Hypertension
An 2006’ update on how to choose and prescript the best medications for our patients

Dr. Wong Bun Lap Bernard

Definition and classification of hypertension: ESH/ESC 2003

Hypertension is defined as blood pressure ≥140/90 mmHg

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic (mmHg)</th>
<th>Diastolic (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal</td>
<td>&lt;120</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Normal</td>
<td>120-129</td>
<td>80-84</td>
</tr>
<tr>
<td>High normal</td>
<td>130-139</td>
<td>85-89</td>
</tr>
<tr>
<td>Grade 1 hypertension (mild)</td>
<td>140-159</td>
<td>90-99</td>
</tr>
<tr>
<td>Grade 2 hypertension (moderate)</td>
<td>160-179</td>
<td>100-109</td>
</tr>
<tr>
<td>Grade 3 hypertension (severe)</td>
<td>≥180</td>
<td>≥110</td>
</tr>
<tr>
<td>Isolated systolic hypertension</td>
<td>≥140</td>
<td>&lt;90</td>
</tr>
</tbody>
</table>

When a patient’s systolic and diastolic blood pressures fall into different categories, the higher category should apply.

ESH/ESC Guidelines 2003
J Hypertens 2003:21 1011-1033
### Definition and classification of hypertension: JNC VII

Hypertension is defined as blood pressure \( \geq 140/90 \) mmHg

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic (mmHg)</th>
<th>Diastolic (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>&lt;120</td>
<td>and &lt;80</td>
</tr>
<tr>
<td>Prehypertension</td>
<td>120-139</td>
<td>or 80-89</td>
</tr>
<tr>
<td>Stage 1 hypertension</td>
<td>140-159</td>
<td>or 90-99</td>
</tr>
<tr>
<td>Stage 2 hypertension</td>
<td>( \geq 160 )</td>
<td>or ( \geq 100 )</td>
</tr>
</tbody>
</table>

(\textit{JNC VII, JAMA 2003;289:2560-2572})

### Definition and classification of hypertension: WHO/ISH 1999/2003

Hypertension is defined as blood pressure \( >140/90 \) mmHg

<table>
<thead>
<tr>
<th>Category</th>
<th>Systolic (mmHg)</th>
<th>Diastolic (mmHg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optimal</td>
<td>&lt;120</td>
<td>&lt;80</td>
</tr>
<tr>
<td>Normal</td>
<td>&lt;130</td>
<td>&lt;85</td>
</tr>
<tr>
<td>High-normal</td>
<td>130-139</td>
<td>85-89</td>
</tr>
<tr>
<td>Grade 1 hypertension (mild)</td>
<td>140-159</td>
<td>or 90-99</td>
</tr>
<tr>
<td>Subgroup: borderline</td>
<td>140-149</td>
<td>90-94</td>
</tr>
<tr>
<td>Grade 2 hypertension (moderate)</td>
<td>160-179</td>
<td>or 100-109</td>
</tr>
<tr>
<td>Grade 3 hypertension (severe)</td>
<td>( \geq 180 )</td>
<td>or ( \geq 110 )</td>
</tr>
<tr>
<td>Isolated systolic hypertension</td>
<td>( \geq 140 )</td>
<td>&lt;90</td>
</tr>
<tr>
<td>Subgroup: borderline</td>
<td>140-149</td>
<td>&lt;90</td>
</tr>
</tbody>
</table>


When a patient's systolic and diastolic blood pressures fall into different categories, the higher category should apply.
Prevalence of hypertension*: North America and Europe

![Graph showing prevalence of hypertension in North America and Europe](image)

Prevalence of hypertension: Asia

![Graph showing prevalence of hypertension in Asia](image)

* BP $\geq$ 140/90 mmHg or treatment with antihypertensive medication


Millimetres matter …

“A 2-mmHg reduction in DBP would result in ... a 6% reduction in the risk of CHD and a 15% reduction in the risk of stroke and TIAs”

DBP, diastolic blood pressure; CHD, coronary heart disease; TIA, transient ischaemic attack


Millimetres matter …

“For individuals 40-70 years of age, each increment of 20 mmHg in systolic BP or 10 mmHg in diastolic BP doubles the risk of CVD across the entire BP range from 115/75 to 185/115 mmHg”

BP, blood pressure; CVD, cardiovascular disease

JNC VII. JAMA 2003;289:2560-2572
Hypertension control rates around the world

<table>
<thead>
<tr>
<th></th>
<th>&lt;140/90 mmHg (%)</th>
<th>&lt;160/95 mmHg (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>27</td>
<td>23</td>
</tr>
<tr>
<td>France</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>Canada</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>Italy</td>
<td>9</td>
<td>19</td>
</tr>
<tr>
<td>Egypt</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>England</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>Korea</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>China</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Poland</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>


National Health and Nutrition Examination Survey (NHANES)

Trends in awareness, treatment and control of high blood pressure in adults aged 18-74*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>51%</td>
<td>73%</td>
<td>68%</td>
<td>70%</td>
</tr>
<tr>
<td>Treatment</td>
<td>31%</td>
<td>55%</td>
<td>54%</td>
<td>59%</td>
</tr>
<tr>
<td>Control†</td>
<td>10%</td>
<td>29%</td>
<td>27%</td>
<td>34%</td>
</tr>
</tbody>
</table>

* High blood pressure defined as SBP ≥140 mmHg or DBP ≥90 mmHg or taking antihypertensive medication
† SBP <140 mmHg and DBP <90 mmHg

Unpublished data for 1999-2000 compiled by M. Wolz, National Heart, Lung and Blood Institute; JNC VI
Goals of treatment: ESH/ESC 2003

- Achieve maximum reduction in total cardiovascular risk
- Treat all reversible risk factors and associated clinical conditions in addition to treating raised blood pressure
- Target blood pressure <140/90 mmHg and to lower values, if tolerated
- For diabetics, target blood pressure is <130/80 mmHg

Goals of treatment: JNC VII

- The SBP and DBP targets are <140/90 mmHg
- The primary focus should be on achieving the SBP goal
- In patients with hypertension and diabetes or renal disease, the BP goal is <130/80 mmHg

SBP, systolic blood pressure; DBP, diastolic blood pressure; BP, blood pressure


JNC VII. JAMA 2003;289:2560-2572
Goals of treatment: WHO/ISH 2003

- In hypertensive patients at low to medium risk*, the SBP goal is <140 mmHg
- In hypertensive patients at high risk*, a target of <130/80 mmHg is appropriate

* Risk of developing a major cardiovascular event (fatal and nonfatal stroke, and myocardial infarction)

SBP, systolic blood pressure

2 Important Directions

1. Life-Style Management
2. Medical Therapy
Life-Style Management
A to E

A – Alcohol moderation
B – Benign emotion
C – Cigarettes
D - Diet
E – Exercise

Medical Therapy

2 points worth to remember on starting Anti-HT medications:
1. When SBP ≥ 140 &/or DBP ≥ 90 mmHg
2. Detailed discussion with patient and their family on (preferably with booklets)
   • Definition of hypertension
   • Complications & prognosis of hypertension
   • The choices, cost, benefit, potential side-effects & the importance of compliance on medications
8 Considerations on Anti - HT Medications

1. Compelling Indications
2. QD → 24 Hours smooth release
3. Single tablet
4. Small doses combination
5. Combination pills
6. Side effects
7. Start Slow – no need to be too hurry
8. Cost - a real life efficient free market

Factors influencing BP control

- Efficacy
- Adverse effects
- Convenience
**Hypertension treatment strategy: ESH/ESC 2003**

**Consider:**
- Untreated BP level
- Presence or absence of TOD and risk factors

**Choose between:**

- Single agent at low dose
- Two-drug combination at low dose

- If goal BP not achieved
  - Previous agent at full dose
  - Switch to different agent at low dose
  - Previous combination at full dose
  - Add a third drug at low dose

- If goal BP not achieved
  - Two- to three-drug combination
  - Full-dose monotherapy
  - Three-drug combination at effective doses

BP, blood pressure; TOD, target organ damage

**Hypertension treatment strategy: JNC VII**

**Without compelling indications**

**Stage 1 hypertension**
(SBP 140-159 or DBP 90-99 mmHg)
Thiazide-type diuretics for most. May consider ACE-I, ARB, BB, CCB or combination

**Stage 2 hypertension**
(SBP ≥160 or DBP ≥100 mmHg)
Two-drug combination for most (usually thiazide-type diuretic and ACE-I or ARB, or BB, or CCB)

**With compelling indications**

**Drug(s) for the compelling indications**
Other antihypertensive Drugs (diuretics, ACE-I, ARB, BB, CCB) as needed

**Lifestyle modifications**

**Not at goal blood pressure (<140/90 mmHg)**
(<130/80 mmHg for patients with diabetes or chronic kidney disease)

**Optimize dosages or add additional drugs until goal blood pressure is achieved.**
Consider consultation with hypertension specialist.

