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Department of Health Research
Ministry of Health and Family Welfare, Government of India

Standard Treatment Workflow (STW)

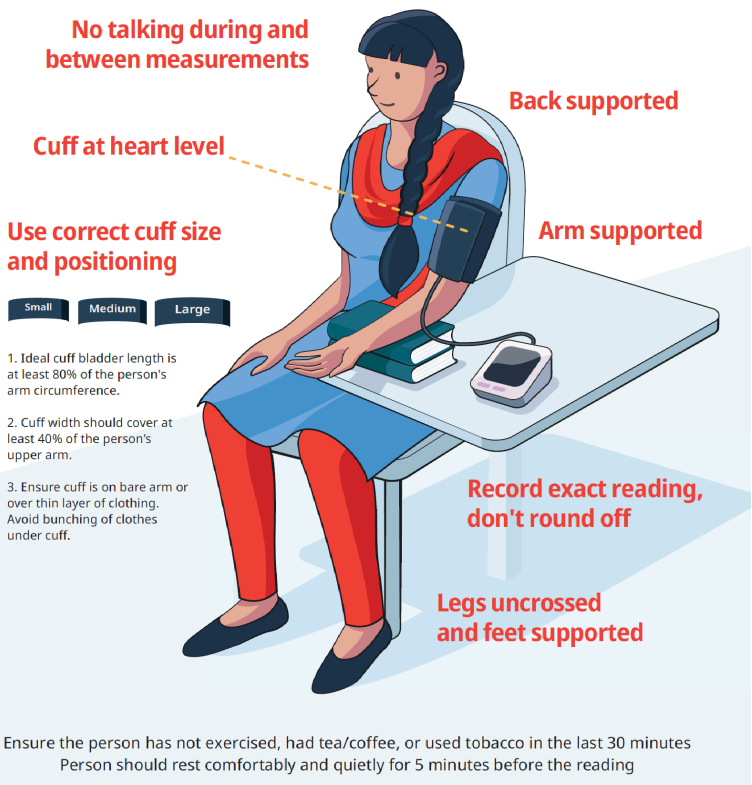
HYPERTENSION IN ADULTS

ICD-11 BA00

Hypertension is a SILENT KILLER
as the majority of patients with high BP are asymptomatic!
Only way to know if BP is high is to measure it accurately!

BP Measurement Checklist

Measure blood pressure of all adults ≥ 30 years



Ensure the person has not exercised, had tea/coffee, or used tobacco in the last 30 minutes
Person should rest comfortably and quietly for 5 minutes before the reading

RISK FACTORS

- High salt intake
- Sedentary behavior
- Tobacco and alcohol consumption
- Obesity

CLASSIFICATION	BLOOD PRESSURE LEVELS	ACTION
Normal	Systolic <120 AND Diastolic<80	Reassure and encourage healthy lifestyle
Elevated BP	Systolic 120-139 AND/ OR Diastolic 80-89	Lifestyle modification
Hypertension Grade 1	Systolic 140-159 AND/ OR Diastolic 90-99	Pharmacological management+ Lifestyle modification
Hypertension Grade 2	Systolic 160-179 AND/ OR Diastolic 100-109	
Hypertension Grade 3	Systolic ≥ 180 AND/ OR Diastolic ≥ 110	

DIAGNOSIS OF HYPERTENSION

- Systolic BP ≥140 AND/OR Diastolic BP ≥ 90 mmHg on two different clinic visits
- Population screening BP reading may count as the first reading
- Use the higher category if only Systolic or Diastolic BP is high, manage based on the higher value
- If Systolic BP is ≥160 AND/OR Diastolic BP ≥100 measurement of one clinic visit is sufficient for diagnosing hypertension

BLOOD PRESSURE CONTROL TARGETS

- All adults: SBP <140 and DBP <90 mmHg
- Diabetes mellitus, CKD, or established CVD: SBP <130 and DBP <80 mmHg (optimal target if tolerated)
- Age ≥80 years: SBP <150 and DBP <90 mmHg
- Assess orthostatic BP at every visit of adults ≥ 65 years

MANAGEMENT OF HYPERTENSION

PHARMACOTHERAPY

DRUG CLASS	DRUG	DOSES	CONTRAINDICATIONS	SIDE EFFECTS
CCB	Amlodipine	2.5–10 mg OD	Heart failure	Pedal edema, constipation
ACE inhibitors	Enalapril	5–40 mg OD or BD	Pregnancy, Women planning pregnancy, prior angioedema to ACEi, Hyperkalemia, Bilateral renal artery stenosis	Dry cough, angioedema, hyperkalemia rise in serum creatinine
	Ramipril	2.5–10 mg OD or BD		
ARB	Losartan	50–100 mg OD		Hypotension, acute renal failure, hyperkalemia
	Olmesartan	20–40 mg OD		
	Telmisartan	40–80 mg OD		
Diuretics	Chlorthalidone	12.5–25 mg OD	Pregnancy, Gout	Glucose intolerance, metabolic syndrome, hyponatremia, hypercalcemia, hypokalemia
	Hydrochlorothiazide	12.5 mg OD		
Beta-blockers	Carvedilol	12.5–50 mg OD or BD	Asthma, severe bradycardia, A-V block (grade 2 or 3), uncontrolled heart failure	Depression, fatigue, reduced exercise tolerance, hyperglycemia, sexual dysfunction
	Labetalol	100–400 mg BD		
	Metoprolol	50–100 mg OD or BD		
	Nebivolol	5 mg OD		
Aldosterone antagonist	Spironolactone	25 mg OD	Hyperkalemia	Mastalgia, gynecomastia, sexual dysfunction, gout

