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Medications for treating hypertension

Doctors once hesitated to prescribe medication until a patient's blood pressure reached 160/100. Anything below that level was deemed "mild hypertension" and not considered dangerous, so many doctors worried that the drugs' potential side effects might outweigh their benefits. These perceptions turned out to be false. Research has firmly established the value of treating stage 1 hypertension (140/90 to 159/99 mm Hg) with drugs, if necessary.

For those with diabetes or kidney disease, medications may be necessary at pressures as low as 130/80. And today, blood pressure can be controlled with lower doses of medications, meaning there is less chance of side effects.

Doctors can choose from an abundant selection of antihypertensive medications, including many preparations that combine one or more drugs. Many newer antihypertensive drugs have a slightly different chemical structure from older drugs but produce nearly identical effects in the body. Others act in entirely different ways. Doctors can tailor treatment to the individual patient and can often prescribe a drug that controls blood pressure, produces few or no side effects, and, hopefully, protects against complications. In addition, it's often possible to use a single medication to treat both the hypertension and accompanying medical problems, like congestive heart failure.

It's also important to understand that no single drug is superior to the others. Blood pressure control is ultimately a numbers game: the value of any antihypertensive drug is judged on an individual basis, depending on how significantly the medication reduces blood pressure for the person who takes it.

Experts recommend starting any antihypertensive drug at the lowest possible dose and gradually increasing it until blood pressure sinks to a normal level. If the drug causes troublesome side effects, it should be replaced with a different medication.

The usual course of treatment for stage 1 hypertension is to begin with one drug and add a second if your blood pressure does not fall to desired levels (usually less than 140/90 mm Hg, or less than 130/80 mm Hg for those with diabetes or chronic kidney disease). You may have to try several medications before you find a drug, or a combination, that works. The treatment for stage 2 hypertension often begins with a two-drug combination. Additional drugs may be added if your blood pressure doesn't drop to an acceptable level. With all stages of hypertension, and even prehypertension, lifestyle changes are also an important component of treatment.

The JNC found that blood pressure can be adequately controlled in most people with hypertension, but many individuals will need two or more medications to get their blood pressure in check. Poor blood pressure control can result if the doctor doesn't encourage lifestyle changes, prescribe adequate doses of medications, or add additional medications as needed.

Fast fact

In the United States, 71% of adults with hypertension don't have their blood pressure under control.

Classes of hypertension drugs

Doctors can choose from several classes of antihypertensive drugs: diuretics, anti-adrenergics, direct-acting vasodilators, calcium-channel blockers, angiotensin-converting enzyme (ACE) inhibitors, and angiotensin-receptor blockers (ARBs). In addition, researchers are testing three potent classes: direct renin inhibitors, endothelin-receptor antagonists, and vasopeptidase inhibitors. With so many choices available, which medication should you and your doctor choose? The JNC recommends that most people with hypertension start with diuretics, but many experts disagree with this advice (see "The right drug for the right person"). In light of the controversy, it's wise to talk to your doctor about which medications are best for you.

Diuretics

Diuretics, commonly called "water pills," are the oldest and least expensive class of drugs used to treat hypertension (see Table 1). They help the kidneys eliminate sodium and water from the body. This process decreases blood volume, so your heart has less to pump with each beat, which in turn lowers blood pressure. Loop diuretics, which act on the part of the kidney tubules called the loop of Henle, block sodium and chloride from being reabsorbed from the tubules into the bloodstream. Thiazide diuretics act on another portion of the kidney tubules to stop sodium from re-entering circulation.

One drawback of diuretics is that they deplete potassium, so if you take these drugs you may need potassium supplements. Doctors sometimes prescribe another type of diuretic, called potassium-sparing, to counteract potassium depletion. However, these drugs can cause dangerously high levels of potassium in some patients.

Diuretics are especially effective for salt-sensitive patients with hypertension and older patients with isolated systolic hypertension. Aside from hypertension, diuretics are often prescribed for fluid retention (edema) caused by heart failure, kidney disorders, liver disease, or premenstrual bloating.

