Module 7  Drug Treatment for People with Hypertension

Treatment algorithm

Drug treatment for essential HT

Compelling indication / contraindication over choice of drug

Yes
Go to Appendix 1

No

Start with either ACEI (or ARB if ACEI intolerant),
calcium channel blocker or thiazide-type diuretic

● No response or not tolerated, switch to another drug
● Inadequate response but tolerated, add a second drug from different class

If blood pressure goal is still not reached, increase dose or consider adding third drug from different class

Refer to specialist if blood pressure still not under control

Choices of antihypertensive drugs and goals of therapy

The ultimate goal of anti-hypertensive therapy is to reduce cardiovascular morbidity and mortality. There are excellent clinical outcome trial data proving that lowering blood pressure with different classes of anti-hypertensives, including angiotensin converting enzyme inhibitors (ACEIs), angiotensin receptor blockers (ARBs), beta-blockers (BBS), calcium channel blockers (CCBs), and thiazide-type diuretics, will all reduce the complications of hypertension.\cite{4,6,11,14}  It should be emphasized that the perceived risk reduction was directly proportional to blood pressure reduction rather than the drug class used to achieve it,\cite{1}  although different drug classes were recognized to have unique benefits specific to individual patient populations.\cite{28}
It has also shown that the lower the blood pressure the better, and that this should be the primary objective of any treatment strategy.\textsuperscript{1} Therefore it is important to treat in order to reach the target blood pressure levels whichever drug(s) is/are used\textsuperscript{1}, i.e. for uncomplicated hypertensive patients, treating SBP and DBP to targets <140/90mmHg, or to 130/80mmHg or lower if tolerable. In patients with co-morbidities of diabetes or renal disease, the blood pressure target is <130/80mmHg. While for patients with coronary artery disease, the blood pressure should be lowered slowly, and caution is advised in inducing falls of diastolic blood pressure below 60 mmHg if the patient also has diabetes mellitus or is over the age of 60 years.\textsuperscript{25}

Within the array of available agents, the choice of drugs will be influenced by many factors, including:

1. The previous, favourable or unfavourable, experience of the individual patient with a given class of drugs.
2. The cost of drugs, either to the individual patient or to the health care provider, although cost considerations should not predominate over efficacy and tolerability in any individual patient.
3. The presence of target organ damage, renal disease, diabetes or the presence of other coexisting cardiovascular disease that may either favour or limit the use of particular classes of antihypertensive drugs.\textsuperscript{25} Approach to patients with compelling indications is described in Appendix 1.
4. A significant number of patients require two or more anti-hypertensive drugs in order to achieve blood pressure control.\textsuperscript{2,3} The possibility of interactions with drugs used for other conditions present in the patient.
5. There is substantial inter-individual variation in response to single drugs with large absolute falls in some patients, contrasting with little or no response in others.\textsuperscript{26}

The family doctor should tailor the choice of drugs to the individual patient, after taking all these factors into account.
With reference to the UK and US guidelines, the rationales on selecting different classes of drugs for uncomplicated hypertensive patients are introduced below.

**Thiazide-type diuretics**
Thiazide-type diuretics have been widely studied and shown to be the drug most likely to confer benefit as first-line treatment for most patients. In these trials, including ALLHAT thiazide-type diuretics had significantly prevented the cardiovascular complications of hypertension. Thiazide-type diuretics are generally well tolerated and have good blood pressure lowing effect in particular older patients. Thiazide-type diuretics are also more affordable than other antihypertensive agents and are recommended as the initial therapy for most patients with hypertension by US guideline.

**Angiotensin-converting enzyme inhibitors (ACEI)/ Angiotensin II Receptor Antagonists (ARB)**
It was demonstrated that younger patients and Caucasians tend to have higher serum renin levels than those older patients and the black population, and thus should have better response to ACEI/ ARB which inhibit the renin-angiotensin system. ACEI/ ARB is recommended by the UK guideline as the initial drug choice for people aged <55. Apart from younger patients, ACEI/ ARB are also the drug of choice for patients with heart failure, left ventricular dysfunction, myocardial infarction, ischemic heart disease, diabetic nephropathy, microalbuminuria or history of stroke.

**Calcium Channel Blockers (CCB)**
Data showed that the blood-pressure lowering effect of CCB is good in most patients. It is well tolerated in general. Clinical trial data also proved that lowering BP with CCB reduces the complications of hypertension. It is the most commonly used anti-hypertensive medication by private doctors in Hong Kong.
**Beta-blocker**

The decision not to recommend Beta-blockers for first line therapy is based on evidence from head-to-head trials\(^{19,20,21,22}\) that beta-blockers were less effective than the comparator drug at reducing major cardiovascular events, in particular stroke. An additional concern is the increased risk of developing diabetes, particular with the combination of thiazide-type diuretic. However, beta-blockers may be considered in younger people, particularly\(^{24}\):

- for those with an intolerance or contraindication to ACE inhibitors and angiotensin-II antagonists or
- for women of child-bearing potential or
- for patients who have previously had a heart attack, angina, heart failure or an irregular heart beat
## Appendix 1

### Compelling and Possible Indications and Contraindications for the Major Classes of Antihypertensive Drugs

<table>
<thead>
<tr>
<th>Class of Drug</th>
<th>Compelling Indications</th>
<th>Possible Indications</th>
<th>Compelling Contraindications</th>
<th>Possible Contraindications</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE Inhibitors (ACEI)</td>
<td>Heart failure, Left ventricular dysfunction, Post myocardial infarction, Diabetic nephropathy</td>
<td>Proteinuric renal disease</td>
<td>Pregnancy, Bilateral renal artery stenosis, Hyperkalaemia</td>
<td>Renal impairment</td>
</tr>
<tr>
<td>Angiotensin II Receptor Blockers (ARB)</td>
<td>ACE inhibitor intolerance</td>
<td></td>
<td>Pregnancy, Bilateral renal artery stenosis, Hyperkalaemia</td>
<td>Renal impairment</td>
</tr>
<tr>
<td>Alpha-Blockers</td>
<td>Benign prostatic hypertrophy</td>
<td></td>
<td></td>
<td>Orthostatic hypotension</td>
</tr>
<tr>
<td>Beta-Blockers</td>
<td>Angina, Post myocardial infarction, Tachyarrhythmias</td>
<td>Heart failure (low dose)</td>
<td>Asthma, chronic obstructive pulmonary disease, Heart block</td>
<td>Peripheral vascular disease</td>
</tr>
<tr>
<td>Calcium Channel Blockers (dihydropyridine)</td>
<td>Elderly patients, Isolated systolic hypertension</td>
<td>Angina, Peripheral vascular disease</td>
<td></td>
<td>Congestive heart failure</td>
</tr>
<tr>
<td>Calcium Channel Blockers (rate limiting, e.g. verapamil, diltiazem)</td>
<td>Angina</td>
<td>Heart block</td>
<td>Congestive heart failure, combination with beta-blockers</td>
<td></td>
</tr>
<tr>
<td>Thiazide/ thiazide-like Diuretics</td>
<td>Heart failure, Elderly patients, Isolated systolic hypertension</td>
<td>Gout</td>
<td>Dyslipidaemia, Pregnancy, Sexually active males</td>
<td></td>
</tr>
</tbody>
</table>
Reference:


