Hypertension is a common global health problem in clinical practice. The 2nd National Survey reported in 1996 by the National Epidemiology Board of Thailand (NEBT) and Thai Health Research Institute (THRI) revealed that the prevalence of hypertension in working group (aged 13-59 years) was 12.9% and in the elderly (aged ≥60 years) was 32.4% (target BP <140/90 mmHg in general population and <130/80 mmHg among diabetic and chronic kidney disease patients). Prompt BP control along with other cardiovascular (CV) risks will result in a marked reduction of stroke and heart attacks. Most efforts were mainly focused on treatment to yield a better outcome. The far more important issues, e.g., prevention and detection of hypertension which are more labourious on top of gaining very little support tasks were almost left behind.

This article was aimed for general practitioners who have no time to catch up with recent development in the field of hypertension. Important information was added in short and their references were included for further studies.

Guidelines in the treatment of hypertension

There were 3 major guidelines which emerged in 2003, i.e., the seventh report of the Joint National Committee on prevention, detection, evaluation, and treatment of high blood pressure (JNC-7), the 2003 European Society of Hypertension and European Society of Cardiology Guidelines for the management of arterial hypertension (ESH/ESC), the 2003 World Health Organization International Society of Hypertension statement on management of hypertension (WHO/ISH). Their major differences were summarized (Table 1).

The WHO/ISH guidelines are the most practical one for use. Therefore, the hypertension management guidelines proposed by the Thai Hypertension Society was based on it.

In the near future, normotension (NT) will be lower to <120/80 mmHg, like that proposed by JNC-7 guidelines. This is due to epidemiological studies in men enrolled in Framingham Heart Study which showed that NT (BP 120-129/80-84 mmHg) had a higher cumulative incidence of cardiovascular events than those with optimal BP (BP <120/80 mmHg) but lower than those with high normal BP (BP 130-139/85-89 mmHg) (Fig 1). This will probably lead to a target BP of <120/80 mmHg. However, cost-benefit studies have to be conducted before such a recommendation was introduced.

The importance of home measured BP

There are many ways to measure BP, e.g., office BP (using mainly mercury sphygmomanometers), home BP (using automated oscillometric devices) and 24 hr ambulatory BP monitoring (ABPM) which help to obtain average 24 hr BP, daytime BP and nighttime BP. Night-time BP was reported to be most correlated with 11-year risk of CV or all-cause death, followed by 24 hr BP, daytime BP, home BP and office BP gives the least correlation. However, 24 hr ABPM devices are not generally available. Only home BP and office BP measurement can be possibly obtained in clinical practice. Home BP is therefore a better and reliable measurement than office BP. Hence, if there is a discordant value of home BP and office BP, the former should be accepted in the condition that regular validated automated devices were used. Moreover, home BP can replace 24 hr ABPM for the detection of white-coat hypertension (average daytime BP by 24 hr ABPM was <135/85 mmHg while office BP was ≥140/90 mmHg) and masked hypertension (average daytime BP by 24 hr ABPM was ≥135/85 mmHg while office BP was <140/90 mmHg). Both conditions are important in clinical practice. White-coat hypertension will cause unnecessary antihypertensive therapy and might cause a dramatic increase in the incidence of stroke in long term while masked hypertension will have a higher composite risk of cardiovascular mortality and stroke morbidity than normotenive individuals.

The importance of SBP

In the past, DBP received the most attention, evidenced by the earlier guidelines in the management of hypertension and almost always remain the only BP enrollment criteria in lots of antihypertensive drug studies. Further studies on age specific ischemic heart disease mortality correlated with both SBP and DBP. Subsequent epidemiologic data suggested that SBP is far more important than DBP concerning coronary heart disease death rate. Surprisingly, the BP control rate is particularly low for SBP when compared to DBP. Recent trials focused on normalization of SBP rather than DBP. SBP has the most predictive value for vascular death irrespective of age, if only one single measurement of BP is used to predict the risk. A 2 mmHg lower than usual SBP would involve about 10% lower stroke mortality and about 7% lower mortality from IHD or other vascular causes in the middle age.
**TABLE 1.** Comparison of 3 major Guidelines in the management of hypertension.

