Hypertension

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Abstract

Hypertension has high prevalence in the general population, accounts for one in every eight consultations in primary care and is a major risk factor for cardiovascular and renal disease. Despite the wide availability of suitable medicines, only about 25% of all hypertensive patients have their blood pressure controlled adequately. Effective management of patients with hypertension mandates assessment for asymptomatic target organ damage and also for potential secondary causes. Accurate blood pressure measurement is crucial for diagnosis and may require recordings to be made in the clinic and at home, as well as use of ambulatory methods. Treatment is dependent not only on blood pressure level but also on total cardiovascular risk. Evidence-based treatment algorithms exist to simplify the approach to treatment and most patients require at least two medicines to achieve control. Severely elevated blood pressure can lead to acute organ failure that requires emergency treatment but routine management of hypertension relies on the careful combination of different classes of drug and titration of dosage.

Keywords Ambulatory blood pressure monitoring; antihypertensive medications; blood pressure; cardiovascular risk; hypertension; resistant hypertension; secondary hypertension

What's new?

- Emphasis on out-of-office blood pressure monitoring, particularly ambulatory blood pressure for diagnosis and home blood pressure for on-going monitoring
- Most patients will require step 2 treatment as a combination of angiotensin-converting enzyme inhibitor (or low-cost angiotensin-receptor blocker) and calcium-channel blocker to control blood pressure
- Thiazide-like diuretics are preferred to thiazide diuretics and are now step 3 treatment
- Patients with uncontrolled hypertension taking step 3 treatment or young patients with hypertension should be referred for expert evaluation
- Spironolactone is recommended as the preferred fourth line agent

Introduction

Blood pressure (BP) is continuously related to both cardiovascular (CV) diseases and chronic kidney disease (CKD) (Figure 1).[1] However, to simplify decisions about diagnosis and pharmacotherapy, threshold levels of BP are used in all international guidelines on the management of clinic systolic BP (SBP) >140 mmHg and/or diastolic BP (DBP) >90 mmHg[2,3] (Table 1).

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Epidemiology

Hypertension is the largest attributable risk factor for mortality worldwide,[4] and is responsible for more than half of all stroke and coronary heart disease (CHD).[5] The burden of the problem is increasing, with predictions that one-third of adults worldwide will have hypertension by 2025.[6] Despite public health programmes and effective pharmacotherapy for hypertension in developed economies, approximately 25% of adults have hypertension. Hypertension remains untreated in up to 50% of these patients and, disappointingly, BP is controlled to guideline-driven targets in only 50% of those hypertensive patients advised to take treatment.[7]

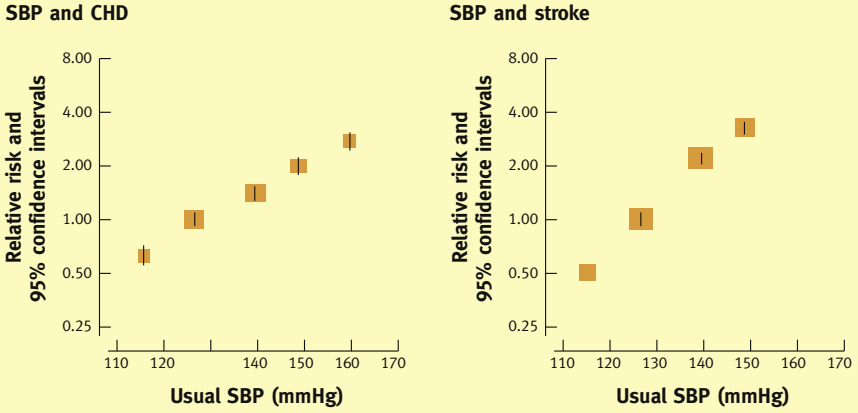
Hypertension is one of the most common chronic non-communicable diseases and accounts for 12% of all primary care consultations in UK.[3] Blood pressure rises with increasing age and this is thought to reflect environmental and lifestyle factors, as well as changes in haemodynamics caused by arterial stiffness in the major elastic arterial vasculature, especially the aorta. Increased arterial stiffness causes augmentation of SBP and diminution of DBP and is thus also responsible for the increasing prevalence of isolated systolic hypertension (ISH) in the elderly. Furthermore, hypertension has a higher prevalence in women and ethnic minorities in predominantly Caucasian countries such as the UK and the USA.

