

Management of Hypertension

(3rd Edition)



Quick Reference for Health Care Providers



Ministry of Health Malaysia



Academy of Medicine of Malaysia



Malaysian Society of Hypertension

KEY MESSAGES

1. Hypertension (HPT) is defined as persistent elevation of SBP of ≥ 140 mm Hg and/or DBP of ≥ 90 mm Hg.
2. In 2006, prevalence of HPT in Malaysia was 42.6% among those aged ≥ 30 years.
3. HPT is a silent disease; 64% of cases remain undiagnosed. Therefore, BP should be measured at every chance encounter.
4. Untreated or sub-optimally controlled HPT leads to increased cardiovascular, cerebrovascular and renal morbidity and mortality.
5. A SBP of 120–139 and/or DBP of 80–89 mm Hg is defined as pre-HPT and should be treated in certain high risk groups.
6. Therapeutic lifestyle changes should be recommended for all individuals with HPT and pre-HPT.
7. Decision to commence pharmacological treatment should be based on global cardiovascular risks and not on the level of blood pressure (BP) per se.
8. In patients with newly diagnosed uncomplicated HPT who have no compelling indications, choice of first line monotherapy includes ACEIs, ARBs, CCBs and Diuretics. Beta-blockers are no longer recommended as first line monotherapy.
9. Only 26% of treated patients achieve target BP.
10. Combination therapy is often required to achieve target and may be instituted early.

This Quick Reference provides key messages and a summary of the main recommendations in the Clinical Practice Guidelines (CPG) Management of Hypertension, 3rd Edition (2008).

Details of the evidence supporting these recommendations can be found in the above CPG, available on the following websites:

Ministry of Health, Malaysia	: http://www.moh.gov.my
Academy of Medicine	: http://www.acadmed.org.my
Malaysian Society of Hypertension	: http://www.msh.org.my

CLASSIFICATION OF BLOOD PRESSURE (adults ≥ 18 years)

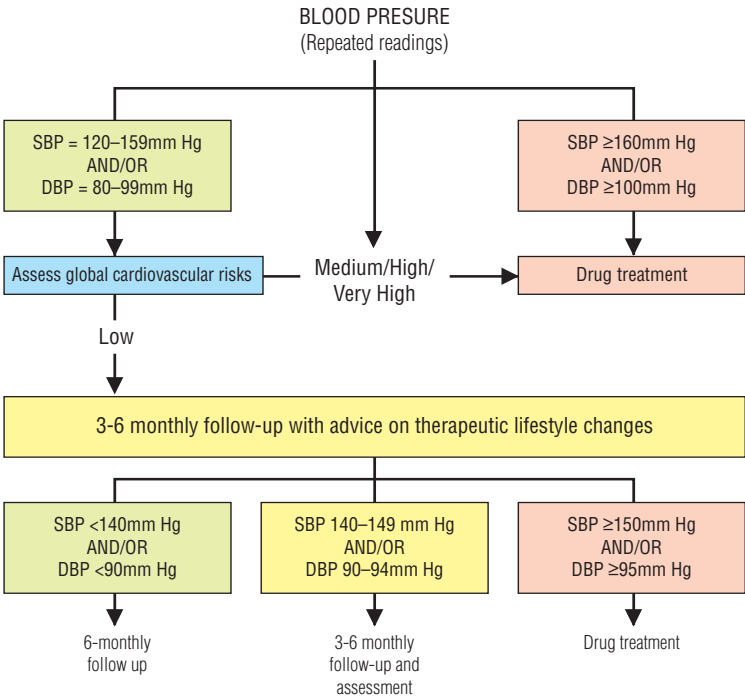
Category	Systolic (mmHg)	Diastolic (mmHg)	<i>Diagnosis of hypertension is made based on the average of two or more readings, taken at two or more visits to the health care providers</i>
Optimal	<120	and <80	
Prehypertension	120–139	and/or 80–89	
Stage 1 HPT	140–159	and/or 90–99	
Stage 2 HPT	160–179	and/or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

EVALUATION OF NEWLY DIAGNOSED HYPERTENSIVE PATIENTS

Evaluation should include thorough history, physical examination and relevant investigations.

Three main objectives:

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

ALGORITHM FOR THE MANAGEMENT OF HYPERTENSION

BASELINE INVESTIGATIONS

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

Note : Should be repeated 6-12 monthly thereafter (except for Chest X-Ray)

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.
Renal	GFR <60ml/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.