According to the JNC report, diuretics are very effective and underused. The JNC recommends that thiazide diuretics be the initial drug used for most people with hypertension, and suggests that these medications be part of treatment for most individuals taking multiple medications to control their blood pressure.

Common side effects of these drugs include frequent urination, lightheadedness, fatigue, diarrhea or constipation, and muscle cramps. Men may occasionally experience erectile dysfunction. Diuretics can cause gout, a painful form of arthritis caused by the buildup of uric acid in the body, because they elevate blood levels of this substance.

Thiazide diuretics may cause an elevated blood sugar level. In some people, this may be enough to cause diabetes or to make their diabetes worse. Blood sugar levels therefore should be monitored in people taking diuretics for blood pressure control.

Table 1: Diuretics

Class	Generic name	Brand name	Side effects

Thiazide diuretics	chlorothiazide	Diuril	Weakness, confusion, potassium depletion, gout, fatigue, thirst, frequent urination, lightheadedness, muscle cramps, diarrhea or constipation, increased sensitivity to sunlight, allergic reaction in people allergic to sulfa drugs, impotence.
	chlorthalidone	Hygroton	
	hydrochlorothiazide	Esidrix, HydroDiuril, Microzide	
	indapamide	Lozol	
	metolazone	Mykrox, Zaroxolyn	
Loop diuretics	bumetanide	Bumex	Weakness, confusion, potassium depletion, gout, fatigue, thirst, diarrhea or constipation, increased sensitivity to sunlight, allergic reaction in people allergic to sulfa drugs, impotence.
	ethacrynic acid	Edecrin	
	furosemide	Lasix	
	toremide	Demadex	
Potassium-sparing diuretics/ aldosterone-receptor blockers*	amiloride	Midamor	Excessive potassium levels, especially in patients with kidney disease; breast enlargement and erectile dysfunction in men; menstrual irregularities in women.
	spironolactone	Aldactone	
	triamterene	Dyrenium	
	eplerenone	Inspra	Headache, dizziness, diarrhea, fatigue, upset stomach, and breast enlargement or tenderness.
*Note: Potassium-sparing diuretics also directly or indirectly block aldosterone, a hormone that raises blood pressure by causing the kidneys to conserve sodium and water. As a result, these four medications are sometimes also known as aldosterone-receptor blockers. Amiloride (Midamor), spironolactone			

(Aldactone), and triamterene (Dyrenium) also affect other hormones and thus carry some unwanted side effects, such as breast enlargement and impotence in men and menstrual irregularities in women. Eplerenone (Inspra) is the only one of these medications that affects solely aldosterone and not other hormones.

Anti-adrenergics

Anti-adrenergics lower blood pressure by limiting the action of the hormones epinephrine and norepinephrine, thereby relaxing the blood vessels and reducing the speed and force of the heart's contractions. This class includes a variety of different agents that work in slightly different ways (see Table 2).

Peripheral adrenergic-receptor blockers. These drugs work by preventing neurotransmitters from attaching to cells and stimulating the heart and blood vessels. They are divided into two major groups: beta blockers and alpha blockers (see "Receptor blockers: Fooling the body," below).

Beta blockers, which have been used since the 1960s, lock on to cell structures called beta receptors—the same receptors that certain neurotransmitters (primarily epinephrine) normally attach themselves to in order to stimulate the heart. Thus, by preventing the neurotransmitters from activating heart cells, beta blockers cause the heart rate to slow and blood pressure to fall.

Beta blockers come in two varieties: cardioselective and nonselective. Cardioselective beta blockers attach primarily to beta-1 receptors in the heart. Nonselective beta blockers attach not only to beta-1 receptors but also to beta-2 receptors, which are found in the lungs, blood vessels, and other tissues.

Either type of beta blocker can worsen asthma or other chronic lung disorders, but the nonselective agents are potentially more dangerous for people with respiratory problems. Beta blockers can also worsen heart failure in some patients while improving it in others. They can mask the warning signs of hypoglycemia (low blood sugar) in patients with diabetes. The most common side effects of beta blockers are fatigue, depression, erectile dysfunction, shortness of breath, insomnia, and reduced tolerance for exercise.