<table>
<thead>
<tr>
<th>JNC-7</th>
<th>WHO/ISH</th>
<th>ESH/ESC</th>
</tr>
</thead>
<tbody>
<tr>
<td>NT &lt;120/80</td>
<td>-</td>
<td>Optimal &lt;120/80</td>
</tr>
<tr>
<td>Pre-HT 120-139 and/or 80-89</td>
<td>-</td>
<td>NT &lt;130/85</td>
</tr>
<tr>
<td>HT stage 1 140-159 and/or 90-99</td>
<td>-</td>
<td>High normal 130-139 and/or 85-89</td>
</tr>
<tr>
<td>HT stage 2 ≥160 and/or ≥100</td>
<td>-</td>
<td>HT grade I 140-159 and/or 90-99</td>
</tr>
<tr>
<td></td>
<td>Risk assessment</td>
<td></td>
</tr>
<tr>
<td>nil</td>
<td>3 strata</td>
<td>5 strata +/-SCORE</td>
</tr>
<tr>
<td>BP targets (mmHg)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;140/90</td>
<td>SBP &lt;140</td>
<td>&lt;140/90 lower if tolerated</td>
</tr>
<tr>
<td>DM/CKD&lt;130/80</td>
<td>DM/CKD/CVD &lt;130/80</td>
<td>DM &lt;130/80</td>
</tr>
<tr>
<td>Diuretic</td>
<td>Low dose diuretic</td>
<td>Any of 5 drug classes</td>
</tr>
<tr>
<td></td>
<td>1st line treatment</td>
<td>(ACE-I, ARB, BB, CA, diuretics)</td>
</tr>
<tr>
<td>2 drug combination</td>
<td>Compelling indication for others</td>
<td>2 drug combination</td>
</tr>
<tr>
<td>Compelling indication for others</td>
<td></td>
<td>Compelling indication for others</td>
</tr>
</tbody>
</table>


**Metabolic syndrome**

Metabolic syndrome (MS) is a cluster of interrelated common clinical disorders, including obesity, insulin resistance, glucose intolerance, hypertension and dyslipidemia (hypertriglyceridemia and low HDL-cholesterol levels). Criteria to diagnose this condition was recently reviewed and proposed by the International Diabetic Federation (IDF) in 2005.

**New Criteria for Metabolic Syndrome**

According to the new IDF definition, for a person to be defined as having the metabolic syndrome (MS) they must have:

- Central obesity (defined as waist circumference ≥ 90 cm for Asian men and ≥ 80 cm for Asian women, with ethnicity specific values for other groups).
- Plus any two of the following four factors:
  - Raised TG level: >150 mg/dL (1.7 mmol/L), or specific treatment for this lipid abnormality;
  - Reduced HDL cholesterol: <40 mg/dL (0.9 mmol/L) in males and <50 mg/dL (1.1 mmol/L) in females, or specific treatment for this lipid abnormality;
  - Raised blood pressure: systolic BP ≥ 130 or diastolic BP ≥ 85 mmHg, or treatment of previously diagnosed hypertension;
  - Raised fasting plasma glucose (FPG) ≥ 100 mg/dL (5.6 mmol/L), or previously diagnosed type 2 diabetes.

If above 5.6 mmol/L or 100 mg/dL, OGTT is strongly recommended but is not necessary to define presence of the syndrome.

**Fig 1.** The cumulative incidence of cardiovascular events in men enrolled in Framingham Heart Study with initial blood pressure classified as optimal (below 120/80), normal (120-129/80-84), or high-normal (130-139/85-89) over a 12-year follow up. (Modified form Vasan RS, Larson MG, Leip EP, et al. Impact of high-normal blood pressure on the risk of cardiovascular disease. N Engl J Med 2001; 345: 1291-7.)

**Fig 2.** Office, home, 24-hour, daytime, and nighttime systolic (S) and diastolic (D) BP as predictors of 11-year risk of cardiovascular or all-cause deaths.
There is a considerable amount of evidence that showed the interrelationship between visceral abdominal fat and insulin resistance. Visceral fat tissue, in addition to its role as an energy storage depot, elaborates endocrine hormones including leptin, cytokines, and other metabolic mediators. Excess adiposity is associated with the release of inflammatory adipokines, also mediate increases in fibrinogen and plasminogen activators (PAI)-I levels. These factors may contribute to an increase in the level of C-reactive protein, a marker of inflammation, and a recently recognized CV risk factors. Using the criteria of The National Cholesterol Education Program Adult Treatment Panel III (NCEP-ATP III), the prevalence of MS in US adults ≥ 20 years of age was recently estimated to be 23.7%, and the prevalence increased with age, reaching 43.5% and 42.1% for those 60-69 and ≥ 70 years of age, respectively. A significant positive association was found between the presence of MS and myocardial infarction and stroke.