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 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

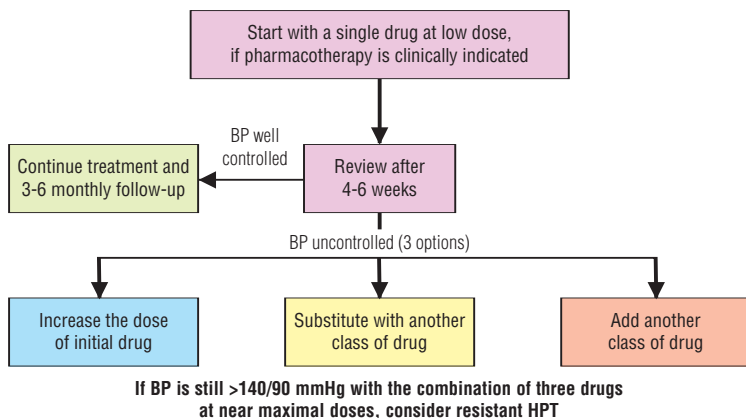
TOD: LVH, Retinopathy, Proteinuria

TOC: Heart Failure, Renal Failure

Risk Factors (RF): additional RF (smoking, TC>6.5mmol/L, family history of premature vascular disease)
Clinical atherosclerosis (CHD, carotid stenosis, peripheral vascular disease, TIA, stroke)

MI: Myocardial Infarction

PHARMACOLOGICAL MANAGEMENT OF STAGE 1 HYPERTENSION



Pharmacological management of Stage 2 hypertension
Initiating therapy with the right combination of at least 2 drugs is recommended.

EFFECTIVE ANTIHYPERTENSIVE COMBINATION

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

BLOOD PRESSURE TREATMENT TARGETS

Category	Target blood pressure (mmHg)	<i>Once target BP is achieved, follow-up at 3-6 month interval is appropriate.</i>
Uncomplicated hypertension	<140/90	
Hypertension in high risk groups: DM, History of CVD	<130/80	
Diabetics with proteinuria of >1g/24 hours	<125/75	

RECOMMENDATIONS FOR FOLLOW-UP BASED ON INITIAL BLOOD PRESSURE MEASUREMENTS FOR ADULTS

Initial BP (mmHg)		Follow-up recommended to confirm diagnosis and/or review response to treatment.
Systolic	Diastolic	
<130	and <85	Recheck in one year.
130-139	and 85-89	Recheck within 3-6 months.
140-159	and/or 90-99	Confirm within two months and treat if medium, high or very high risks.
160-179	and/or 100-109	Evaluate within one month and treat when confirmed.
180-209	and/or 110-119	Look for symptoms and signs of hypertensive urgency or emergency. If asymptomatic, evaluate within one week and treat when confirmed.
≥210	and/or ≥120	Initiate drug treatment immediately.

SEVERE HYPERTENSION

Severe hypertension is defined as BP >180/110mm Hg (persistent elevation after 30 minutes bed rest)

Possible clinical scenarios

Asymptomatic severe HPT

- Incidental findings
- Non-specific symptoms like headache, dizziness, lethargy

Management

- Most can be managed as outpatient
- Review existing drug regime and compliance
- For newly-diagnosed, consider admission for evaluation
- For established HPT, admit if compliance remains a problem

Hypertensive urgencies

- Presents with grade III and IV retinal changes, proteinuria $\geq 2+$, but no overt organ failure

Management

- Initial treatment should aim for 25% reduction in BP over 24 hours but not lower than 160/90mm Hg
- Combination therapy is often necessary (see table below)
- Admit patient if BP remain >180/110mm Hg

Hypertensive emergencies

- Presents with symptoms and signs of TOC e.g. acute heart failure, subarachnoid haemorrhage, acute coronary syndromes

Management

- All patient should be admitted
- Aim to reduce BP by 25% over 3-12 hours but not lower than 160/90 mmHg
- Best achieved with parenteral drugs

Treatment options for hypertensive urgencies (oral)

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

Treatment options for hypertensive emergencies (parenteral)

Drug	Dose	Onset of action (hr)	Duration (hr)	Remarks
Sodium nitroprusside	0.25–10 μ g/kg/min	seconds	1 – 5 min	Caution in renal failure
Labetalol	IV bolus 50mg (over at least 1 min, repeating if necessary at 5 min intervals to a max of 200mg then 2mg/min IV)	≤ 5 min	3 – 6 hrs	Caution in heart failure
Nitrates	5–100 μ g/min	2 – 5 min	3 – 5 min	Preferred in acute coronary syndromes and acute pulmonary oedema

Rapid reduction of BP (within minutes to hours) in asymptomatic severe HPT or hypertensive urgencies is best avoided as it may precipitate ischaemic events.