Alpha blockers are similar in action to beta blockers, but they work on alpha receptors—the sites where neurotransmitters that cause vessel constriction (primarily norepinephrine) attach themselves. Drugs called alpha-1 blockers block alpha receptors in the heart and blood vessels. They may be especially useful for hypertensive patients with high cholesterol. In addition to reducing blood pressure, alpha-1 blockers also reduce "bad" LDL cholesterol levels and increase "good" HDL cholesterol. They may improve insulin sensitivity in patients with glucose intolerance and hyperglycemia (high blood sugar). They are also prescribed for men with benign prostatic hyperplasia, a noncancerous enlargement of the prostate gland, because these drugs relax smooth muscles surrounding the prostate, relieving the constriction of the urethra and easing urine flow.

Side effects of alpha blockers include orthostatic hypotension (a drop in blood pressure upon standing up), heart palpitations, dizziness, nasal congestion, headaches, and dry mouth. These drugs can also cause erectile dysfunction, although not as frequently as some other blood pressure medications.

Receptor blockers: Fooling the body

The discovery of the "lock and key" system of cell communication opened the door to a new world of drug research. The search began with a simple question: why do some cells react to particular chemicals, but not others? The answer is both maddeningly complex and extremely simple.

Chemicals circulating through the blood, such as hormones and neurotransmitters, stimulate cells. At any given moment, a cell may come in contact with hundreds of different chemicals, so it must be selective about which ones it responds to. To do this, cells have special structures on their outer surfaces called receptors. A receptor operates much like a car's ignition switch. Only a chemical with the right molecular configuration (the key) will fit the receptor (the lock) and start up biological activity inside the cell.

Researchers have used their knowledge of this system to formulate drugs that prevent cells from responding to certain substances. Beta blockers, which are used to treat hypertension, are a prime example. At times of stress and during exercise, your nerve cells release the neurotransmitters epinephrine and norepinephrine. When epinephrine attaches to beta receptors on cells in your heart, the heart cells become activated, increasing your heart rate and the strength of your heart's contractions. This raises your blood pressure. But beta blockers attach to the same receptors, because their structure has been carefully designed to fit neatly into the same "lock." With this spot filled, epinephrine and norepinephrine are unable to connect to the receptor, thus breaking the chain of chemical communication that would otherwise stimulate the heart and spark an increase in blood pressure.

Some patients require both alpha and beta blockers to control their blood pressure. The drugs labetalol (Normodyne) and carvedilol (Coreg) have properties of both.

Centrally acting agents. These agents block the neurotransmitters that activate the sympathetic nervous system to increase blood pressure. They include clonidine (Catapres) and methyldopa (Aldomet). Like peripheral nerve-acting agents (see below), they are generally used in combination with other blood pressure medicines. Common side effects include abnormally low blood pressure when standing up, dry mouth, depression, erectile dysfunction, and sedation.

Peripheral nerve-acting agents. These anti-adrenergics (now used far less often because of frequent side effects) deplete the autonomic nerves of norepinephrine, a substance that causes vessels to contract and raises blood pressure. Such drugs are usually prescribed along with other antihypertensives since they are more effective this way. Reserpine (Serpalan) can cause depression, nightmares, nasal stuffiness, and indigestion, while guanethidine (Ismelin) is more apt to bring on orthostatic hypotension and slow the heart rate.

Table 2: Anti-adrenergic drugs

Class	Generic name	Brand name	Side effects
Beta blockers (cardioselective)	atenolol	Tenormin	Wheezing, dizziness, depression, impotence, fatigue, insomnia, decreased HDL cholesterol levels, lower exercise tolerance. Can worsen peripheral vascular disease and heart failure. Abrupt withdrawal may trigger angina or a heart attack in patients with heart disease.
	metoprolol	Lopressor	
	metoprolol extended	Toprol-XL	

