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Guidelines

MANAGEMENT OF HYPERTENSION

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A. Definition and Classification of Hypertension

Hypertension (HPT) is defined as persistent elevation of systolic blood pressure (SBP) of ≥140 mmHg and/or diastolic blood pressure (DBP) of ≥90 mmHg. In 2006, prevalence of HPT in Malaysia was 42.6% among those aged ≥30 years.

The classification of high blood pressure (BP), although arbitrary, is useful as clinicians must make treatment decisions based on the measured BP and the patients' associated cardiovascular/cerebrovascular risks and co-morbidities. Table 1 provides a classification of BP for adults (age ≥18 years old) who are not on any antihypertensive medication and who are not acutely ill.

Table 1: Classification of BP (Adult e"18 years)

Category	Systolic (mmHg)		Diastolic (mmHg)	
Optimal	<120	and	<80	Diagnosis of HPT is made based on the average of two or more readings, taken at two or more visits to the healthcare providers.
Pre-hypertension	120-139	and/or	80-89	
Stage 1 HPT	140-159	and/or	90-99	
Stage 2 HPT	160-179	and/or	100-109	
Stage 3 HPT	≥180	and/or	≥110	

B. Diagnosis and Assessment

HPT is a silent disease; 64% of cases remain undiagnosed. Therefore, BP should be measured at every chance encounter. Evaluation of newly diagnosed hypertensive patients has three main objectives i.e.:

1. To exclude secondary causes of HPT.
2. To ascertain the presence or absence of target organ damage (TOD).
3. To assess lifestyle and identify other cardiovascular risk factors and/or concomitant disorders that affect treatment and prognosis.

The baseline investigations should include the following:

- Full blood count (FBC)
- Fasting blood sugar (FBS)
- Urinalysis
- Fasting lipid profile
- Urine albumin excretion or albumin/creatinine ratio
- Electrocardiogram (ECG)
- Renal profile and serum uric acid
- Chest x-ray (if clinically indicated)

Note: Should be repeated 6-12 monthly thereafter (except for chest x-ray)

If an examination or investigations suggest presence of a secondary cause, the patient should be referred for specialist evaluation. If there is evidence of TOD (refer Table 2), further tests should be considered.

A local study has revealed that as high as 53% patients with essential HPT did not have their cardiovascular risks

Table 2: Manifestations of TOD/target organ complication (TOC)

Organ system	Manifestations
Cardiac	Left ventricular hypertrophy (LVH), coronary heart disease (CHD), heart failure
Cerebrovascular	Transient ischaemic attack (TIA), stroke
Peripheral vasculature	Absence of one or more major pulses in extremities (except dorsalis pedis) with or without intermittent claudication, presence of carotid bruit
Renal	GFR <60 ml/min /1.73m^2, proteinuria (≥1+), microalbuminuria (2 out of 3 positive tests over a period of 4-6 months)
Retinopathy	Haemorrhages or exudates, with or without papilloedema

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Table 3: Cardiovascular Risk Stratification

Co-existing condition / BP levels (mmHg)	No RF No TOD No TOC	TOD or RF (1 - 2), No TOC	TOD or RF (>3) or Clinical atherosclerosis	Previous MI or Previous Stroke or Diabetes Mellitus (DM)
SBP 120 – 139 and/or DBP 80 – 89	Low	Medium	High	Very High
SBP 140 – 159 and/or DBP 90 – 99	Low	Medium	High	Very High
SBP 160 – 179 and/or DBP 100 – 109	Medium	High	Very High	Very High
SBP 180 – 209 and/or DBP 110 – 119	High	High	Very High	Very High
SBP >210 and/or DBP >120	Very High	Very High	Very High	Very High

Risk Level	Risk of Major Cardiovascular (CV) Event in 10 Years	Management
Low	<10%	Lifestyle changes
Medium	10-20%	Drug treatment and lifestyle changes
High	20-30%	Drug treatment and lifestyle changes
Very High	>30%	Drug treatment and lifestyle changes

TOD: LVH, Retinopathy, Proteinuria
TOC: Heart failure, Renal failure
RF: Additional risk factors (smoking, total cholesterol >6.5mmol/L, family history of premature vascular disease)
Clinical atherosclerosis: CHD, carotid stenosis, peripheral vascular disease, TIA, stroke

adequately assessed. Table 3 stratifies the risk of a patient with HPT developing a major cardiovascular event, which includes cardiovascular death, stroke or myocardial infarction (MI). This classification is a useful guide for therapeutic decisions.

C. Management of HPT

All patients should be managed with non-pharmacologic interventions/therapeutic lifestyle modifications to lower BP. Patients with pre-hypertension should be followed up yearly to detect and treat HPT as early as possible. Decisions regarding pharmacological treatment should be based on the individual patient's global cardiovascular risk. In subjects with **MEDIUM RISK or HIGHER**, the threshold for commencing HPT treatment should be lower. Algorithm 1 outlines the management of a patient with HPT. Untreated or sub-optimally controlled HPT leads to increased cardiovascular, cerebrovascular and renal morbidity and mortality.