WHEN TO REFER

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

ANTIHYPERTENSIVE AGENTS

Formulation	Minimum dose	Maximum dose	Remarks
Diuretics			
Chlorothiazide	250mg OD	500mg OD	<ul style="list-style-type: none"> • Potassium should be closely monitored. • Used with care in patient with gout.
Hydrochlorothiazide	25mg OD	200mg OD	
Amloride/hydrochlorothiazide 5mg/50mg	1 tablet OD	4 tablet OD	
Indapamide SR	1.5mg OD	1.5mg OD	<ul style="list-style-type: none"> • Potassium sparing diuretics may cause hyperkalemia if given with ACEIs/ARBs/renal insufficiency.
Indapamide	2.5mg OD	2.5mg OD	
Triamterene/hydrochlorothiazide 50mg/25mg	1 tablet BD	2 tablet BD	
Beta Blockers			
Atenolol	50mg OD	100mg OD	<ul style="list-style-type: none"> • Contraindicated in patient with COAD, severe Peripheral Vascular Disease and heart block.
Bisoprolol	5mg OD	10mg OD	
Metoprolol	50mg BD	200mg BD	
Propranolol	40mg BD	320mg BD	
Calcium Channel Blockers (CCBs)			
Amlodipine	5mg OD	10mg OD	<ul style="list-style-type: none"> • Verapamil may reduce heart rate and use with care with Beta Blockers.
Diltiazem	30mg TDS	60mg TDS	
Diltiazem SR	90mg BD	90mg BD	
Felodipine	2.5mg OD	10mg OD	
Lercanidipine	10mg OD	20mg OD	
Nifedipine	10mg TDS	30mg TDS	
Nifedine SR	30mg OD	120mg OD	
Verapamil	80mg BD	240mg TDS	
Verapamil CR	200mg OD	200mg BD	
ACE Inhibitors (ACEIs)			
Captopril	25mg BD	50mg TDS	<ul style="list-style-type: none"> • Contraindicated in pregnancy and bilateral renal artery stenosis. • Check serum creatinine before initiation and repeat 2 weeks after initiation. • ACEIs should be stopped if rise in creatinine >30% from baseline.
Enalapril	2.5mg OD	20mg BD	
Lisinopril	5mg OD	80mg OD	
Perindopril	2mg OD	8mg OD	
Ramipril	2.5mg OD	10mg OD	
Quinapril	2.5mg OD	40mg BD	
Angiotensin Receptor Blockers (ARBs)			
Candesartan	8mg OD	16mg OD	<ul style="list-style-type: none"> • Contraindicated in pregnancy and bilateral renal artery stenosis.
Irbesartan	150mg OD	300mg OD	
Losartan	50mg OD	100mg OD	
Telmisartan	20mg OD	80mg OD	
Valsartan	80mg OD	160mg OD	
Olmesartan	20mg OD	40mg OD	
Miscellaneous			
Prazosin (Alpha Blocker)	0.5mg BD	10mg BD	<ul style="list-style-type: none"> • Doxazosin is useful in patient with benign prostatic hypertrophy. • In elderly, start Labetolol with 50mg BD.
Doxazosin	1mg OD	16mg OD	
Labetalol	100mg BD	800mg TDS	
Carvedilol	12.5mg OD	50mg OD	
Methyldopa	125mg BD	1gm BD	

CHOICE OF ANTIHYPERTENSIVE AGENTS IN PATIENTS WITH CONCOMITANT CONDITIONS

Concomitant disease	Diuretics	Beta-blockers	ACEIs	CCBs	Peripheral Alpha-blockers	ARBs
Diabetes mellitus (without nephropathy)	+	+/-	+++	+	+/-	++
Diabetes mellitus (with nephropathy)	++	+/-	+++	++*	+/-	+++
Gout	+/-	+	+	+	+	+
Dyslipidaemia	+/-	+/-	+	+	+	+
Coronary heart disease	+	+++	+++	++	+	++
Heart failure	+++	+++ [#]	+++	+ [@]	+	+++
Asthma	+	-	+	+	+	+
Peripheral vascular disease	+	+/-	+	+	+	+
Non-diabetic renal impairment	++	+	+++	+	+	++
Renal artery stenosis	+	+	+++ ^{\$}	+	+	+++ ^{\$}
Elderly with no co-morbid conditions	+++	+	+	+++	+/-	+
Very elderly (>80 years old) with no co-morbid conditions	+++	+	++	+	+/-	+

The grading of recommendation from (+) to (+++) is based on increasing levels of evidence and/or current widely accepted practice

+/- Use with care

- Contraindicated

* Only non-dihydropyridine CCB

Metoprolol, bisoprolol, carvedilol – dose needs to be gradually titrated

@ Current evidence available for amlodipine and felodipine only

\$ Contraindicated in bilateral renal artery stenosis

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