	release		
	nebivolol	Bystolic	
Beta blockers (nonselective)	nadolol	Corgard	
	pindolol	Visken	
	propranolol	Inderal, Inderal LA	
	sotalol	Betapace	
	timolol	Blocadren	
Alpha-1 blockers	doxazosin	Cardura	A drop in blood pressure upon standing up, fainting, weakness, heart palpitations, headache, nasal congestion, dry mouth.
	prazosin	Minipress	
	terazosin	Hytrin	
Alpha and beta blockers	carvedilol	Coreg	Wheezing, depression, insomnia, diarrhea, lightheadedness, dizziness, unusual tiredness or weakness, drying of the eyes, erectile dysfunction, headache, dry mouth, nasal congestion, decreased HDL cholesterol levels, lower exercise tolerance, a drop in blood pressure upon standing up, fainting, heart palpitations. Can worsen peripheral vascular disease and heart failure. Abrupt withdrawal may trigger angina or a heart attack in patients with heart disease.
	labetalol	Normodyne, Trandate	
Centrally acting agents	clonidine	Catapres, Catapres-TTS	A drop in blood pressure upon standing up, drowsiness, sedation, dry mouth, fatigue, erectile

	methyldopa	Aldomet	dysfunction, depression, dizziness. Catapres-TTS (a patch) may cause a rash.
Peripheral nerve-acting agents	guanethidine	Ismelin	A drop in blood pressure upon standing up, depression, nasal stuffiness, nightmares. Guanethidine may slow heart rate and reserpine may cause indigestion.
	reserpine	Serpalan	

Direct-acting vasodilators

Direct-acting vasodilators (see Table 3) relax the arteries. They act quickly and are often used in emergencies. However, they can cause fluid retention and tachycardia (fast heart rate), so doctors usually prescribe them in combination with another blood pressure medication that slows heart rate, such as a cardioselective beta blocker. Hydralazine and minoxidil, the direct-acting vasodilators most commonly used to treat hypertension, can cause headaches, weakness, flushing, and nausea. In addition, minoxidil can cause hair growth, fluid retention, and hyperglycemia (increased blood sugar).

Table 3: Direct-acting vasodilators		
Generic name	Brand name	Side effects
hydralazine	Apresoline	Headaches, palpitations, weakness, flushing, nausea. Minoxidil may cause hair growth, fluid retention, and increased blood sugar.
minoxidil	Loniten	

Calcium-channel blockers

Calcium-channel blockers (see Table 4) slow the movement of calcium into the smooth-muscle cells of the heart and blood vessels. This weakens heart muscle contractions and dilates blood vessels, lowering blood pressure. Because calcium-channel blockers also slow nerve impulses in the heart, they are often prescribed for arrhythmias (irregular heartbeat). Common side effects of calcium-channel blockers are headache, edema, heartburn, bradycardia (slow heart rate), and constipation.

Table 4: Calcium-channel blockers		
Generic name	Brand name	Side effects

amlodipine	Norvasc	Headache, dizziness, edema, and heartburn. Nifedipine can cause palpitations. Diltiazem and verapamil can cause constipation and a slowed heartbeat.
diltiazem	Cardizem, Dilacor, others	
felodipine	Plendil	
isradipine	DynaCirc	
nicardipine	Cardene, Cardene SR	
nifedipine	Adalat CC, Procardia XL	
verapamil	Calan, Isoptin, others	

ACE inhibitors

This class of drugs, introduced in 1981, has proved widely effective in treating hypertension. These agents prevent your kidneys from retaining sodium and water by deactivating angiotensin-converting enzyme, which converts inactive angiotensin I to the active angiotensin II. Angiotensin II raises blood pressure by triggering sodium and water retention and constricting the arteries.

ACE inhibitors (see Table 5) reduce blood pressure in most patients and produce fewer side effects than many other antihypertensive drugs. In addition, ACE inhibitors protect the kidneys of people with diabetes and kidney dysfunction and the hearts of people with congestive heart failure.

The most common side effects of these medications are a reduced sense of taste and a dry cough. Rarely, a patient can have difficulty breathing because of a swelling of the lips, tongue, and throat. ACE inhibitors can also cause potassium retention; therefore, people with poor kidney function must use them cautiously. Because these drugs can cause fetal abnormalities, women who are pregnant or trying to get pregnant should not take them.