SBP, systolic blood pressure; DBP, diastolic blood pressure; ACE-I, angiotensin converting enzyme inhibitor; ARB, angiotensin II receptor blocker; BB, beta-blocker; CCB, calcium-channel blocker

JNC VII. JAMA 2003;289:2560-2572
### The BHS recommendations for combining blood pressure-lowering drugs

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4 Resistant hypertension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Younger (eg &lt;55 years) and non-black</td>
<td>Older (eg ≥55 years) or black</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **A**: ACE inhibitor or ARB
- **B**: Beta-blocker
- **C**: Calcium-channel blocker
- **D**: Diuretic (thiazide)

Add: further diuretic, alpha-blocker or beta-blocker

---

### 4 Major Classes of Medications A to D

- **A**: ACEI/ARB, Alpha-Blocker
- **B**: Beta-Blockers
- **C**: Calcium Channel Blockers
- **D**: Diuretics
## A - ACEI

**ACEI**
- Acertil (Perindopril) 2-8mg QD
- Tritace (Ramipril) 2.5-10mg QD
- Zestril (Lisinopril) 5-20mg QD

## A - ARB

**ARB**
- Aprovel (Irbesartan) 75-300mg QD
- Blopress (Candesartan) 4-16mg QD
- Cozaar (Losartan) 25-100mg QD
- Diovan (Valsartan) 40-160mg QD
- Olmetec (Olmesartan) 20-40mg QD
- Micardis (Telmisartan) 40-80mg QD
A - Alpha Blockers
Cardura XL (Doxazosin) 4 – 8mg QD

B - Beta-blockers
Betaloc Zok (Metoprolol) 25-200mg QD
Concor (Bisoprolol) 1.25-10mg QD
Dilatrend (Carvedilol) 3.125-25mg BD
C – Calcium Channel Blockers (dihydropyridine group)

- Norvasc (Amlodipine) 2.5-10mg QD
- Plendil (Felodipine) 2.5-10mg QD

D - Diuretics

- Natrilix SR (Indapamide) 1.5mg QD
Combination Pills

A + D → ACEI + Diuretics

- Predonium
  - Acertil (Perindopril) 2mg + Natrilix (Indapamide) 0.625mg

Combination Pills

A + D → ARB + Diuretics (hydrochlorothiazide)

- Co-Approval 150 /300 + 12.5
- Blopress Plus 8 + 12.5
- Co-Diovan 80/160 + 12.5
- Hyzaar 50/100,
  - Hyzaar Forte 12.5/25
- Micardis Plus 40 + 12.5
Combination Pills

B + D →
Beta-Blocker + Diuretics (hydrochlorothiazide)
- Lodoz (Bisoprolol) 2.5mg/6.25mg
- Betaloc Comp (Metoprolol) 100mg/12.5mg

Combination Pills

B + C →
Beta-blocker+Calcium Channel Blocker Logimax
- Betaloc Zok (Metoprolol) 50mg + Plendil (Felodipine) 5mg
NICE June 2006’

- Beta-blocker – no longer a routine initial therapy

  - Less effective in the reduction of CVA
  - Less effective in reducing the risk of diabetes

NICE June 2006’

- Beta-blocker:
  - No longer a routine initial HT drug
  - Only for Patients intolerance to ACEI/ARB
  - Avoid the addition of diuretic to beta-blocker → increase the risk of DM development
  - When withdrawing a beta-blocker, step down the dose gradually
  - Beta-blocker should not be withdrawn in
    - Symptomatic angina
    - Old MI
A fine Sunday afternoon
wake-up
Word of Wisdom

Whatever
THE MIND OF MAN
can
CONCIEVE
and
BELIEVE
it can
ACHIEVE

~ Napoleon Hill (1883-1970)

Q & A

1. According to WHO/ISH 2003, ESC 2003, NICE 2006, the optimal BP is SBP < 120 and DBP < 80mmHg.

True or False
Q & A

2. According to the WHO/ISH 2003, ESC 2003, NICE 2006 guidelines, we can consider anti-hypertensive medications when the SBP is $\geq 140$ and/or DBP $\geq 90\text{mmHg}$

True or False

Q & A

3. According to the NICE 2006 guidelines, beta-blocker is no longer a first line medication

True or False
Q & A

4. According to the NICE 2006 guidelines, ACEI/ARB are the first-line medications for younger patients (<55 years old) and CCB/Diuretics are the first line medications for (≥55 years old) older patients.

True or False

Q & A

5. Detailed discussion with patient and their family on
   - Definition of hypertension
   - Complications & prognosis of hypertension
   - The choices, cost, benefit, potential side-effects & the importance of compliance on medications

is the most important key to success

True or False
Q & A

Questions 1 → 5

Answers: All True