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Hypertension

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Aims and intended learning outcomes

This article aims to provide an overview and update on hypertension, its causes and effects, and how it is regulated within the body. The main strategies for management and prevention are discussed, with an emphasis on early nursing intervention and patient education to promote a healthy lifestyle. After reading this article you should be able to:

- Define hypertension.
- Discuss the causes of hypertension.
- Outline the long-term consequences of high blood pressure.
- Understand the technique of blood pressure measurement.
- Give an overview of the methods of preventing hypertension.
- Describe the drug management of a hypertensive patient.

TIME OUT 1

Before reading on summarise what you know already about hypertension:

- How would you define hypertension?
- What are the risk factors for the condition?
- What illnesses can occur as a result of hypertension?
- How would you manage a newly diagnosed hypertensive patient?

Introduction

An estimated 20 per cent of people in the UK have elevated blood pressure of more than 140/90mmHg that warrants some form of treatment or monitoring (Elliott 2002). High blood pressure (hypertension) contributes to the 66,000 deaths from coronary heart disease (CHD) and stroke in people aged under 75 (DoH 1999a), costing the NHS billions each year (BHF 2003).

The prevalence of high blood pressure is greater in males than in females and rises with age. A Department of Health (1999b) report demonstrated that certain ethnic groups are more prone to hypertension, showing that black Caribbean and Pakistani women were at least 20 per cent more likely to have high blood pressure than the general female population. Reducing blood pressure is part of the government's plan to improve the health of the nation. A target has been set to reduce the death rate from CHD, stroke and related diseases in people aged under 75 by at least two fifths by 2010 – saving up to 200,000 lives in total (DoH 1999a).

Since no specific level of blood pressure clearly separates 'normal' from 'abnormal', the definition of hypertension has been under much debate. The risk of death from adverse cardiovascular events such as stroke and myocardial infarction has been shown to rise with increasing levels of diastolic blood pressure (Figure 1). Collins *et al* (1990) conducted a meta-analysis of 14 unconfounded randomised trials of antihypertensive drugs and found that a reduction of 5-6mmHg in diastolic blood pressure was associated with a 42 per cent reduction in stroke risk and a 14 per cent reduction in CHD risk. The accepted definition and classification of high blood pressure is illustrated in Table 1. A diagnosis of hypertension should not be made until a patient's systolic blood pressure has been recorded as >140mmHg on three separate occasions – ideally over a period of two months (NICE 2002a, NSF 2000). It should be noted that 12-50 per cent of the general population are thought to have 'white coat hypertension' (O'Brien *et al* 2001, Pickering *et al* 1998) – characterised by high blood pressure when measured by a healthcare worker, which is within normal limits at all other times. Mancia *et al* (1987) found the white coat effect to be more pronounced when the procedure was carried out by a doctor

In brief

Author
Ellen Welch BA(Hons), is a medical student, University of Liverpool.
Email: welchellen@yahoo.co.uk

Summary
An estimated 20 per cent of people in the UK have elevated blood pressure that warrants some form of treatment or monitoring. Hypertension can have serious consequences for patients and may result in death from coronary heart disease and stroke. Early intervention, patient education and lifestyle modification are essential for effective management of hypertension.

Key words
- Cardiovascular disorders
- Hypertension
- Prevention and screening

These key words are based on subject headings from the British Nursing Index. This article has been subject to double-blind review.

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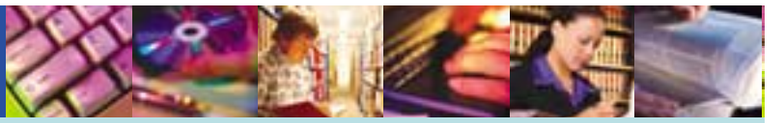
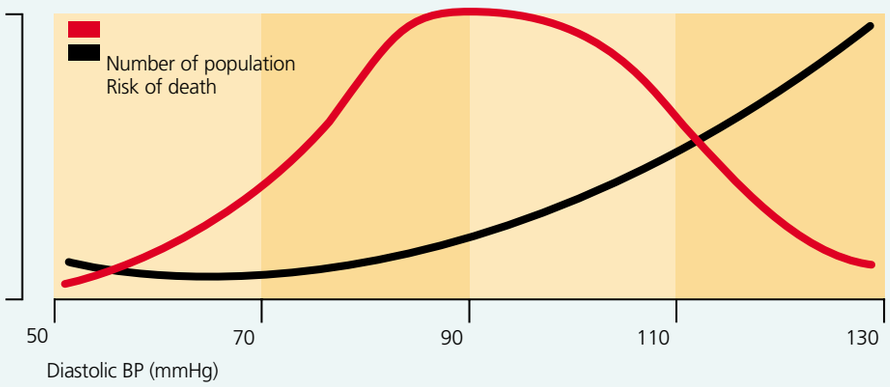