Table 5: ACE inhibitors

Generic name	Brand name	Side effects

benazepril	Lotensin	Cough, rash, fluid retention, high potassium levels, and loss of taste. May cause low blood pressure and fainting. Can worsen kidney impairment if narrowed arteries feed both kidneys. May cause fetal abnormalities.
captopril	Capoten	
enalapril	Vasotec	
fosinopril	Monopril	
lisinopril	Prinivil, Zestril	
quinapril	Accupril	
ramipril	Altace	

Angiotensin-receptor blockers (ARB)

This class of medication, approved for treating hypertension since 1995, blocks angiotensin II from constricting the blood vessels and stimulating salt and water retention. Because ARBs are highly effective and well tolerated by most people who take them, these medications have become quite popular (see Table 6). They don't produce any of the traditional side effects of other antihypertensive medications, and they're less likely than ACE inhibitors to cause a cough. In addition, like ACE inhibitors, they benefit patients with diabetes, congestive heart failure, or both.

Table 6: Angiotensin-receptor blockers (ARB)

Generic name	Brand name	Side effects
candesartan	Atacand	Muscle cramps, dizziness.
eprosartan	Teveten	
irbesartan	Avapro	

losartan	Cozaar
olmesartan	Benicar
telmisartan	Micardis
valsartan	Diovan

Direct renin inhibitors

These drugs, in development since the 1980s, represent a newer generation of blood pressure medications. Renin inhibitors work, as the name would suggest, by inhibiting the activity of renin, the enzyme largely responsible for angiotensin II levels. In clinical trials, renin inhibitors have proven effective in not only lowering blood pressure, but also keeping blood pressure levels steadier throughout the day. (Fluctuations throughout the day have been linked with heart problems.) One renin inhibitor, aliskiren (Tekturna), was approved by the FDA in 2007. Other drugs in this class are in development.

Table 7: Combination antihypertensive drugs

Class	Generic name	Brand name
Potassium-sparing and thiazide diuretics	amiloride + HCTZ*	Moduretic
	spironolactone + HCTZ	Aldactazide, Spironazide, Spirozide
	triamterene + HCTZ	Dyazide, Maxzide
Alpha blocker and diuretic	prazosin + polythiazide	Minizide
Beta blocker and diuretic	atenolol + chlorthalidone	Tenoretic
	bisoprolol + HCTZ	Ziac

	metoprolol + HCTZ	Lopressor HCT
	nadolol + bendroflumethiazide	Corzide
	propranolol + HCTZ	Inderide, Inderide LA
	timolol + HCTZ	Timolide
ACE inhibitor and diuretic	benazepril +HCTZ	Lotensin HCT
	captopril + HCTZ	Capozide
	enalapril + HCTZ	Vaseretic
	fosinopril + HCTZ	Monopril HCT
	lisinopril + HCTZ	Prinzide, Zestoretic
	moexipril + HCTZ	Uniretic
	quinapril + HCTZ	Accuretic
ARB and diuretic	candesartan + HCTZ	Atacand HCT
	eprosartan + HCTZ	Teveten HCT
	irbesartan + HCTZ	Avalide
	losartan + HCTZ	Hyzaar

	telmisartan + HCTZ	Micardis HCT
	valsartan + HCTZ	Diovan HCT
Calcium-channel blocker and ACE inhibitor	amlodipine + benazepril	Lotrel
	diltiazem + enalapril	Teczem
	felodipine + enalapril	Lexxel
	verapamil + trandolapril	Tarka
Other combinations	methyldopa + HCTZ	Aldoril
	reserpine + chlorothiazide	Diupres
	reserpine + HCTZ	Hydropres
	aliskiren + HCTZ	Tekturna HCT
Calcium-channel blocker and ARB	amlodipine + valsartan	Exforge
	amlodipine + olmesartan	Azor
*HCTZ=hydrochlorothiazide		

Drug combinations

Because having to take several different pills often presents an obstacle for people sticking to their blood pressure treatment program, some of the most common drug combinations are now available in a single pill. Frequently prescribed combination medications include pills in which the diuretic hydrochlorothiazide (HCTZ) is added to a beta blocker such as atenolol or metoprolol or an ACE inhibitor such as benazepril or lisinopril. Some of the most commonly used combination medications are listed in Table 7. (For side effects, see the listings for the individual drugs in the previous tables.)

