40–50% and a reduction in coronary heart disease risk of 15–30%.

The treatment option for hypertension is two-fold with lifestyle interventions and anti-hypertensive medication if needed.

Lifestyle modification
Lifestyle modification is important to prevent cardiovascular events; help control other cardiovascular risks; improve other medical conditions, such as diabetes; and reduce blood pressure. There are a range of lifestyle modifications that have been shown to be beneficial in blood pressure reduction and risk reduction (Box 3). These lifestyle modifications are important in all age groups; however, it has been shown that a restriction of salt intake lowers blood pressure more in the older age group than the younger age group (Chaudhry et al, 2012). This is, therefore, an important intervention to take into consideration in the older population.

Medication
Initiation of medication is based on the level of hypertension and the number of risk factors that are present along with any evidence of damage to organs, such as the heart or kidneys. Consult the European (Mancia et al, 2013) or local treatment guidelines for further information on this area if needed.

However, the recommendations for treatment of older people differ from those for the younger age group. In those over the age of 80 it is recommended that medication should be started if the systolic blood pressure is >160 mmHg with a recommended reduction in blood pressure to 140–150 mmHg (Mancia et al, 2013). In those who are under the age of 80, treatment may be considered when the systolic readings are >140 mmHg aiming for a blood pressure reduction to <140 mmHg (Mancia, et al 2013). In frail older residents, the decision

| Box 1. Definition and classification of blood pressure levels (mmHg) |
|-----------------|-----------------|-----------------|
| **Category**    | **Systolic**    | **Diastolic**   |
| Optimal         | <120            | And             | <80             |
| Normal          | 120–129         | And/or          | 80–84           |
| High normal     | 130–139         | And/or          | 85–89           |
| Grade 1 hypertension | 140–159        | And/or          | 90–99           |
| Grade 2 hypertension | 160–179        | And/or          | 100–109         |
| Grade 3 hypertension | >180            | And/or          | >110            |
| Isolated systolic hypertension | >140           | And             | <90             |

Reference: Mancia et al, 2013
to treat can be difficult and in these patients a decision needs to be made by the treating physician, who will consider the risks and benefits of any treatment.

Medications used to treat hypertension include thiazide diuretics, calcium channel blockers, ACE inhibitors or angiotensin II receptor blocker, beta-blockers or alpha-blockers (Chaudhry et al, 2012). Each of these drugs has specific advantages and side effects that need to be taken into consideration. However, any of the agents can be used in older patients (Blood Pressure Lowering Treatment Trialists’ Collaboration, 2008) and the choice is often dependent on other medical conditions that are being treated and which drug is likely to be most effective for all of the relevant medical conditions. The recommended choice in elevation of only the systolic blood pressure is a diuretic or calcium channel blocker (SHEP Co-operative Research Group, 1991; Mancia et al, 2013; Weber et al, 2013).

Medications should be commenced with low doses of the drug, carefully monitoring for any adverse effects including orthostatic hypotension (Chaudhry et al, 2012). Any dose increases should take place slowly and be carefully monitored. In those who are already diagnosed with hypertension, no change to drugs is needed unless there is a problem with control or side effects (Box 4) (McCormack et al, 2013; Mancia et al, 2013).

Risks and benefits

Age

There has been some controversy and debate over the treatment of hypertension in the over 80 age group owing to a limited body of evidence (Chaudhry et al, 2012). However, following the Hypertension in the Very Elderly Trial (Beckett et al, 2008), which showed that treatment produced major benefits in this age group, there are now evidence-based recommendations. The trial included patients over the age of 80 with a systolic blood pressure between 160 and 199 mmHg and a diastolic blood pressure <110 mmHg. However, an important exclusion criterion was orthostatic hypotension.

Since the original research there has been an extension of the main study, which has confirmed the original findings and also found that appropriate treatment of hypertension in this group may also lead to a reduction in cognitive decline and fractures (Mukhtar and Jackson, 2013). There is therefore no debate that older patients with hypertension should be treated.

Comorbidities and compliance

Medication in older hypertensive patients can often be difficult due to other complex medical conditions and already existing drug regimens. Drugs that are commonly used for blood pressure reduction may not always be suitable in the older population. This is due to side effects of these drugs, as older people are more prone to side effects, which can cause issues with compliance (Jha and Dutta, 2009).

Compliance with treatment may also be affected by cognitive problems or physical limitations. These drugs, while effective in a younger population, can cause problems with...
orthostatic hypotension, which if severe can lead to episodes of blackouts and increased risks of falls and other potential risks to safety (Weber, 2012). Research has shown that moving the time of administration to the evening of at least one blood pressure medication for those on three or more drugs produced more effective blood pressure control (Basile and Bloch, 2013). This would also help to minimise the effects of orthostatic hypotension in the group where this proves to be a problem.

Medications should only be commenced after a discussion about risks and benefits and with the agreement of the individual (McCormack et al, 2013).

**Conclusion**

Hypertension is a common problem in older people and likely to affect a large proportion of individuals in residential and care homes. Staff should be aware of good practice in blood pressure measurement as this is key to recognition, diagnosis and checking effectiveness of treatment. They also have an important part to play in management of hypertension with medication and lifestyle modifications, which have a significant effect on blood pressure reduction and risk reduction in the older population. A further important area is recognition of side effects or safety issues including orthostatic hypotension due to the associated risks and ensuring these are documented and reported. This article provides an up-to-date summary of recommendations for hypertension assessment, classification and management. NRC

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**Box 4. Side effects of hypertension medication**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Examples</th>
<th>Side effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thiazide diuretics</td>
<td>Indapamide, bendrofluazide</td>
<td>Weakness, confusion, electrolyte abnormalities, gout, fatigue, thirst, dizziness, muscle cramps, gastrointestinal upset</td>
</tr>
<tr>
<td>Calcium channel blockers</td>
<td>Amlodipine, diltiazem, felodipine, lercanidipine</td>
<td>Nausea, palpitations, flushing, ankle swelling, headache, dizziness, fatigue, sleep disturbance, abdominal pain, bradycardia and conduction problems</td>
</tr>
<tr>
<td>Angiotensin-converting enzyme inhibitors</td>
<td>Lisinopril, perindopril, Ramipril, enalapril</td>
<td>Low blood pressure, loss of taste, worsening of kidney function, angioedema, gastrointestinal effects, headache, dizziness, altered liver function, fatigue</td>
</tr>
<tr>
<td>Angiotensin-II receptor antagonists</td>
<td>Candesartan, irbesartan, losartan, valsartan, telmisartan</td>
<td>Dizziness, angioedema, high potassium levels</td>
</tr>
<tr>
<td>Beta-blockers</td>
<td>Bisoprolol, atenolol, metoprolol, propranolol, carvedilol</td>
<td>Bradycardia, hypotension, heart conduction problems, peripheral vasoconstriction, bronchospasm, dyspnoea, fatigue, headache, dizziness</td>
</tr>
<tr>
<td>Alpha blockers</td>
<td>Doxazosin, prazosin</td>
<td>Shortness of breath, fatigue, fainting, drowsiness, hypotension, postural hypertension, dry mouth, headache, gastro-intestinal disturbance</td>
</tr>
</tbody>
</table>

From: Joint Formulary Committee, 2014.

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**Key points**

- Hypertension is a common problem in older people and among residential and care home residents
- Accurate blood pressure measurement and following good practice are essential
- Management of hypertension involves drug therapy and lifestyle modifications
- Monitoring for side effects of medications and identification of any safety issues is vital
- There are significant risk reductions seen with good treatment of hypertension in the elderly population

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