PHARMACOLOGICAL STRATEGY

- Combination therapy (two drugs from two different classes) could be the default initial pharmacological treatment for most adults with hypertension
- Single-pill combinations (SPCs/fixed-dose combinations, FDCs) are preferred over multiple pills to improve adherence
- Monotherapy remains appropriate only for (a) low-risk Grade 1 HTN, (b) elderly ≥ 80 years, or (c) frail patients
- A CCB or Thiazide/Thiazide-like diuretic should be used with a Renin-Angiotensin-Aldosterone System (RAAS) blocker (either an ACEi or an ARB)
- Three-drug combination, often a RAAS blocker, CCB, or a Thiazide/Thiazide-like diuretic, if blood pressure is not controlled with the initial two-drug combination
- β-blockers are appropriate in cases of angina, postmyocardial infarction, heart failure (HFrEF or HFpEF with ischemia)
- DO NOT combine two RAAS blockers as it increases the risk of adverse effects, including acute kidney injury (AKI)

SUGGESTED TREATMENT PROTOCOLS

PROTOCOL NO 1 ATTACC

1. **If BP is high:*** Prescribe Amlodipine 5mg
2. **After 4 weeks measure BP again. If still high:** Add Telmisartan 40mg
3. **After 4 weeks measure BP again. If still high:** Increase Telmisartan to 80mg
4. **After 4 weeks measure BP again. If still high:** Increase Amlodipine to 10mg
5. **After 4 weeks measure BP again. If still high:** Add Chlorthalidone 12.5mg
6. **After 4 weeks measure BP again. If still high:**

PROTOCOL NO 2 AATTCC

1. **If BP is high:*** Prescribe Amlodipine 5mg
2. **After 4 weeks measure BP again. If still high:** Increase to Amlodipine 10mg
3. **After 4 weeks measure BP again. If still high:** Add Telmisartan 40mg
4. **After 4 weeks measure BP again. If still high:** Increase to Telmisartan 80mg
5. **After 4 weeks measure BP again. If still high:** Add Chlorthalidone 12.5mg
6. **After 4 weeks measure BP again. If still high:**

Consider adding drugs of other classes, preferably MRA (eg.Spironolactone)

*High BP ≥140 /90 mmHg
At every visit: Check if the patient has been taking medications regularly and correctly

LIFESTYLE MODIFICATION

- Advise all patients against tobacco and alcohol use
- Limit salt intake to <5g/day
- Use healthy oils, eat more fruits/vegetables, prefer fish/omega-3 foods such as nuts and seeds
- Physical Activity: 30 minutes daily
- Weight Management: Keep BMI <23 kg/m^2 and waist circumference: <90 cm (men) and <80 cm (women)

MONITORING OF HYPERTENSION

- BP to be measured at every clinical visit
- Evaluate for diabetes (fasting plasma glucose or HbA_{1c}) and manage accordingly
- Annual evaluations - Serum creatinine, Urine (albumin, sugar, creatinine), Lipid profile, Fundoscopy
- Additional investigations (if required)- ECG, ECHO

HYPERTENSION URGENCY

- Systolic BP ≥180 AND/OR Diastolic ≥ 120 mmHg
  AND
- No signs of acute target-organ damage

Management

- Start oral antihypertensive drugs
- Do NOT use IV medicines
- Reduce BP gradually over 24–48 hours
- Refer/admit if symptoms or organ damage suspected
- Follow-up within 1 week

RED FLAGS SIGNS

Systolic BP ≥180 AND/OR Diastolic BP ≥120

with

Symptoms of target organ damage

- Visual disturbance, dizziness, confusion, headache
- Chest pain
- Breathlessness (worse lying down/leg swelling)
- Sudden weakness, speech/ swallowing difficulty, vision problem

Management

- Stabilise ABC and refer to emergency care at higher center

ABBREVIATIONS

ACEi: Angiotensin-converting enzyme inhibitor
ARB: Angiotensin receptor blocker
BP: Blood pressure
CCB: Calcium channel blocker
FDC: Fixed-dose combination
HFrEF: Heart failure with reduced ejection fraction
HFpEF: Heart Failure with Preserved Ejection
OD: Once Daily
MRA: Mineralocorticoid Receptor Antagonist
RAAS: Renin Angiotensin-Aldosterone System

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ALL ADULTS ≥ 18 YEARS SHOULD GET BLOOD PRESSURE MEASURED AT EVERY CLINIC VISIT

This STW has been prepared by national experts of India with feasibility considerations for various levels of healthcare system in the country. These broad guidelines are advisory, and are based on expert opinions and available scientific evidence. There may be variations in the management of an individual patient based on his/her specific condition, as decided by the treating physician. There will be no indemnity for direct or indirect consequences. Kindly visit our web portal (stw.icmr.org.in) for more information.