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Hypertension guidelines: Treat patients, not numbers

ABSTRACT

The updated 2017 American College of Cardiology and American Heart Association (ACC/AHA) guidelines for managing hypertension advocate tighter blood pressure control than previous guidelines. This review summarizes the evidence behind the guidelines, discusses the risks and benefits of stricter blood pressure control, and provides our insights on blood pressure management in clinical practice.

KEY POINTS

The 2017 ACC/AHA guidelines lowered the definition of hypertension to 130/80 mm Hg or higher, thereby increasing the number of US adults with hypertension from 31.9% to 45.6%.

For patients with known cardiovascular disease or a 10-year risk of an atherosclerotic cardiovascular disease event of 10% or higher, drug treatment "is recommended" if the average blood pressure is 130/80 mm Hg or higher. For those without cardiovascular disease and at lower risk, drug treatment is recommended if the average blood pressure is 140/90 mm Hg or higher.

A treatment goal of less than 130/80 mm Hg "is recommended" for patients with hypertension and known cardiovascular disease or a 10-year risk of an atherosclerotic cardiovascular disease event of 10% or higher, and "may be reasonable" for those without additional markers of increased cardiovascular risk.

Intensive blood pressure control has the potential to significantly reduce rates of morbidity and death associated with cardiovascular disease, at the price of causing more adverse effects.

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When treating high blood pressure, how low should we try to go? Debate continues about optimal blood pressure goals after publication of guidelines from the American College of Cardiology and American Heart Association (ACC/AHA) in 2017 that set or permitted a treatment goal of less than 130 mm Hg, depending on the population.[1]

In this article, we summarize the evolution of hypertension guidelines and the evidence behind them.

HOW THE GOALS EVOLVED

JNC 7, 2003: 140/90 or 130/80

The seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7),[2] published in 2003, specified treatment goals of:

- < 140/90 mm Hg for most patients
- < 130/80 mm Hg for those with diabetes or chronic kidney disease.

JNC 7 defined hypertension as 140/90 mm Hg or higher, and introduced the classification of *prehypertension* for patients with a systolic blood pressure of 120 to 139 mm Hg or a diastolic blood pressure of 80 to 89 mm Hg. It advocated managing systolic hypertension in patients over age 50. It also recommended lifestyle changes such as the Dietary Approaches to Stop Hypertension (DASH) diet, moderate alcohol consumption, weight loss, and a physical activity plan.

JNC 7 provided much-needed clarity and uniformity to managing hypertension. Since then, various scientific groups have published their own guidelines **(Table 1)**.[1–9]

TABLE 1

Blood pressure guidelines, 2003–2017

Guideline	Published	Blood pressure goals (mm Hg)	Notes
JNC 7[2]	2003	< 140/90 without comorbidity < 130/80 with diabetes mellitus or chronic kidney disease	Introduced the term *prehypertension* Recommended lifestyle modifications
ACC/AHA/CDC[3]	2014	< 140/90	Recommended polytherapy for stage 2 hypertension
JNC 8[4]	2014	< 140/90 for < 60 years old < 150/90 for ≥ 60 years old	Addressed intrapopulation variations, race, and comorbidities
ASH/ISH[6]	2014	< 140/90 for < 80 years old < 150/90 for ≥ 80 years old	Lacked systematic evidence
AHA/ACC/ASH[7]	2015	< 150/90 for > 80 years old < 140/90 with coronary artery disease < 130/80 with comorbidities	
ADA[8]	2017	< 140/90 for adults with diabetes mellitus < 130/80 for younger adults with diabetes mellitus 120–160/80–105 for pregnant patients with diabetes and preexisting hypertension	
ACP/AAFP[9]	2017	< 150 systolic for ≥ 60 years old < 140 systolic for ≥ 60 years old with transient ischemic attack, stroke, or high cardiovascular risk	
ACC/AHA[1]	2017	< 130/80 for general population, older patients (≥ 65 years old), and those with comorbidities	Lowered hypertension classification to 130/80 mm Hg

AAFP = American Academy of Family Physicians; ACC = American College of Cardiology; ACP = American College of Physicians; ADA = American Diabetes Association; AHA = American Heart Association; ASH = American Society of Hypertension; CDC = Centers for Disease Control and Prevention; ISH = International Society of Hypertension; JNC = Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure

ACC/AHA/CDC 2014: 140/90

In 2014, the ACC, AHA, and US Centers for Disease Control and Prevention (CDC) published an evidence-based algorithm for hypertension management.[3] As in JNC 7, they suggested a blood pressure goal of less than 140/90 mm Hg, lifestyle modification, and polytherapy, eg, a thiazide diuretic for stage 1 hypertension (< 160/100 mm Hg) and combination therapy with a thiazide diuretic and an angiotensin-converting enzyme (ACE) inhibitor, angiotensin II receptor blocker (ARB), or calcium channel blocker for stage 2 hypertension (≥ 160/100 mm Hg).

JNC 8 2014: 140/90 or 150/90

Soon after, the much-anticipated report of the panel members appointed to the eighth JNC (JNC 8) was published.[4] Previous JNC reports were written and published under the auspices of the National Heart, Lung, and Blood Institute, but while the JNC 8 report was being prepared, this government body announced it would no longer publish guidelines.

In contrast to JNC 7, the JNC 8 panel based its recommendations on a systematic review of randomized clinical trials. However, the process and methodology were controver-

TABLE 2

JNC 7 and JNC 8 guidelines compared

	JNC 7[2]	JNC 8[4]
Methodology	Nonsystematic literature review by expert committees	Systematic review of randomized controlled trials
Treatment goal (mm Hg)	< 140/90 for most patients < 130/80 for patients with diabetes < 130/80 for patients with chronic kidney disease	< 140/90 for < 60 years old < 150/90 for ≥ 60 years old
Drug therapy	Recommended use of 5 drug classes; thiazide diuretic for initial treatment in most cases	Recommended 4 classes of drugs to be used; thiazide diuretic, angiotensin-converting enzyme inhibitor, angiotensin II receptor blocker, or calcium channel blocker
Special recommendations	Heart failure, postmyocardial infarction, high coronary disease risk, diabetes, chronic kidney disease, and recurrent stroke prevention	Black and nonblack patient groups, chronic kidney disease, and diabetes
Lifestyle recommendations	Based on literature review and expert opinion	Endorsed the evidence-based findings of the Lifestyle Work Group

JNC = Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure

sial, especially as the panel excluded some important clinical trials from the analysis.

JNC 8 relaxed the targets in several subgroups, such as patients over age 60 and those with diabetes and chronic kidney disease, due to a lack of definitive evidence on the impact of blood pressure targets lower than 140/90 mm Hg in these groups. Thus, their goals were:

- < 140/90 mm Hg for patients under age 60
- < 150/90 mm Hg for patients age 60 and older.

Table 2 shows the differences in recommendations between JNC 7 and JNC 8.

Of note, a minority of the JNC 8 panel disagreed with the new targets and provided evidence for keeping the systolic blood pressure target below 140 mm Hg for patients 60 and older.[5] Further, the JNC 8 report was not endorsed by several important societies, ie, the AHA, ACC, National Heart, Lung, and Blood Institute, and American Society of Hypertension (ASH). These issues compromised the acceptance and applicability of the guidelines.

ASH/ISH 2014: 140/90 or 150/90

Also in 2014, the ASH and the International Society of Hypertension released their own report.[6] Their goals:

- < 140/90 mm Hg for most patients
- < 150/90 mm Hg for patients age 80 and older.

AHA/ACC/ASH 2015: Goals in subgroups

In 2015, the AHA, ACC, and ASH released a joint scientific statement outlining hypertension goals for specific patient populations[7]:

- < 150/90 mm Hg for those age 80 and older
- < 140/90 mm Hg for those with coronary artery disease
- < 130/80 mm Hg for those with comorbidities such as diabetes and cardiovascular disease.

ADA 2016: Goals for patients with diabetes

In 2016, the American Diabetes Association (ADA) set the following blood pressure goals for patients with diabetes[8]:

- < 140/90 mm Hg for adults with diabetes
- < 130/80 mm Hg for younger adults with diabetes and adults with a high risk of cardiovascular disease
- 120–160/80–105 mm Hg for pregnant patients with diabetes and preexisting hypertension who are treated with antihypertensive therapy.

JNC 8 relaxed the targets in patients over age 60, or those with diabetes or chronic kidney disease, due to lack of evidence

ACP/AAFP 2017: Systolic 150 or 130

In 2017, the American College of Physicians (ACP) and the American Academy of Family Physicians (AAFP) recommended a relaxed systolic blood pressure target, ie, below 150 mm Hg, for adults over age 60, but a tighter goal of less than 140 mm Hg for the same age group if they have transient ischemic attack, stroke, or high cardiovascular risk.[9]

ACC/AHA 2017: 130/80

The 2017 ACC/AHA guidelines recommended a more aggressive goal of below 130/80 for all, including patients age 65 and older.[1]

This is a class I (strong) recommendation for patients with known cardiovascular disease or a 10-year risk of a cardiovascular event of 10% or higher, with a B-R level of evidence for the systolic goal (ie, moderate-quality, based on systematic review of randomized controlled trials) and a C-EO level of evidence for the diastolic goal (ie, based on expert opinion).

For patients who do not have cardiovascular disease and who are at lower risk of it, this is a class IIb (weak) recommendation, ie, it "may be reasonable," with a B-NR level of evidence (moderate-quality, based on nonrandomized studies) for the systolic goal and C-EO (expert opinion) for the diastolic goal.

Recommended lifestyle changes: weight loss, sodium restriction, DASH diet, exercise, moderate alcohol intake

For many patients, this involves drug treatment. For those with known cardiovascular disease or a 10-year risk of an atherosclerotic cardiovascular disease event of 10% or higher, the ACC/AHA guidelines say that drug treatment "is recommended" if their average blood pressure is 130/80 mm Hg or higher (class I recommendation, based on strong evidence for the systolic threshold and expert option for the diastolic). For those without cardiovascular disease and at lower risk, drug treatment is recommended if their average blood pressure is 140/90 mm Hg or higher (also class I, but based on limited data).

EVERYONE AGREES ON LIFESTYLE

Although the guidelines differ in their blood pressure targets, they consistently recommend lifestyle modifications.

Lifestyle modifications, first described in JNC 7, included weight loss, sodium restriction, and the DASH diet, which is rich in fruits, vegetables, low-fat dairy products, whole grains, poultry, and fish, and low in red meat, sweets, cholesterol, and total and saturated fat.[2]

These recommendations were based on results from 3 large randomized controlled trials in patients with and without hypertension.[10–12] In patients with no history of hypertension, interventions to promote weight loss and sodium restriction significantly reduced blood pressure and the incidence of hypertension (the latter by as much as 77%) compared with usual care.[10,11]

In patients with and without hypertension, lowering sodium intake in conjunction with the DASH diet was associated with substantially larger reductions in systolic blood pressure.[12]

The recommendation to lower sodium intake has not changed in the guideline revisions. Meanwhile, other modifications have been added, such as incorporating both aerobic and resistance exercise and moderating alcohol intake. These recommendations have a class I level of evidence (ie, strongest level) in the 2017 ACC/AHA guidelines.[1]

HYPERTENSION BEGINS AT 130/80

The definition of hypertension changed in the 2017 ACC/AHA guidelines[1]: previously set at 140/90 mm Hg or higher, it is now 130/80 mm Hg or higher for all age groups. Adults with systolic blood pressure of 130 to 139 mm Hg or diastolic blood pressure of 80 to 89 mm Hg are now classified as having stage 1 hypertension.

Under the new definition, the number of US adults who have hypertension expanded to 45.6% of the general population,[13] up from 31.9% under the JNC 7 definition. Thus, overall, 103.3 million US adults now have hypertension, compared with 72.2 million under the JNC 7 criteria.

In addition, the new guidelines expanded the population of adults for whom antihypertensive drug treatment is recommended to 36.2% (81.9 million). However, this represents only a 1.9% absolute increase over the JNC 7 recommendations (34.3%) and a 5.1% absolute increase over the JNC 8 recommendations.[14]

SPRINT: INTENSIVE TREATMENT IS BENEFICIAL

The new ACC/AHA guidelines[1] were based on evidence from several trials, including the Systolic Blood Pressure Intervention Trial (SPRINT).[15]

This multicenter trial investigated the effect of intensive blood pressure treatment on cardiovascular disease risk.[16] The primary outcome was a composite of myocardial infarction, acute coronary syndrome, stroke, and heart failure.

The trial enrolled 9,361 participants at least 50 years of age with systolic blood pressure 130 mm Hg or higher and at least 1 additional risk factor for cardiovascular disease. It excluded anyone with a history of diabetes mellitus, stroke, symptomatic heart failure, or end-stage renal disease.

Two interventions were compared:

- Intensive treatment, with a systolic blood pressure goal of less than 120 mm Hg: the protocol called for polytherapy, even for participants who were 75 or older if their blood pressure was 140 mm Hg or higher
- Standard treatment, with a systolic blood pressure goal of less than 140 mm Hg: it used polytherapy for patients whose systolic blood pressure was 160 mm Hg or higher.