Figure 1. Distribution of diastolic blood pressure in a Western population



(The Malaysian Society of Hypertension, adapted from Souhami and Moxham 1994)

Table 1. Hypertension classification

Category	Systolic reading (mmHg)		Diastolic reading (mmHg)	Management	
Optimal	Less than 120	and	Less than 80	Lifestyle modification encouraged	Indications for drug therapy
Pre-hypertension	120-139	or	80-90	Definitive modifications	Drug therapy not indicated unless compelling indication* exists
Hypertension Stage 1 (mild)	140-159	or	90-99	Definitive modifications	Drug therapy indicated. Compelling indications have specific medications
Hypertension Stage 2 (moderate)	160-179	or	100-109	Definitive modifications	Drug therapy indicated. Compelling indications have specific medications
Hypertension Stage 3 (severe)	Greater than 180	or	Greater than 110	Definitive modifications	Drug therapy indicated. Compelling indications have specific medications

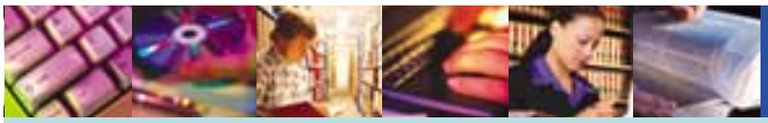
*Compelling indications are high-risk situations such as CHF, MI, CHD, diabetes, kidney disease and stroke. Patients with chronic kidney disease or diabetes are treated to BP goal of less than 130/80mmHg.

Taken from the Joint National Committee on Detection, Evaluation and Treatment of High Blood Pressure (1997)

rather than a nurse. In such patients, ambulatory blood pressure monitoring will cut out the transient rise produced in the surroundings of the clinic (Owens *et al* 1999, Staessen *et al* 2000).

Aetiology

In the majority of cases, hypertension is idiopathic (has no known cause) and is classified as primary



or 'essential' hypertension. Genetic influences on blood pressure have been suggested by family studies – patients with a family history of hypertension have a higher risk of developing the disease (Lu *et al* 2000), but it has been recognised that environmental factors play a deciding role in its development. This is well illustrated by migration studies in Africa. The prevalence of hypertension in parts of rural Africa is extremely low, but black Africans living in the UK have higher blood pressure levels than Caucasians. Poulter *et al* (1990) studied people migrating from rural Africa to urban environments and found that blood pressure rose abruptly after relocation to the city and this was attributed to increased sodium intake, weight gain and increased stress. The evidence suggests that certain people may be genetically inclined to develop hypertension, but it is the lifestyles we choose that lead to the expression of the condition.

Primary hypertension rarely occurs in isolation from other risk factors and nurses should be aware that the following risk factors are responsible for increased blood pressure (Appel *et al* 2003):

- Obesity and physical inactivity.
- High consumption of alcohol.
- Dietary sodium.
- Dietary potassium.
- Stress.
- Increasing age.
- Cigarette smoking.
- Increased blood cholesterol.
- Diabetes mellitus.

Secondary hypertension accounts for less than 5 per cent of cases of hypertension (Beevers *et al* 2001) and encompasses those cases of high blood pressure in which a definite underlying cause can be found (Box 1). This article focuses on the management of primary hypertension.

TIME OUT 2

Consider your own lifestyle and any risk factors you may have for hypertension. List any modifications you could make to lower your blood pressure.

Measuring blood pressure

Accurate diagnosis and monitoring of hypertension depends on reliable blood pressure measurement. Intra-arterial recording is the most accurate method for recording blood pressure. However, this form of monitoring is invasive, impractical and unpleasant for regular use and is usually reserved for use in theatre and intensive care units (ICUs) where accurate readings are paramount. Scipione Riva-Rocci devised the air-filled rubber bladder cuff for the measurement of systolic pressure in 1896 (O'Brien 1996). Ten years later Nicolai Korotkoff described the bruits generated in the brachial artery below the Riva-Rocci cuff, using a mercury manometer to measure the pressure being applied. His description of the sounds he observed are shown in Table 2 and provides a basis for the accurate determination of systolic and diastolic pressures. Korotkoff's auscultatory method is still in use today – but maybe not for much longer. Environmental concerns regarding the safety of mercury have led to the removal of mercury-based sphygmomanometers from general use in some European countries (Device Bulletin 2000).