A SBP of 120-139 and/or DBP of 80-89 mmHg is defined as pre-HPT. In Malaysia, data from the National Health and Morbidity Survey 1996 indicates that 37% of the populations have pre-HPT. The term "borderline hypertension" is discouraged from use as it is imprecise and inconsistently defined. Pre-HPT should be treated if the CV risk is MEDIUM OR HIGHER.

Therapeutic lifestyle changes should be recommended for all individuals with HPT and pre-HPT. It may be the only treatment necessary in Stage 1 HPT. A high degree of motivation is also needed to sustain the benefits of non-pharmacological treatment. It is also important to remember that lifestyle modification requires a concerted effort and reinforcement on behalf of the practitioner. Lifestyle modification works better with concurrent behavioural intervention than just passive advice. This non-pharmacological management includes weight reduction, sodium restriction, avoidance of alcohol intake, regular physical exercise, healthy eating and cessation of smoking.

It must be emphasised that the decision to commence pharmacological treatment should be based on global cardiovascular risks and not on the level of BP per se.

For patients with Stage 1 HPT, an observational period of three to six months is recommended unless target organ involvement is already evident or the patient has at least one other risk factor. Appropriate advice should be given on lifestyle

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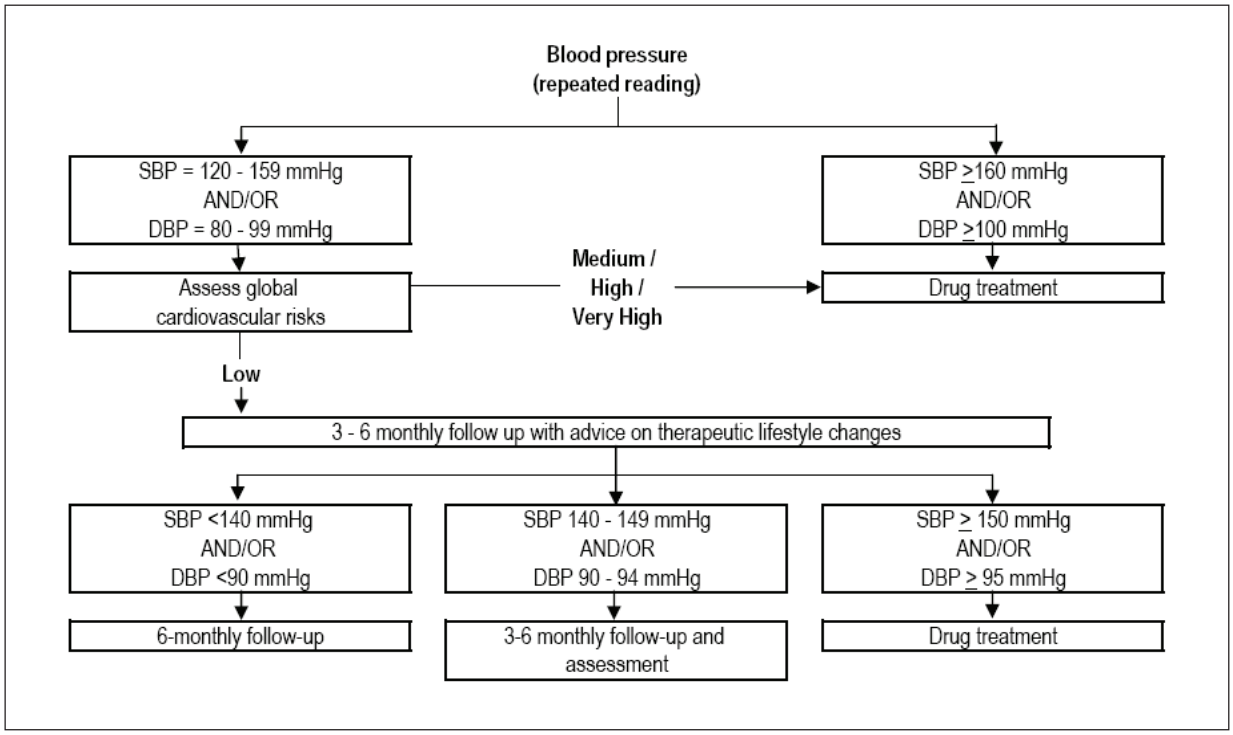
Algorithm 1: Management of Hypertension