Aetiology

Essential hypertension

Hypertension is thought to arise from the interplay of multiple genetic traits that are all individually responsible for only small increases in BP but collectively may be responsible for 30–50% of individual variation,[8] with environmental and lifestyle factors that elevate BP responsible for the rest. Commonly implicated medicines/drugs or foodstuffs that elevate BP include non-steroidal anti-inflammatory drugs (NSAIDs), steroids, calcineurin inhibitors, hormonal oral contraceptives and female hormone replacement, stimulant sympathomimetic medications and illicit drugs, liquorice, salt (sodium chloride) and alcohol. Furthermore, a sedentary lifestyle, and dietary patterns of low fruit and vegetable intake, as well as high saturated fat and carbohydrate-rich diets that lead to obesity, also contribute to raised BP. In such cases

Relative risk of coronary heart disease and stroke by clinic (usual) SBP



CHD, coronary heart disease; SBP, systolic blood pressure.
Jackson R, Lawes CMM, Bennett DA, Milne RJ, Rodgers A. Treatment with drugs to lower blood pressure and blood cholesterol based on an individual's absolute cardiovascular risk. *Lancet* 2005; **365:** 434-441. With kind permission from Elsevier.

Figure 1

where there is no single identifiable cause for hypertension, the term *essential* or *primary* hypertension is used.

Secondary hypertension

In 5–10% of hypertensive patients, an identifiable, possibly reversible or treatable, cause for hypertension can be elucidated through careful assessment. These are broadly categorized into renal, vascular, endocrine or neural problems (Table 2). In young patients (aged <30 years), patients with sudden-onset, severe hypertension, and patients with *resistant hypertension* (uncontrolled BP despite at least three antihypertensive medicines, including a diuretic), the prevalence of secondary causes increases to between 20% and 60%.[9] The most common secondary causes found in resistant hypertension are obstructive sleep apnoea (OSA) (through sympathetic overdrive) and hyperaldosteronism (Conn's adenoma or bilateral adrenal hyperplasia causing mineralocorticoid excess).[9]

Diagnosis and evaluation

Hypertension is normally asymptomatic, though many patients ascribe symptoms such as epistaxis, headaches, lethargy and dizziness to their raised blood pressure. Hence, clinical assessment should be tailored to answer four key questions:

- Is the patient truly hypertensive?
- Is there evidence that hypertension has caused complications (target organ damage (TOD); major CV events)?
- Is a secondary cause identifiable?
- What is the total CV risk of the patient?

Definitions and classification of BP levels/patterns by different methods of measurement

Category	Clinic BP (mmHg)		Ambulatory BP (mmHg)	
	SBP	DBP	SBP	DBP
Optimal BP	<120	<80	n/a	n/a
Normal BP	<130	<85	n/a	n/a
High-normal BP	130–139	85–89	n/a	n/a
Grade 1 hypertension	140–159	90–99	135–149	85–94
Grade 2 hypertension	160–179	100–109	>150	>95
Grade 3 hypertension	>180	>110	n/a	n/a
Isolated systolic hypertension	>140	<90	>135	<85
White-coat hypertension	>140	>90	<135	<85
Masked hypertension	<140	<90	>135	>85

For diagnosis of different grades of hypertension, the highest categorization of DBP or SBP is used. Diagnosis using ABPM requires only daytime mean (>14 readings to be valid). Data adapted from Mancia et al.[2] and UK NICE guidelines.[3] BP, blood pressure; DBP, diastolic blood pressure; n/a, not applicable; NICE, National Institute for Health and Care Excellence; SBP, systolic blood pressure.

Table 1