Automated devices are used more frequently on hospital wards, providing blood pressure readings that are more consistently accurate than those obtained by manual methods using sphygmomanometers (O'Brien 1996). Campbell (1990) confirmed that technique in measuring blood pressure using sphygmomanometers can account for differences in readings of more than 15mmHg, while an audit by Carney *et al* (1993) found that out of 463 sphygmomanometers used in a hospital,

Table 2. The Korotkoff's method

Phase	Description of sound	Artery under the cuff	Cuff pressure
0	No sounds, pulse absent	Artery occluded	Above systolic pressure
1	Clear tapping sound audible	Artery just opens	At systolic pressure
2-3	Sounds are louder initially, then fade	Artery open for more of systole	Between systolic and diastolic pressure
4	Muffling of sounds	Artery open for nearly all of systole	At diastolic pressure
5	Disappearance of sounds	Artery open all the time	Just below diastolic pressure

Box 1. Causes of secondary hypertension

Renal disease: chronic glomerulonephritis; chronic pyelonephritis; renal artery stenosis; polycystic kidney disease; polyarteritis nodosa; obstructive nephropathy; tuberculosis

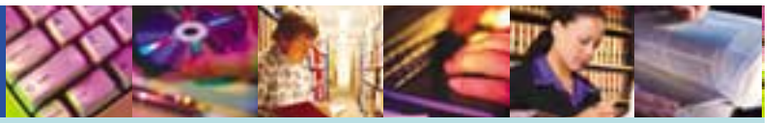
Endocrine disease: Cushing's syndrome; Conn's syndrome; phaeochromocytoma (tumour of the adrenal glands); acromegaly; hyperaldosteronism

Pregnancy-induced hypertension and pre-eclampsia: associated with oedema and proteinuria

Coarctation of the aorta

Raised intracranial pressure

Drugs: oestrogen-containing oral contraceptive pill; non-steroidal anti-inflammatory drugs (NSAIDs); steroids; sympathomimetics in cold cures; carbenoxolone; liquorice



Box 2. The British Hypertension Society's recommendations for good practice in blood pressure measurement (O'Brien *et al* 1999)

The nurse should:

- Provide an explanation of the procedure to the patient.
- Allow the patient to rest for three minutes if supine or seated, and for one minute if the patient is standing.
- Position the patient correctly, supporting the arm and ensuring that the upper arm is at the same level as the heart.
- Ensure that tight or restrictive clothing is removed from the arm.
- Use an appropriate sized cuff so that the bladder covers 80 per cent of the circumference of the upper arm.
- Apply the cuff evenly and smoothly on the arm with the tubing exiting from the top of the cuff, ensuring that the centre of the bladder covers the brachial artery.
- Position the manometer within three feet of the patient, at the operator's eye level and at the same height as the patient's arm.

Estimating systolic blood pressure

Systolic blood pressure represents the force of the contraction that empties the ventricle of the heart, pushing the blood into the aorta. Systolic blood pressure is estimated by inflating the cuff while palpating the brachial or radial artery and noting systolic blood pressure when the pulsations stop.

Completing the measurement

- Place the diaphragm of a stethoscope gently over the point of maximal pulsation of the brachial artery.
- Do not tuck the diaphragm under the edge of the cuff.
- Inflate the cuff to approximately 30mmHg above the palpated systolic blood pressure.
- Deflate the system at 2 to 3mmHg per second or per heartbeat.
- Systolic blood pressure is measured when a minimum of two clear repetitive tapping sounds are heard and diastolic blood pressure is measured at the point when the sound can no longer be heard.
- The measurement includes a recording of the blood pressure to the nearest 2mmHg, the arm used and its position.

only 58 per cent were in working order. Markandu *et al* (2000) believe that sphygmomanometers cannot be relied on for accurate readings because of a lack of technical knowledge among staff using them. Staessen *et al* (2000) suggest that ambulatory blood pressure monitoring is necessary to diagnose nocturnal hypertension and is especially indicated in older patients, those with borderline hypertension, pregnant women and those people with treatment-resistant hypertension. Despite the improved accuracy produced by automated devices, readings can still be influenced by tight clothing and the size of the cuff used and it is important that nurses are aware of how to take manual blood pressure readings (Box 2).

TIME OUT 3

Think about the devices available in your place of work to measure blood pressure. Do you know how to use them? Do you prefer the traditional method of sphygmomanometry, or automated devices? Why? If you have become used to the automated devices – enlist the help of a colleague to practise on and see if you can still use a sphygmomanometer.

TIME OUT 4

Before reading on, consider some of the signs and symptoms you may expect to find in a hypertensive patient. Compare your list with those outlined in the text below.

Effects of hypertension

Increased blood pressure increases the risk of death – mainly due to coronary heart disease, stroke, heart failure and renal failure (Rutan *et al* 1998). Hypertension has been called the 'silent killer' because it can cause considerable damage to the heart, brain and kidneys before a person notices any symptoms. Some of the signs and symptoms that may develop due to hypertension are illustrated in Figure 2.