Tips to help you remember to take your blood pressure medicine

- Take your medicine after you brush your teeth. Keep it with your toothpaste as a reminder.
- Put self-stick notes in visible places to remind yourself.
- Use a weekly pillbox to store your medicines so you can see at a glance whether you've taken the current day's dose.
- Keep your medicine on the nightstand next to your bed to remind yourself to take your evening medications.
- Ask a friend or relative to call your telephone answering machine to remind you to take your medicine; then don't erase the message.
- Establish a buddy system with a friend who also takes a medication each day.

The right drug for the right person

If you can't control your blood pressure by adopting healthier habits such as limiting salt, increasing exercise, and quitting smoking then it's time for medications. Although the JNC recommended thiazide diuretics as the first medications to try, several studies have provided evidence that other drugs might be better choices, especially if you have other health conditions. For instance, diabetes and heart disease often accompany hypertension, and newer drugs, such as ACE inhibitors or ARBs, perform double duty by helping to treat these conditions while lowering blood pressure.

Several major studies have attempted to differentiate among the many categories of hypertension drugs, to determine which are best and under what circumstances. For example, the Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT) examined blood pressure control and cardiovascular events in more than 42,000 men and women, ages 55 and older, who had mild to moderate hypertension. For five years, the participants took one of three drugs: chlorthalidone (a diuretic), amlodipine (a calcium-channel blocker), or lisinopril (an ACE inhibitor).

The findings were reported in 2002 in *The Journal of the American Medical Association*. To many people's surprise, the diuretic seemed to perform as well as or slightly better than the newer drugs in controlling blood pressure and preventing complications such as stroke and heart failure. These results and the low cost of diuretics prompted the JNC to recommend thiazide diuretics as the first line of treatment for most people with hypertension. And a 2005 subgroup analysis of the ALLHAT data found that diuretics were just as effective for people with diabetes as they were for the other study participants.

Even so, the consensus is growing that diuretics are not always the best first choice, especially for people with certain health problems, including diabetes, kidney disease, or heart failure, as evidenced by several studies. The Anglo-Scandinavian Cardiac Outcomes Trial (ASCOT) involved more than 19,000 people with hypertension who were between the ages of 40 and 79. ASCOT was designed to see whether using a combination of two drugs—a calcium-channel blocker (amlodipine) with an ACE inhibitor (perindopril) added, if necessary—was better at preventing heart attack and stroke than the more traditional approach of using a beta blocker (in this case, atenolol) with a thiazide diuretic added, if necessary. As reported in 2005 in *The Lancet*, the researchers found that compared with the older drug combination, the amlodipine-perindopril combination reduced the risk of major cardiac events (such as heart attacks) by an additional 16%, the risk of stroke by an additional 23%, and the risk of dying from cardiovascular disease by an additional 24%.

However, experts have cautioned against interpreting this study as evidence that the newer drugs trump the old. Instead, the picture is more complex. One clear take-home message is that lowering blood pressure in whatever way you can provides real benefits: people who took the calcium-channel blockerâ€“ACE inhibitor combination lowered their systolic blood pressure by an average of 2.7 mm Hg more than people taking the beta blockerâ€“diuretic combination â€” and some experts think that perhaps the blood pressure reduction helps explain the reduction in heart disease risk. Second, the calcium-channel blockerâ€“ACE inhibitor combination significantly lowered the risk of developing diabetes, and may have had other heart-healthy benefits as well â€” a reminder that tackling multiple risk factors at once is good for your heart.

Indeed, this two-pronged message â€” about the value of lowering blood pressure while also reducing diabetes risk â€” was also underscored by the 2004 Valsartan Antihypertensive Long-term Use Evaluation (VALUE) trial. The VALUE trial compared valsartan (an ARB) to the calcium-channel blocker amlodipine in order to determine which was better at reducing the risk of cardiovascular events such as heart attack and stroke. The study involved more than 15,000 hypertensive patients ages 50 and older who were at high risk of cardiovascular problems because of underlying disease or a history of heart attack or stroke.

As with the ASCOT trial, the VALUE study results were complicated. On the one hand, the calcium-channel blocker lowered blood pressure more significantly than the ARB, especially initially: in the first few months of the study, amlodipine lowered systolic blood pressure by 4 mm Hg more than valsartan, while beyond six months, the extra decrease in systolic blood pressure was a less dramatic but still significant 2 mm Hg. Amlodipine also significantly reduced the risk of suffering a heart attack. But the people who took valsartan were less likely to develop diabetes. And â€” in a surprise â€” both drugs provided the same protection against actually dying from a heart attack.

Clearly the ASCOT and VALUE studies both underscore the importance of controlling blood pressure to reduce the risk of heart attack and stroke. But these two trials have led experts to question the JNCâ€™s advice to start with thiazide diuretics. It now appears that people should use whatever drug is most likely to work for them, given their other cardiac risk factors. In particular, both the ASCOT and VALUE trials provide additional evidence that reducing your risk of diabetes may also help protect you against cardiac events.

So what do all of these studies mean for you? To put it simply, there is clearly no cookie-cutter approach to protecting yourself from cardiovascular disease. Designing an effective medication program for hypertension is like fitting together the pieces of a jigsaw puzzle. Matching the benefits and side effects of the dozens of available drugs to a particular personâ€™s risk factors, health conditions, and lifestyle considerations is often a trial-and-error process. What may work well for your neighbor or cousin may not be right for you. It may take some time to find a medication that offers you the best blood pressure control with the fewest side effects.

So talk with your doctor about which medications are best for you. The best regimen is one thatâ€™s tailored to your needs and is based on your medical history, any coexisting diseases, your preferences about how and when to take medications, and your concerns about side effects. Some general recommendations for particular subgroups of people, found in the following pages, may also be helpful.

African Americans

Developing healthy habits is particularly important among African Americans because they have higher rates of smoking, obesity, diabetes, and salt sensitivity. They are also more likely to incur complications such as stroke or kidney damage as a result of unchecked hypertension. Diuretics work especially well in this population because of their effectiveness in treating hypertension in patients who are salt-sensitive. On the other hand, ACE inhibitors seem to be less effective at low doses when prescribed as a single medication. Ultimately, many African Americans have such severe hypertension that two or more drugs are needed to bring their blood pressure under control.

Older people

For older people, the JNC recommends thiazide diuretics, either alone or in combination with beta blockers, but calcium-channel blockers are also often used. Older people should not use medications that are prone to cause orthostatic hypotension (a sudden drop in blood pressure upon standing up), such as anti-adrenergics and alpha blockers, because these drugs can lead to fainting and falls, a common cause of hip fractures. Older adults should also avoid combination medications that contain alpha blockers such as labetalol. ACE inhibitors and ARBs may also be appropriate in the elderly because of the high incidence of diabetes.

Can you reduce your need for medication?

Controlling your stress and learning to make healthful lifestyle choices can help lower your blood pressure. But can these steps actually reduce your need to take blood pressure medicine?

To answer this question, investigators conducted a randomized trial to determine the impact of the relaxation response on both blood pressure and the need for medication. (The relaxation response is a physiological state that can be elicited through a variety of mental and physical techniques aimed at reducing stress.) The study involved 122 people ages 55 and over, with systolic blood pressure between 140 and 159 mm Hg, who took at least two antihypertensive medications. Participants were divided into two groups: one that would practice the relaxation response for eight weeks, and one that would receive health education about blood pressure.

After eight weeks, 34 of the people who practiced the relaxation response “a little more than half” had achieved a systolic blood pressure reduction of more than 5 mm Hg, and were therefore eligible for the next phase of the study, in which they could reduce levels of the medication they were taking. During that second phase, 50% were able to eliminate at least one blood pressure medicine, while 35% were able to reduce the dosage of their medication.

People randomized to the health education group also saw improvement, although it was not as dramatic as in the relaxation response group. In the education group, 24 people (a little more than a third of those who started) were able to reduce their blood pressure enough to progress to the second phase of the study. During that second phase, 19% eliminated medication, and 50% reduced their dosage.

The study thus demonstrated that both practicing the relaxation response and undergoing health education can enable some people to reduce systolic pressure by about 10 mm Hg, but those who practiced the relaxation response were more likely to successfully eliminate or reduce their antihypertensive medications. Subsequent studies are planned to examine whether people at risk of developing high blood pressure can use relaxation techniques to stave off full-blown hypertension and the use of medications altogether. While the results of this study are compelling, just remember that any reduction or elimination of medication must be done on your doctor’s recommendation and under his or her supervision.

People with coronary artery disease

People with hypertension complicated by angina often benefit from beta blockers and calcium-channel blockers. The JNC recommends beta blockers for those who have had heart attacks because these medications reduce the risk of having another one.

People with congestive heart failure

Because ACE inhibitors help prevent the progression of heart failure, the JNC recommends these drugs

either alone or in combination with a diuretic” for people who have congestive heart failure and high blood pressure. Beta blockers and ARBs may also be helpful.

People with left ventricular hypertrophy

The JNC found that all antihypertensive drugs except direct-acting vasodilators (hydralazine and minoxidil) reduce left ventricle wall thickness. ACE inhibitors, however, are generally considered to be the most effective. Weight loss and salt restriction are also effective strategies for patients with this condition.

People with kidney disease

All types of antihypertensive drugs are effective in patients with kidney disease, and in many cases more than one type of medication will be needed. People with kidney disease or diabetes respond favorably to ACE inhibitors because these drugs can slow the rate of progression of kidney failure. But ACE inhibitors can promote a dangerous buildup of potassium, especially when taken with nonsteroidal anti-inflammatory drugs (NSAIDs) such as aspirin, ibuprofen, and many prescription painkillers. Consequently, potassium levels and kidney function tests must be closely monitored.

People with chronic kidney failure often develop hypertension because they retain too much sodium and water. Frequently, loop diuretics are required to help control hypertension in these patients, but the JNC cautions that potassium-sparing diuretics can be dangerous.

People with diabetes

ACE inhibitors or ARBs are the preferred choices for patients with diabetes because these drugs slow the rate of kidney disease. Several antihypertensive drugs can be dangerous for people with diabetes. For example, thiazide diuretics may elevate blood sugar levels, and beta blockers can mask the symptoms of hypoglycemia.

People with high cholesterol

If you need medication to control high cholesterol, alpha-1 blockers may slightly reduce your total cholesterol and raise your levels of protective HDL. The harmful effect of some other hypertension medications on blood lipids has raised concern among doctors about prescribing these drugs to people with high cholesterol. Beta blockers can increase triglyceride levels and reduce beneficial HDL. In high doses, thiazide and loop diuretics can raise overall cholesterol levels, increase LDL cholesterol, and triglycerides. Calcium-channel blockers, ACE inhibitors, and ARBs do not affect blood lipids.

People with respiratory disease

Because beta blockers can aggravate symptoms of chronic bronchitis, emphysema, and asthma, they aren't recommended as initial therapy for anyone with these conditions. Most other antihypertensive agents can be used safely for patients with respiratory ailments.

Because many over-the-counter asthma preparations and cold remedies contain vasoconstrictors, which can raise both heart rate and blood pressure, you should consult your doctor before taking these medications.

People with gout

High blood levels of uric acid can trigger gout, a painful joint disorder. Diuretics can increase uric acid levels, making gout attacks more likely. For this reason, diuretics aren't recommended for people with gout unless they take other measures to control their uric acid levels.

Source: https://www.health.harvard.edu/newsletters/Harvard_Womens_Health_Watch/2009/August/Medications-for-treating-hypertension

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