

# Interview Of The Month

What Experts Have to Say?

## DIAQGNOSIS AND EVALUATION OF HYPERTENSION

### 10 Questions a GP Must Know

DR SUNIL THANVI MD, FCCP, DM, FACC, FESC, FSCAI  
Gujarat university

Dr Thanvi is a practicing Cardiologist in Ahmedabad, India for last 14 years. Postgraduated from BJ Medical College, Ahmedabad, Dr Thanvi has been recently awarded "Glory of Gujarat, 2015" by the Hon. Governor of Gujarat. He is also a Fellow of the American College of Cardiology, European Society of Cardiology and the Society for Cardiac Angiography and Interventions. Backed by an experience of more than 25, 000 procedures, Dr Thanvi is a faculty at various National and International Conferences and also conducts regular CMEs for doctors as well as public awareness programs and camps.

Here, Dr Thanvi has been interviewed by **Dr Soham D Bhaduri**. Dr Soham is a medical graduate from Rajiv Gandhi Medical College, Maharashtra, who also takes keen interest in writing on healthcare and medical education.



#### 1 Q. WHAT ARE THE CRITERIA FOR DIAGNOSIS OF HYPERTENSION?

Blood pressure, like height and weight, is a continuous biological variable with no cut-off point separating normotension from hypertension (HT). The definition of hypertension is usually taken as that level of arterial blood pressure associated with doubling of long-term cardiovascular risk.

##### Criteria for diagnosis

- If the clinic BP  $\geq 140/90$  mmHg, offer an ambulatory blood pressure monitoring (ABPM) to confirm.
- When using ABPM to confirm the diagnosis, ensure that at least 2 measurements per hour are taken during the person's usual waking hours. Take average value of at least 14 measurements during the person's usual waking hours to confirm HT.
- When using home blood pressure monitoring (HBPM) to confirm hypertension, ensure that:
  - for each BP recording, 2 consecutive measurements are taken, at least 1 minute apart with the person seated,
  - BP is recorded twice daily, ideally in the morning and evening,
  - BP recording continues for at least 4 days, ideally for 7 days,
  - Discard the measurements taken on the first day and use the average value of all the remaining measurements to confirm a diagnosis of hypertension.

**Table 1. Blood pressure thresholds for definition of hypertension with different types of measurement**

| Types of Measurement | Systolic BP (mmHg) | Diastolic BP (mmHg) |
|----------------------|--------------------|---------------------|
| Clinics              | 140                | 90                  |
| 24-hour ambulatory   | 125                | 80                  |
| Home                 | 135                | 85                  |

Daytime average APBM Or average HBPM during person's usual waking hours are (Table 1):

- People aged < 80 years: <135/85 mm Hg
- People aged >80 years: <145/85 mm Hg.

#### 2 Q. WHAT ARE THE CLINICAL SIGNS AND SYMPTOMS OF HT?

Uncomplicated HT is usually asymptomatic and many of the symptoms often attributed to HT such as headache, tinnitus, dizziness and fainting are probably psychogenic in origin. Even if not totally asymptomatic, hypertension can go unrecognized for years because overt symptoms and signs generally coincide with the onset of target organ damage.

#### 3 Q. WHAT IS THE IDEAL METHOD OF MEASURING BLOOD PRESSURE?

##### Condition of the patient

##### Posture

- Sitting pressures are usually adequate for routine

measurement of blood pressure. Patients should sit quietly with back supported for 5 minutes, with arm bared and supported at the level of the heart.

- In patients aged  $\geq 65$  years, diabetic or receiving antihypertensive therapy, check for postural changes by taking readings 1 and 5 minutes after patient stands up.

### *Circumstance*

- A quiet, warm setting is required.
- No caffeine, smoking or alcohol for preceding 30 minutes.
- Question about the most recent meal or evacuation of bowels or bladder. Distended abdominal viscera cause blood pressure elevation presumably because of anxiety, sympathetic stimulation and pain. Older persons typically have lower blood pressure post-prandially.
- No exogenous adrenergic stimulants e.g., nasal decongestants or eye drops for papillary dilatation.
- Home readings under varying circumstances and 24-hour ambulatory readings may be preferable.

### *Equipment*

**Cuff size.** The bladder size (six sizes available) should encircle at least 80% of the arm circumference and cover two thirds of the arm length; if not, place the bladder over the brachial artery. If bladder is too small, spuriously high readings may result. The lower edge of the bladder should be within 2.5 cm of the antecubital fossa.

**Manometer.** Mercury, aneroid or electronic devices used in measurement of blood pressure should be calibrated frequently and routinely against standards (typically every 6 months) to assure accuracy. Ensure that the equipment used is in working order: clean, calibrated, filled with non-leaking tubing and has a properly sized cuff.

**Ultrasonic.** For infants use ultrasonic equipment e.g., Doppler method.

### **Technique and precautions**

#### *Number of readings*

- On each occasion, take at least 2 readings separated by as much time as is practical. If readings vary by more than 5 mmHg, take additional readings until 2 or more are reading are close. Multiple measurements should be taken in patients with irregular pulse (e.g., atrial fibrillation) and in older patients with systolic hypertension.
- For diagnosis, obtain at least two sets of readings at least a week apart. Although it is traditional to average blood pressure measurements at a given visit, recent guidelines state that recording individual blood pressure measurements with the lowest reading in any position (including standing) to be considered as the “blood pressure taken at that visit”.
- Initially, take blood pressure in both arms. If pressure differs by  $>10/5$  mmHg, use arm with higher pressure.

- If arm pressure is elevated, take pressures in one leg.

### *Performance*

- Inflate the bladder quickly to a pressure of 20 mmHg above systolic as recognized by disappearance of the radial pulse. Important diagnostic information will be missed if the “auscultatory gap” is not detected.
- Deflate the bladder 3 mmHg every second. At least one Korotkoff sound should be heard at each 2 mmHg gradation of the mercury column.
- Record the Korotkoff phase V (disappearance) except in children in whom use of phase IV (muffling) may be preferable.
- If Korotkoff sounds are weak, ask the patient to raise the arm and then to open and close the hand 5–10 times, after which the bladder should be inflated quickly.
- Listen over the brachial artery by using the bell of the stethoscope with minimal pressure exerted on the skin. At the conclusion of blood pressure measurement, there should be no lasting indentation in the area where the stethoscope was placed. Too great pressure with the stethoscope overestimates the systolic blood pressure and underestimates the diastolic blood pressure.

### *Recordings*

- Note the pressure, patient position, the arm used and cuff size (e.g., 140/90, seated, right arm, large adult cuff).
- Clinic blood pressure measurements taken by trained professionals should be the blood pressure used for diagnosing and treating hypertension in all but a few special situations.

## 4 Q. HOW IS HT CLASSIFIED?

As per Indian guidelines on hypertension-III – 2013, the classification of hypertension is as depicted in **Table 2**.

## 5 Q. WHAT IS HOME BLOOD PRESSURE MONITORING (HBPM)? HOW IS IT MEASURED?

Home readings of BP tend to be better correlated with both the extent of target organ damage and the risk of future mortality than readings taken at the physician’s clinic. They are also helpful in evaluating symptoms of hypotension particularly if they are intermittent and infrequent.

Home readings are on an average 12/7 mmHg less than clinic measurements, even in normotensive subjects.

### **Technique and precautions**

When giving instruction about self-measurement of blood pressure at home, the following points should be made:

- Advise to use only the validated devices.
- Advise that the patient keep the arm at heart level during measurement.

**Table 2: Classification of Hypertension\***

| Category                              | Systolic (mm Hg) |     | Diastolic (mm Hg) |
|---------------------------------------|------------------|-----|-------------------|
| Optional**                            | <120             | and | <80               |
| Normal                                | <130             | and | <85               |
| High-normal***                        | 130-139          | or  | 85-89             |
| <b>Hypertension***</b>                |                  |     |                   |
| Stage 1                               | 140-159          | or  | 90-99             |
| Stage 2                               | 160-179          | or  | 100-109           |
| Stage 3                               | >180             | or  | >110              |
| <b>Isolated systolic hypertension</b> |                  |     |                   |
| Grade 1                               | 140-159          | and | <90               |
| Grade 2                               | >160             | and | <90               |

\*Not taking antihypertensive drugs and not acutely ill. In addition to classifying stages of hypertension on the basis of average blood pressure levels, clinicians should specify presence or absence of target organ disease and additional risk factors.

\*\*Optional blood pressure with respect to cardiovascular risk is below 120/80 mm Hg. However unusually low readings should be evaluated for clinical significance.

\*\*\*Based on the average of two or more blood pressure readings taken at least on two visits after an initial screening.

Source: Indian guidelines on hypertension-III – 2013. JAPI. 2013 Feb;61(2) suppl.

- Recommend semi-automatic rather than mercury devices to avoid the difficulty of patient instruction and error from hearing problems in elderly individuals.
- Instruct the patient to take measurement when seated after several minutes of rest.
- Inform them that values may differ between measurements because of spontaneous blood pressure variability.
- Avoid requesting an excessive number of measurements; ensure that some of the measurements are made before drugs are taken to provide information on treatment effect

## 6 Q. WHAT IS AMBULATORY BLOOD PRESSURE MONITORING (ABPM)? HOW DOES IT HELP IN DIAGNOSIS OF HT?

Ambulatory BP is usually several mmHg lower than a clinic BP. Clinic values of 140/90 mmHg correspond to 24-hour average values of approximately 125/80 mmHg. Clinical decisions may be based on day, night, or 24-hour mean values, but 24-hour values are preferable. Compared with casual BP measurements, ABPM measurements are a better predictor of LVH, cardiac function and optic, carotid, renal and peripheral vascular damage resulting from elevated blood pressure.

Most normotensive patients and perhaps 80% of hypertensives have at least 10% drop in blood pressure during sleep compared with daytime average (Dippers).

There is about a 3 times increased risk of CV events among those with non-dipping blood pressure or pulse patterns (Non-Dippers).

The following situations are ones in which a better knowledge of what is happening to a patient's blood pressure over 24 hours can lead to different therapeutic decisions:

### Evaluation of newly diagnosed hypertensive patients without target organ damage:

#### Isolated clinic HT (White Coat HT).

Seen in <10% HT patients, it refers to persistently elevated clinic BP readings ( $\geq 140/90$  mmHg at several visits) while ABPM values are normal (<120/80 mmHg). Diagnosis can also be based on HBPM mean values of <135/85 mmHg, after several days recording.

#### Masked HT.

It is the reverse of isolated clinic HT. This refers to individuals with normal clinic BP (<140/90 mmHg) but elevated ABPM values (isolated ambulatory hypertension). These individuals display a greater than normal prevalence of target organ damage.

#### Refractory hypertension.

This may be the result of a genuinely resistant hypertension, non-compliance or an exaggerated white-coat hypertension. The best clue to this exaggerated white-coat effect is a persistently elevated clinic pressure in the absence of target organ damage. Another common cause is the sleep apnoea syndrome. A clue to this may be that although the average BP level and heart rate fall during the night, their variability increases.

### Intermittent symptoms possibly related to blood pressure

Episodes of light-headedness, particularly in patients who are on antihypertensive medication, may be a manifestation of transient hypotension. This can potentially be detected by ABPM.

#### Episodic hypertension.

Episodic symptoms accompanied by transient elevation in BP may occur in a variety of conditions, including pheochromocytoma and panic attacks.

#### Episodic hypotension.

ABPM may be helpful in cases of idiopathic orthostatic hypotension because many patients who are orthostatic during the day are hypertensives during the night (BP remains high at night).

## 7 Q. MENTION THE CUT OFF VALUES FOR VARIOUS CATEGORIES OF HT. WHEN DOES IT MANDATE PHARMACOLOGICAL TREATMENT?

The diagnosis of HT is made only after an elevated and properly measured BP has been confirmed on at least three separate occasions, or if an elevated BP is confirmed by out-of-clinic measurements. Summary

points from the NICE guideline on the management of hypertension in adults in primary care are provided below:

### Stage 1 hypertension.

Clinic BP is 140/90 mmHg or higher and subsequent ABPM daytime average or HBPM average BP is 135/85 mmHg or higher.

### Stage 2 hypertension.

Clinic BP is 160/100 mmHg or higher and subsequent ABPM daytime average or HBPM average blood pressure is 150/95 mmHg or higher.

### Severe hypertension.

Clinic systolic BP is 180 mmHg or higher, or clinic diastolic BP is 110 mmHg or higher.

Stage 1 hypertensives require only therapeutic life-style changes but any patient falling under category of Stage 2 HT or above should receive pharmacological therapy along with life style modification.

## 8 Q. WHICH IS MORE DANGEROUS: SYSTOLIC OR DIASTOLIC HT?

Historically, more emphasis has been placed on diastolic than systolic BP as a predictor of cerebrovascular and coronary artery disease. However, observational data have repeatedly confirmed that both systolic and diastolic BP show a continuously graded, yet independent, relationship with the risk of stroke and coronary events. The relationship between systolic BP and relative risk of stroke is steeper than that for coronary events, which reflects its closer etiological relationship with strokes.

## 9 Q. WHAT IS ISOLATED HT, ACCELERATED HT AND PSEUDO HT?

**Isolated systolic hypertension** is defined as SBP  $\geq$ 140 mmHg and DBP  $<$ 90 mmHg.

**Accelerated hypertension** is characterized by markedly elevated BP (DBP  $>$ 120 mmHg) associated with retinal haemorrhage and exudates (grade 3 Keith Wagener retinopathy). If untreated, it commonly progresses to malignant hypertension, which is characterized by papilloedema (grade 4 Keith Wagener retinopathy).

**Pseudo-hypertension** refers to the uncommon situation where BP measurements by the usual indirect sphygmomanometry are much higher than direct intra-vascular measurements. These differences are usually attributed to very stiff and calcified arteries that are nearly impossible to compress with the bladder in the usual blood pressure cuff.

## 10 Q. HOW SHOULD A GP PROCEED TO MANAGE A FIRST TIME DETECTED HYPERTENSIVE PATIENT AT CLINIC?

Evaluation of hypertension primarily involves accurately measuring the patient's Blood Pressure (BP), performing a focussed medical history and physical examination and obtaining results of routine laboratory studies.

Two aspects of the initial evaluation of hypertensive adults deserve emphasis:

1. Need for more accurate measurements of BP in the clinic with the addition of out-of-clinic measurements, either by home or ambulatory monitoring.
2. The diagnosis of hypertension in adults is made when the average of two or more DBP measurements on at least two subsequent visits is  $\geq$ 90 mmHg, or when the average of multiple SBP readings on two or more subsequent visits is  $\geq$ 140 mmHg.
3. Patients should be clearly informed that a single elevated reading does not constitute a diagnosis of hypertension but is a sign that further observation is required.
4. Assessment of overall cardiovascular risk (CV) is important, particularly in the large number of patients with prehypertension, in order to establish appropriate management. Tests like 12-lead ECG, USG (KUB), fundoscopy and 2D echocardiography (for left ventricular hypertrophy) should be obtained.

These tests can help determine the:

- Presence of end-organ disease
- Possible causes of hypertension
- Cardiovascular risk factors
- Baseline values for judging biochemical effects of therapy