It is well established that hypertension is associated with premature cardiovascular morbidity and mortality, but concomitant risk factors such as cigarette smoking, hypercholesterolaemia, atherosclerosis and obesity also contribute. It has been found that people with type 2 diabetes who are also hypertensive are twice as likely to develop cardiovascular problems (Campbell *et al* 2001). Increased blood pressure causes thickened arteries, with hypertrophied smooth muscle and deposited fibrous tissue (atherosclerosis). Dilated vessels become less compliant and unable to cope with increasing pressure. The heart is the organ most commonly affected by hypertension – because more pressure is placed on the heart to pump the blood through the constricted vessels. This can lead to left ventricular hypertrophy, atrial fibrillation and angina. The smaller blood vessels begin to narrow with continual high blood pressure, reducing the blood flow to the organs they supply. Small vessel diseases cause kidney failure and changes to the retina, which can eventually lead to blindness. Box 3 lists the diseases that can be attributable to hypertension.

Management and prevention

Lifestyle changes are the first line of treatment for hypertensive individuals. Nurses play an important role in promoting these changes to patients with high blood pressure and to those who have not yet developed it, since lifestyle modification has a prophylactic effect. Recommendations made to patients should include advice on weight loss, diet, alcohol, smoking cessation and stress management.

Weight loss Ebrahim and Smith (1998) analysed several studies and found a clear link between weight loss and a reduction in blood pressure.

Fat intake A low-fat diet has been shown to reduce blood pressure (Appel *et al* 1997).

Alcohol intake Alcohol increases blood pressure (Klatsky *et al* 1977), and the Department of Health

(DoH) (1995) recommends that men drink no more than 28 units per week, while women should consume no more than 21 units per week.

Exercise Regular dynamic physical exercise reduces blood pressure (Pate *et al* 1995) and is also thought to help reduce stress levels. Brisk walking for 20 minutes a day is effective in reducing blood pressure (Pate *et al* 1995).

Salt intake Increased salt in the diet leads to increased blood pressure (Law *et al* 1991). Patients should be advised to eliminate salt from the diet so that not more than 5g is consumed each day (Ramsay *et al* 1999). Nurses should remember that salt may be included in many foods, especially those that have been canned or processed.

Potassium intake Consuming foods that are rich in potassium may lower blood pressure (Khaw *et al* 1982). Potassium can be found in most fruit and vegetables, especially dried figs, bananas, mushrooms and orange juice.

Smoking cessation Smoking is responsible for a myriad of diseases, and combined with hypertension can be problematic. Nurses are uniquely positioned to advise patients against the risks of smoking (Campbell 1999).

Stress management Reducing the levels of adrenaline released in the body by relaxation techniques such as meditation may help to reduce blood pressure in some people (Appel *et al* 2003).

Drug therapy

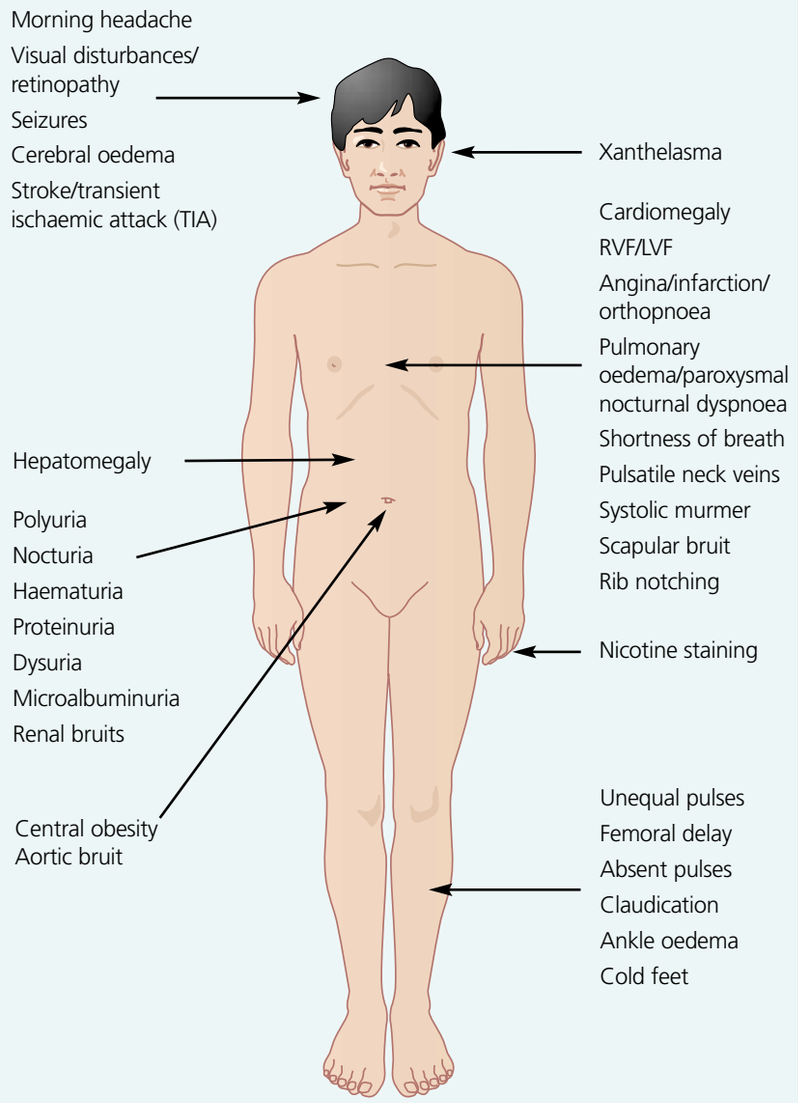
Multiple lifestyle changes have been shown to lower blood pressure and reduce the risk of cardiovascular disease in patients with mild hypertension (Appel *et al* 2003). In more severe cases, where a change of lifestyle provides insufficient control, drug treatment may be indicated with the aim of preventing target organ damage, as outlined in Box 3, and cardiovascular disease. Current guidelines recommend that patients with a systolic blood pressure of 160mmHg or a diastolic of 100mmHg should commence drug treatment for hypertension (Ramsay *et al* 1999). Patients with established diabetes or target organ damage and those at particular risk of developing cardiovascular disease can be treated at lower thresholds. Various risk assessment charts have been developed to identify levels of cardiovascular risk, to help health professionals to assess which patients need to be treated, and can be now be accessed via the internet (Wood *et al* 1998). The British Hypertension Society's thresholds for intervention in patients with high blood pressure are illustrated in Figure 3.

A multitude of drugs are available for the treatment of hypertension. Treatment regimens often differ between patients, taking into consideration co-existing conditions that may be affected by certain drugs. It is necessary to have some knowledge of how blood pressure is regulated to understand how antihypertensive drugs function. Several interconnected negative feedback systems work together in the body to adjust cardiac output, systemic vascular resistance and blood volume, depending on the needs of the body.

The nervous system maintains blood pressure by adjusting the size of the blood vessels, and by influencing the heart's pumping action, while the kidneys release the hormone renin in response to a decrease in blood volume. In narrowed atherosclerotic vessels, for example, there would be a decrease in blood flow, provoking the release of renin. This stimulates the renin-angiotensin system, a cascade of hormones resulting in the eventual release of aldosterone. Increased levels of aldosterone cause sodium re-absorption in the kidneys, followed by water re-absorption and an increase in blood pressure. Antihypertensive drugs act on some of these systems to lower blood pressure to normal levels.

The four main types of drug used as first-line agents in the management of hypertension include:

Figure 2. Signs and symptoms of hypertension

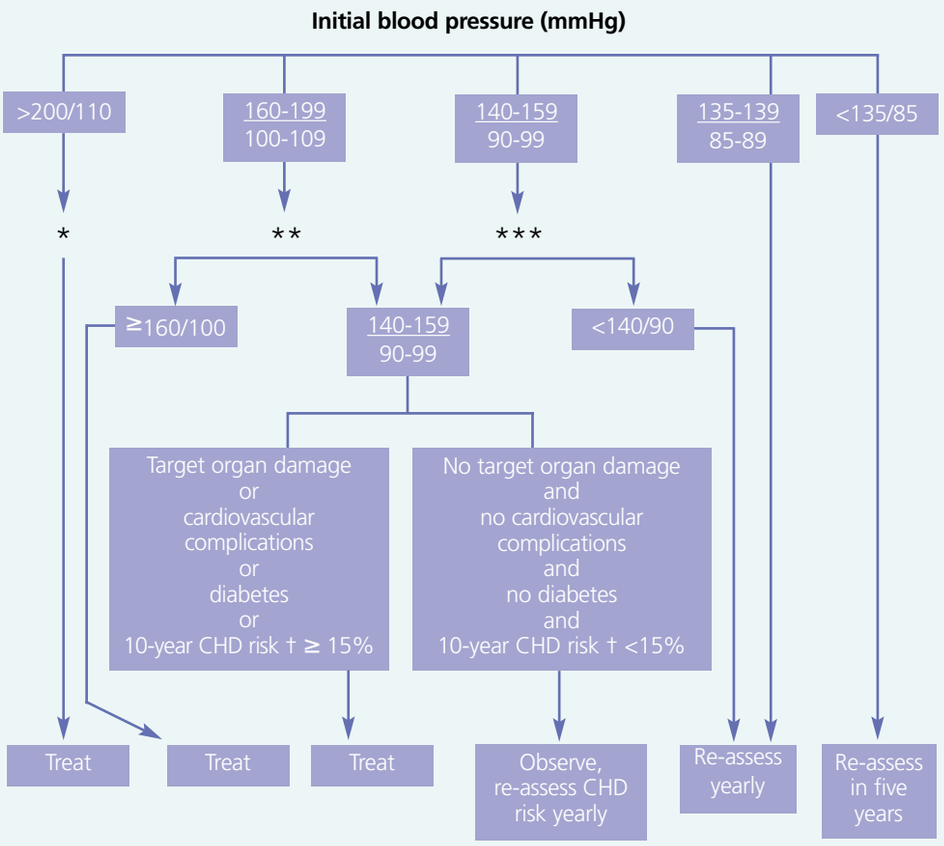


Box 3. Diseases associated with hypertension

- Heart failure
- Myocardial infarction
- Angina
- Atrial fibrillation
- Left ventricular hypertrophy
- Aortic aneurysm rupture
- Stroke
- Cerebral haemorrhage
- Hypertensive encephalopathy
- Pre-eclampsia/eclampsia
- Chronic kidney failure
- Blindness
- Gangrene of the lower extremities

(Rutan *et al* 1998)

Figure 3. The British Hypertension Society's thresholds for intervention (Ramsay *et al* 1999)



* Unless malignant phase or hypertensive emergency, confirm over 1-2 weeks then treat.
** If there are cardiovascular complications, target organ damage, or if diabetes is present, confirm over 3-4 weeks then treat. If absent re-measure weekly and treat if blood pressure persists at these levels over 4-12 weeks.
*** If cardiovascular complications are present, target organ damage, or if diabetes is present, confirm over 12 weeks then treat. If absent re-measure monthly and treat if these levels are maintained and if estimated 10-year CHD risk is ≥15%.
† Assessed with Cardiac Risk Assessor computer programme or coronary heart disease risk chart (6).

- Thiazide diuretics.
- Beta-blockers (beta receptor antagonist or beta-adrenergic blocking agent).
- Calcium channel blockers (calcium antagonists).
- Angiotensin-converting enzyme (ACE) inhibitors.

