

specific isotopes that localize to chromaffin tissue is occasionally needed to identify smaller tumors and paragangliomas.

Treatment of these tumors is by surgical resection. Patients must receive adequate preoperative management with α -blockade followed by β -blockade and volume expansion to prevent the hemodynamic swings that can occur during surgical manipulation of the tumor. For unresectable tumors, chronic therapy with the α -adrenergic blocker phenoxybenzamine is usually effective.

Pheochromocytoma is a great masquerader, and the large differential diagnosis includes causes of neurogenic hypertension such as sympathomimetic agents (e.g., cocaine, methamphetamine), baroreflex failure, and obstructive sleep apnea. A history of surgery and radiation therapy for head and neck tumors suggests the possibility of baroreceptor damage. Loud snoring, obesity, and somnolence suggest obstructive sleep apnea. Weight loss, continuous positive airway pressure, and corrective surgery improve BP control in some patients with sleep apnea.

Other causes of secondary hypertension include nonsteroidal anti-inflammatory drugs (NSAIDs), hypothyroidism, hyperthyroidism, coarctation of the aorta, and immunosuppressive drugs, especially cyclosporine and tacrolimus.

TREATMENT OF HYPERTENSION

Prescription medication is the cornerstone for treatment of hypertension. Lifestyle modification should be used as an essential adjunct but not as an alternative to life-saving BP pharmacotherapy. Most dietary sodium comes from processed foods, and daily salt consumption can be reduced from 10 to 6 g by teaching patients to read food labels (6 g of NaCl = 2.4 g of Na⁺ = 100 mmol of Na⁺). The Dietary Approach to Stop Hypertension (DASH) diet, which is rich in fresh fruits and vegetables (for high potassium content) and low-fat dairy products, has been shown to lower BP in feeding trials. Other lifestyle modifications that can lower BP include weight loss in overweight patients with hypertension, regular aerobic exercise, smoking cessation, and moderation in alcohol intake.

The list of drugs marketed for the treatment of hypertension in the United States is shown in Table 12-6. Major contraindications and side effects of these drugs are summarized in Table 12-7. The following sections describe which drugs should be used for which groups of patients.

Patients with Uncomplicated Hypertension

Current guidelines (Figure 12-11) recommend blood pressure goals of less than 150/90 mm Hg for elderly patients and less than 140/90 mm Hg for most other patients. Some experts recommend the goal of less than 140/90 mm Hg in patients older than 60 years if they are not frail and are able to tolerate such treatment without side effects. Multiple guidelines recommend initiating drug treatment with one or more of three classes of first-line drugs, which have additive or synergistic effects when used in combination: (1) CCBs, (2) renin-angiotensin system blockers—either ACE inhibitors or ARBs, and (3) thiazide diuretics.

The European Society of Hypertension makes no specific drug class recommendation, arguing that the most effective drugs are those that the patient can tolerate and will take. Long-term

patient adherence is best with an ARB, intermediate with an ACEI or CCB, and worst with a thiazide. The British Hypertension Society advocates a treatment strategy that is based on the patient's age and ethnicity. It recommends initiating therapy with an ACEI or ARB for younger white patients (<55 years of age), who often have high-renin hypertension, but a CCB or diuretic for older and black patients, who often have low-renin hypertension.

A growing body of evidence from clinical trials emphasizes the overriding importance of lowering BP with combinations of drugs rather than belaboring the choice of a single, best agent to begin therapy. Primary hypertension is multifactorial, and typically several medications with different mechanisms of action (see Table 12-4) are required simultaneously to reach the BP goal. In most patients with hypertension, low-dose combination drug therapy is the only way to control BP adequately while minimizing side effects. With many classes of antihypertensive medications, the dose-response relationship for BP is rather flat. Most of the BP lowering occurs at the lower end of the dose range. However, many of the side effects are steeply dose dependent, becoming problematic mainly at the high end of the clinical dose range. Therefore, low-dose combinations achieve therapeutic synergy and minimize side effects. Fixed-dose combinations reduce pill burden and cost.

One highly effective, well-tolerated combination is a CCB plus an ACEI or ARB. A recent clinical trial demonstrated a large benefit of combination therapy with an ACEI plus a dihydropyridine CCB, compared with the combination of an ACEI plus a thiazide diuretic, in reducing cardiovascular events in high-risk patients (level A evidence). In contrast, the combination of an ARB plus an ACEI (“dual renin-angiotensin system blockade”) should be avoided because it results in deterioration of renal function and increases the risk of hypotension without added cardiovascular benefit (level A evidence).

Kaiser-Permanente of Northern California, a large managed care organization, has increased the control of hypertension among its membership over the last decade from 44% to an astounding 80% by increasing access through walk-in BP checks by medical assistants, establishing registry rounds to identify and contact patients with elevated office BP, and instituting a system-wide simple medication treatment protocol that features once-daily combination therapy.

Along with antihypertensive medication, lipid-lowering medication should be strongly considered as an integral part of most antihypertensive regimens. A sizeable cardiovascular benefit of adding 10 mg of the HMG-CoA reductase inhibitor atorvastatin to antihypertensive therapy was demonstrated in patients older than 60 years of age who had moderate hypertension and an average LDL-cholesterol level of only 130 mg/dL (level A evidence).

Hypertension in African Americans

Hypertension disproportionately affects African Americans. The explanation is unknown, but the dominant importance of environmental factors is indicated by geographic variation in hypertension prevalence among African-origin and European-origin populations. Hypertension is rare among Africans living in Africa and is more prevalent in several European countries than it is in