Obese hypertensive patients should receive much attention and be scrutinized whether they have metabolic syndrome. Plans of management for these patients include:

A) Therapeutic lifestyle changes to reduce obesity and physical inactivity:
- Dietary restriction of calories, simple carbohydrates, and saturated fat;
- Regular aerobic exercise;
B) Pharmacologic therapy to treat associated risk factors:
- Dyslipidemic drugs e.g. nicotinic acid, fibrates, statins, ezetimibe;
- Drugs to control body weight e.g. orlistat, sibutramine, endocanabinoid (CB) blocker;
- Antihypertensive drugs, e.g., ACE-I, ARB, α-blocker;
- Insulin sensitizing drugs, e.g., thiazolidinediones, metformin.

**Beyond BP lowering effect of antihypertensive agents**

It was shown in many studies that high dosages of antihypertensive agents can protect organ damage, e.g., ATLAS (Assessment of Treatment with Lisinopril and Survival) compared the effect of low dose (2.5 or 5 mg/d) with high dose (up to 30 mg/d) of lisinopril on mortality and morbidity in patients with congestive heart failure, EUROPA (EUEuropean trial on Reduction Of cardiac events with Perindopril in stable coronary Artery disease) compared perindopril high dose (8 mg/d) with placebo in reducing cardiovascular risk in patients with stable coronary artery disease without clinical heart failure, IRMA-II (Irbesartan Microalbuminuria II trial) compared the renoprotective effect of irbesartan low dose (150 mg/d) and high dose (300 mg/d) with placebo in hypertensive, type 2 diabetic patients with microalbuminuria and LIFE (Losartan Intervention For Endpoint reduction in
hypertension) compared the long term effects of losartan (up to 100 mg/d) with atenolol (up to 100 mg/d) on cardiovascular mortality and morbidity in hypertensive patients with left ventricular hypertrophy (LVH), and on regression of LVH. In addition, certain drugs may not elicit much antihypertensive effects but they were meant for organ protection, e.g., ACE-I and ARB in diabetic patients, etc.

The sooner BP control, the better outcome

BP has to be controlled to target in a considerable short period of time, otherwise lesser effect on cardiovascular outcome will result. More people will have the events before their BP’s were controlled to target, e.g., VALUE study (Valsartan Antihypertensive Long-term Use Evaluation) in high-risk hypertensive patients. However, regarding the control BP in the elderly, this should be done gently in weeks, not in days.

New coming antihypertensive drugs

There are two new drug classes now available in the market, i.e., renin inhibitors, e.g., aliskiren, etc., and an aldosterone antagonist analogue, e.g., eplerenone. Both drugs interfere with the renin angiotensin aldosterone system (Diagram 1). Eplerenone produces less pharmacological and side effects in particular, than spironolactone.

CONCLUSION

In dealing with hypertensive patients, general practitioners should know epidemiologic data as much as possible, obtain recent information regularly and follow those outcome studies conscientiously. They should also apply what they have learnt in clinical practice wisely. This will definitely bring benefits to their patients.

REFERENCES


18. Dandona P, Ajlada A, Chaudhuri A. The potential influence of inflammation and insulin resistance on the pathogenesis and treatment of athero...

1. What is (are) the major difference (s) of JNC 7 and other guidelines in the treatment of hypertension?
   A. Normotensive BP level
   B. New definition of prehypertension
   C. There were only 2 stages of hypertension
   D. 2 and 3
   E. 1, 2 and 3

2. Which BP measurement is best correlated with cardiovascular death?
   A. Nighttime BP
   B. Daytime BP
   C. 24 hr BP
   D. Home BP
   E. Office BP

3. Which component of BP is best correlated with coronary heart disease? (SBP-systolic blood pressure, DBP-diastolic blood pressure, PP-pulse pressure)
   A. SBP > DBP > PP
   B. DBP > SBP > PP
   C. PP > SBP > DBP
   D. PP > DBP > SBP
   E. SBP > PP > DBP

4. Which is not correct as individual criteria of metabolic syndrome proposed by IDF 2005?
   A. Central obesity waist circumference ≥ 90 cm in Asian men and ≥ 80 cm in Asian women
   B. Raised serum triglyceride level >150 mg/dL
   C. Reduced serum HDL-cholesterol <40 mg/dL in males and <50 mg/dL in females
   D. Raised blood pressure: SBP ≥ 140 mmHg or diastolic BP ≥ 90 mmHg
   E. Raised fasting plasma glucose ≥ 100 mg/dL

5. What is the major study which showed that the sooner BP control, the better clinical outcome?
   A. ATLAS (Assessment of Treatment with Lisinopril and Survival)
   B. EUROPA (European trial on Reduction Of cardiac events with Perindopril in stable coronary Artery disease)
   C. IRMA-II (Irbesartan Microalbuminuria II trial)
   D. LIFE (Losartan Intervention For Endpoint reduction in hypertension)
   E. VALUE study (Valsartan Antihypertensive Long-term Use Evaluation)