Thiazides, for example, bendrofluazide, hydrochlorothiazide and chlorthalidone lower blood pressure by increasing sodium excretion and urine volume in the distal convoluted tubule of the kidneys. This decrease in blood volume, venous return and cardiac output causes a decrease in peripheral vascular resistance and a fall in blood pressure. Low doses (bendrofluazide 2.5mg) are effective in mild to severe hypertension, especially in older people, but higher doses can upset the biochemical balance. Adverse effects include hypokalaemia (low levels of blood potassium), hyperglycaemia (impaired glucose tolerance leads to an increased incidence of diabetes), hyperuricaemia (gout) and occasionally erectile dysfunction and hyperlipidaemia (increased blood lipids). Thiazides should be avoided in patients with renal or hepatic impairment (BNF 2003).

Less commonly used are potassium-sparing diuretics, such as spironolactone and amiloride, which work in the same way as thiazides, but on the distal tubule of the kidneys. They may be used for the prophylaxis or treatment of thiazide diuretic-induced hypokalaemia. Similarly, loop diuretics, such as frusemide and bumetanide, work on the ascending part of the loop of Henle, and are indicated when hypertension is complicated by chronic renal failure.

Beta-blockers such as atenolol, propranolol, metoprolol and bisoprolol decrease high blood pressure by blocking stimulation to β-receptors in the heart, kidney and nervous system, leading to a decrease in cardiac output, peripheral vascular resistance and reduced activity of the renin-angiotensin-aldosterone system and the sympathetic nervous system. Doses of β-blockers do not need to be high – 50mg atenolol daily will usually be sufficient to control hypertension. If control is inadequate, combination with a thiazide may be effective and reduces the tendency for diuretics to cause hypokalaemia. Common side effects of

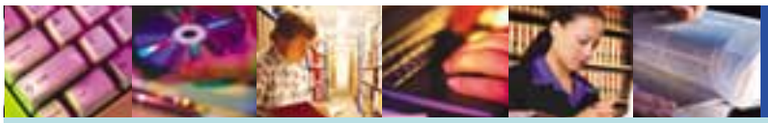


Table 3. The British Hypertension Society's indications and contraindications for the major classes of antihypertensive drugs (Ramsay *et al* 1999)

	Indications		Contraindications	
Class of drug	**Compelling**	**Possible**	**Possible**	**Compelling**
α-blockers	Prostatism	Dyslipidaemia	Postural hypotension	Urinary incontinence
Angiotensin converting enzyme (ACE) inhibitors	Heart failure Left ventricular dysfunction	Chronic renal disease* Type II diabetic nephropathy	Renal impairment* Peripheral vascular disease †	Pregnancy Renovascular disease
Angiotensin II receptor antagonists	Cough induced by ACE inhibitor ††	Heart failure Intolerance of other antihypertensive drugs	Peripheral vascular disease	Pregnancy Renovascular disease
β-blockers	Myocardial infarction Angina	Heart failure	Heart failure Dyslipidaemia Peripheral vascular disease	Asthma or chronic obstructive pulmonary disease (COPD) Heart block
Calcium antagonists (dihydropyridine)	Isolated systolic hypertension (ISH) in older patients	Angina Older patients	—	—
Calcium antagonists (rate limiting)	Angina	Myocardial infarction	Combination with β-blockade	Heart block Heart failure
Thiazides	Older patients including ISH	—	Dyslipidaemia	Gout