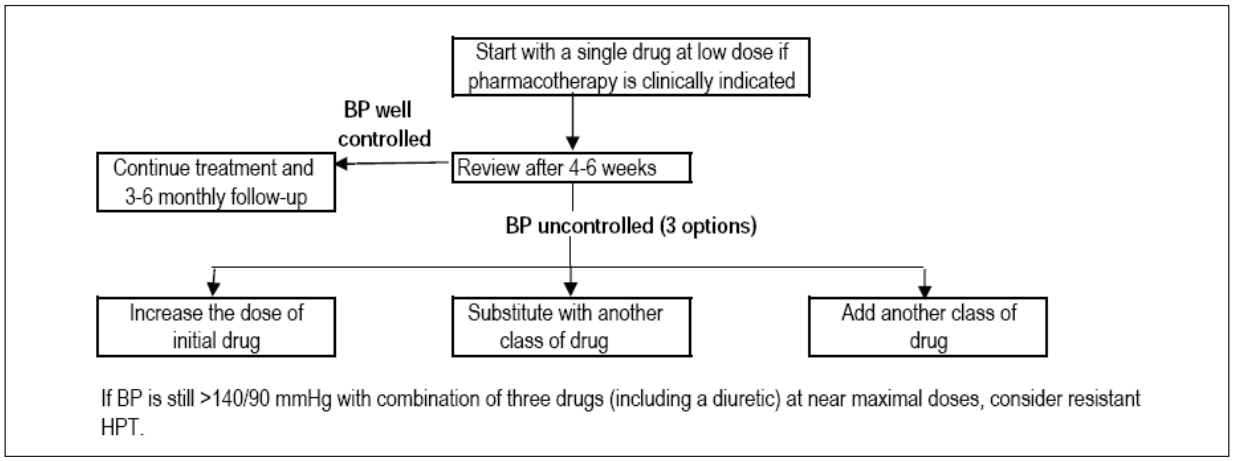


modification. Follow up should be about two monthly so that there will be between one to three visits over the period. Algorithm 2 outlines the management these patients.

In newly diagnosed uncomplicated hypertensives with no compelling indications, choice of first line monotherapy includes Angiotensin-Converting Enzyme Inhibitors (ACEIs), Angiotensin Receptor Blockers (ARBs), Calcium Channel Blockers (CCBs) and Diuretics. Beta-blockers are no longer recommended as first line monotherapy.

For Stage 2 HPT, initiating therapy with a combination of at least two drugs is recommended.

Algorithm 2: Management of Stage 1 Hypertension



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Combination therapy is often required to achieve target and may be instituted early. The effective antihypertensive combinations are as the following Table 4:

Table 4: Effective Antihypertensive Combinations

Effective combination	Comments
β-blockers + diuretics	Benefits proven in the elderly, cost-effective. However, may increase the risk of new onset DM
β-blockers + CCBs	Relatively cheap, appropriate for concurrent CHD
CCBs + ACEIs/ARBs	Appropriate for concurrent dyslipidaemias and DM
ACEIs + diuretics	Appropriate for concurrent heart failure, DM and stroke
ARBs + diuretics	Appropriate for concurrent heart failure and DM

control of hypertension. It is important to identify non-adherence. Most patients will require life-long treatment. The BP treatment targets are shown below in Table 5:

Table 5: BP Treatment Targets

Category	Target Blood Pressure (mmHg)	
Uncomplicated HPT	<140/90	Once target BP is achieved, follow up at 3-6 months interval is appropriate.
HPT in high risk groups: Diabetes Mellitus, history of CVD, chronic kidney disease (CKD), heart failure	<130/80	

HPT. The evaluation of these patients should include a thorough history and physical examination, particularly looking for signs of acute TOD and causes of secondary HPT. Patients are categorised as having:

a) asymptomatic severe hypertension,
b) hypertensive urgencies, or
c) hypertensive emergencies

(b) and (c) are also referred to as hypertensive crises

Only 26% of treated patients achieve target BP. Most patients need two or more drugs to control their hypertension. Poor adherence/compliance is usually the main cause of poor

Severe HPT is defined as BP ≥180/110 mmHg (persistent elevation after 30 minutes bed rest). The most common cause of this condition is still longstanding poorly controlled essential

The aim of drug therapy in patients with severe HPT is to reduce BP in a controlled, predictable and safe manner in order to avoid acute coronary, cerebral or renal ischaemia; or if ischaemia is already present, to avoid aggravating the situation. Rapid reduction of BP (within minutes to hours) in asymptomatic hypertension or hypertensive urgencies is best avoided as it may precipitate ischaemic events. Oral treatment for hypertensive urgencies is shown below in Table 6:

Table 6: Oral Treatment for Hypertensive Urgencies

Drug	Dose	Onset of Action (hr)	Duration (hr)	Frequency (prn)
Captopril	25 mg	0.5	6	1-2 hours
Nifedipine	10-20 mg	0.5	3-5	1-2 hours
Labetalol	200-400 mg	2.0	6	4 hours

Most patients can be effectively managed by their own family practitioners. Patients with the following conditions should be referred to the appropriate specialist for further assessment:

- hypertensive urgency or emergency
- suspected secondary hypertension
- resistant hypertension
- recent onset of TOC/TOD
- pregnancy
- children <18 years old

Details of the evidence supporting these recommendations can be found in the CPG on Management of Hypertension (3rd Edition), available on the following websites: Ministry of Health Malaysia: http://www.moh.gov.my and Academy of Medicine: http://www.acadmed.org.my. Corresponding organisation: CPG Secretariat, Health Technology Assessment Section, Medical Development Division, Ministry of Health Malaysia & contactable at htamalaysia@moh.gov.my