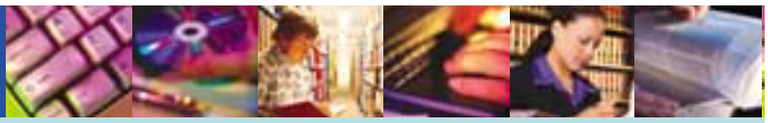
*ACE inhibitors may be beneficial in chronic renal failure but should be used with caution. Close supervision and specialist advice are needed when there is established and significant renal impairment.
† Caution with ACE inhibitors and angiotensin II receptor antagonists in peripheral vascular disease because of association with renovascular disease.
†† If ACE inhibitor indicated beta-blockers may worsen heart failure, but in specialist hands may be used to treat heart failure.

β-blockers include bronchospasm, bradycardia, heart failure and heart block, peripheral vasoconstriction (cold hands and feet), nightmares and fatigue (BNF 2003).

Calcium-channel blockers/calcium antagonists, for example, nifedipine, amlodipine, verapamil and diltiazem increase vasodilation by interfering with the flow of calcium ions into cells – thereby reducing vascular resistance and blood pressure. Although calcium antagonists are usually referred to as a single class of drugs, there are clear distinctions between the three main types:

- Dihydropyridine derivatives (nifedipine).
- Phenylalkalamines (verapamil).
- Benzothiazipine derivatives (diltiazem).

The dihydropyridine derivatives have pronounced peripheral vasodilator properties and minimal direct cardiac effects. They can be either long acting, for example, amlodipine, or short acting, for example, nifedipine. The longer-acting agents are less likely to promote vasodilator effects and guidelines do not generally recommend prescribing short-acting drugs (NICE 2002a and b). The phenylalkalamines and benzothiazipine derivatives differ in that they have significant cardiac effects and are often described as 'rate-limiting' agents because of the bradycardic effect (Elliott 2002). Amlodipine (a dihydropyridine derivative) (5mg daily) is the preferred calcium channel blocker to use because of its lack of negative cardiac effects and its long-acting nature. Adverse effects include headache, flushing, dizziness and ankle swelling. Since verapamil and diltiazem act on the heart to reduce cardiac output, they should be avoided in patients with heart failure (BNF 2003). Side effects of these drugs include bradycardia and constipation (BNF 2003).



Box 4. Common treatment combinations used for hypertension

Diuretic + β-blockers	41%
Diuretic + calcium antagonist	19%
Diuretic + ACE inhibitor	12%
β-blocker + calcium antagonist	12%
ACE inhibitor + calcium antagonist	4%
Others	12%

Angiotensin-converting enzyme (ACE) inhibitors such as captopril, enalapril and ramipril inhibit the activity of ACE, preventing the formation of angiotensin II thus reducing blood pressure. They are recommended for hypertensive patients with diabetes, and in patients in whom thiazides and β-blockers fail. Captopril (12.5mg) is usually administered twice or three times daily due to its short duration of action. Side effects include hypotension, impaired renal function, dry cough and hyperkalaemia (BNF 2003).

Other classes of drugs that may be used as alternatives include angiotensin receptor antagonists such as losartan, selective alpha 1-adrenoceptor antagonists (α-blockers) such as doxazosin, drugs that act on the central nervous system such as moxonidine, and drugs with vasodilator properties, such as hydralazine.

Thiazide diuretics and β-blockers, as well as being cheaper than the other drugs, have been around for longer, have been subjected to numerous clinical trials, and are widely recommended as first choice agents. Calcium channel blockers and ACE inhibitors are increasingly considered appropriate as first-line alternatives. Table 3 shows indications and contraindications for the major classes of antihypertensive drugs.

Hansson *et al* (1998) found that the majority of patients require more than one antihypertensive drug to control their blood pressure. To aid health professionals in their choice of drug treatment, the British Hypertension Society recommends that antihypertensive drugs should be combined following the guidelines outlined in Figure 4. The rationale for these combinations is based on the evidence that younger Caucasian patients usually have renin-dependent hypertension that responds to drugs from category A or B. Most older patients have low rennin hypertension that responds better to diuretics (D) or calcium channel blockers (C) (Brown M *et al* 2003). The most common treatment combinations used for hypertension were identified in a study carried out several years ago by Colhoun *et al* (1998) (Box 4).

The prognosis of hypertension is influenced by the presence of other risk factors, and treatment regimens should take this into account in each individual case. In addition to antihypertensive drugs, aspirin and statin therapy are recommended in certain patients to reduce cardiovascular risk. Statins are indicated for hypertensive patients up to the age of 75 when total serum cholesterol is ≥5.0mmol/l and if the ten-year risk of coronary heart disease is ≥30 per cent (NSF 2000, Wood *et al* 1998) or if they already have established cardiovascular disease (Ramsay *et al* 1999). Aspirin 75mg daily is recommended for hypertensive patients aged over 50, all patients with cardiovascular disease, diabetes and a 10-year risk of coronary heart disease ≥15 per cent (Hansson *et al* 1998, NSF 2000, Ramsay *et al* 1999).

Patients should be followed up at three-monthly intervals at which time lifestyle advice should be positively reinforced and blood pressure assessed. Antihypertensive drug therapy aims for an optimal blood pressure of <140/85mmHg (<140/80mmHg in diabetic patients) (NICE 2002b). Urine should be tested for proteinuria (to detect any kidney problems) and glucosuria (to check for diabetes). Patients should be weighed and asked about any drug side effects. Hypertensive patients may be taking many different drugs, which when taken together could result in severe toxicity, which may be difficult to treat (Bara 1999). If a patient's blood pressure is significantly lower than usual or he or she is displaying any unusual or worrying side effects, drug treatment should be withheld and the patient

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referred to a doctor. Patients should be advised to look out for any side effects and nurses should check in the British National Formulary (BNF) that particular drug combinations are suitable for particular patients.

TIME OUT 5

Summarise the four main classes of drugs used to treat hypertension and list one drug from each category.

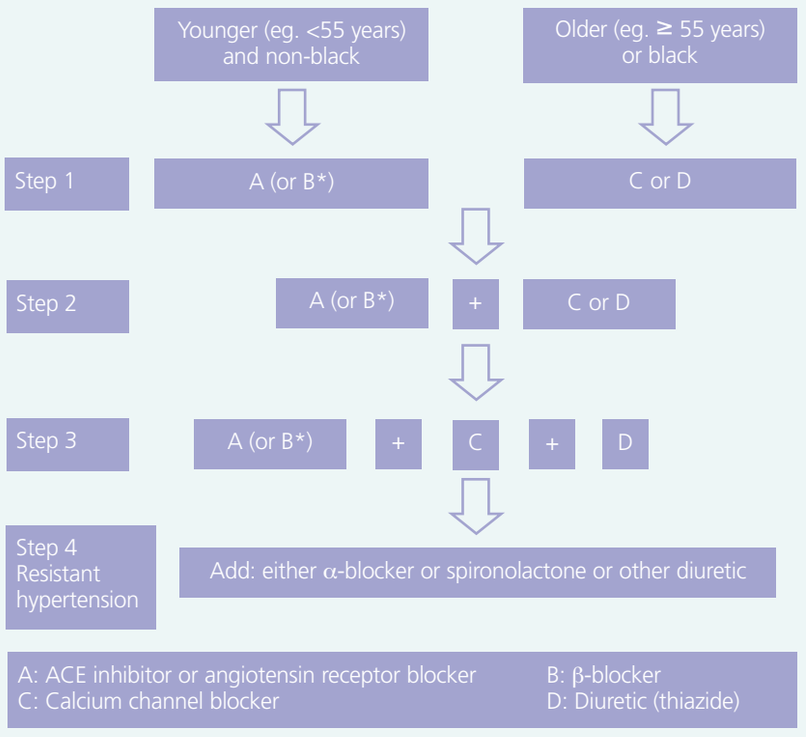
TIME OUT 6

Consider how you would tell a patient that he or she has high blood pressure. Use a spider diagram to outline how a patient without any signs or symptoms may react to this news, and the advice you would give him or her.

Conclusion

Nurses and other health professionals play a huge role in the control and prevention of hypertension, but much of the responsibility for the condition should be taken on by patients. Nurses should encourage them to adapt their lifestyles before the condition develops or before they become reliant on drug therapy. Diseases resulting from hypertension put a huge strain on the NHS, accounting for a large proportion of the health budget, and a large proportion of certified days taken off work (DoH 1999a). Nurses should be able to reassure patients that compliance with therapy and lifestyle modification can prevent the progression of cardiovascular disease

Figure 4. The British Hypertension Society recommendations for combining blood pressure lowering drugs (Brown *et al* 2003)



* Combination therapy involving B and D may induce more new onset diabetes compared with other combination therapies.

(Adapted from Brown *et al* 2003)

TIME OUT 7

Now that you have completed the article, you might like to write a practice profile. Guidelines to help you are on page 55.

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