The trial was intended to last 5 years but was stopped early at a median of 3.26 years owing to a significantly lower rate of the primary composite outcome in the intensive-treatment group: 1.65% per year vs 2.19%, a 25% relative risk reduction ($P < .001$) or a 0.54% absolute risk reduction. We calculate the number needed to treat (NNT) for 1 year to prevent 1 event as 185, and over the 3.26 years of the trial, the investigators calculated the NNT as 61. Similarly, the rate of death from any cause was also lower with intensive treatment, 1.03% per year vs 1.40% per year, a 27% relative risk reduction ($P = .003$) or a 0.37% absolute risk reduction, NNT 270.

Using these findings, Bress et al[16] estimated that implementing intensive blood pressure goals could prevent 107,500 deaths annually.

The downside is adverse effects. In SPRINT,[15] the intensive-treatment group experienced significantly higher rates of serious adverse effects than the standard-treatment group, ie:

- Hypotension 2.4% vs 1.4%, $P = .001$
- Syncope 2.3% vs 1.7%, $P = .05$
- Electrolyte abnormalities 3.1% vs 2.3%, $P = .02$)
- Acute kidney injury or kidney failure 4.1% vs 2.5%, $P < .001$
- Any treatment-related adverse event 4.7% vs 2.5%, $P = .001$.

Thus, Bress et al[16] estimated that fully implementing the intensive-treatment goals could cause an additional 56,100 episodes of hypotension per year, 34,400 cases of syncope, 43,400 serious electrolyte disorders, and 88,700 cases of acute kidney injury. All told, about 3 million Americans could suffer a serious adverse effect under the intensive-treatment goals.

SPRINT caveats and limitations

SPRINT[15] was stopped early, after 3.26 years instead of the planned 5 years. The true risk-benefit ratio may have been different if the trial had been extended longer.

In addition, SPRINT used automated office blood pressure measurements in which patients were seated alone and a device (Model 907, Omron Healthcare) took 3 blood pressure measurements at 1-minute intervals after 5 minutes of quiet rest. This was designed to reduce elevated blood pressure readings in the presence of a healthcare professional in a medical setting (ie, "white coat" hypertension).

Many physicians are still taking blood pressure manually, which tends to give higher readings

Many physicians are still taking blood pressure manually, which tends to give higher readings. Therefore, if they aim for a lower goal, they may risk overtreating the patient.

About 50% of patients did not achieve the target systolic blood pressure (< 120 mm Hg) despite receiving an average of 2.8 antihypertensive medications in the intensive-treatment group and 1.8 in the standard-treatment group. The use of antihypertensive medications, however, was not a controlled variable in the trial, and practitioners chose the appropriate drugs for their patients.

Diastolic pressure, which can be markedly lower in older hypertensive patients, was largely ignored, although lower diastolic pressure may have contributed to higher syncope

rates in response to alpha blockers and calcium blockers.

Moreover, the trial excluded those with significant comorbidities and those younger than 50 (the mean age was 67.9), which limits the generalizability of the results.

JNC 8 VS SPRINT GOALS: WHAT'S THE EFFECT ON OUTCOMES?

JNC 8[4] recommended a relaxed target of less than 140/90 mm Hg for adults younger than 60, including those with chronic kidney disease or diabetes, and less than 150/90 mm Hg for adults 60 and older. The SPRINT findings upended those recommendations, showing that intensive treatment in adults age 75 or older significantly improved the composite cardiovascular disease outcome (2.59 vs 3.85 events per year; $P < .001$) and all-cause mortality (1.78 vs 2.63 events per year; $P < .05$) compared with standard treatment.[17] Also, a subset review of SPRINT trial data found no difference in benefit based on chronic kidney disease status.[18]

A meta-analysis of 74 clinical trials (N = 306,273) offers a compromise between the SPRINT findings and the JNC 8 recommendations.[19] It found that the beneficial effect of blood pressure treatment depended on the patient's baseline systolic blood pressure. In those with a baseline systolic pressure of 160 mm Hg or higher, treatment reduced cardiovascular mortality by about 15% (relative risk [RR] 0.85; 95% confidence interval [CI] 0.77–0.95). In patients with systolic pressure below 140 mm Hg, treatment effects were neutral (RR 1.03, 95% CI 0.87–1.20) and not associated with any benefit as primary prevention, although data suggest it may reduce the risk of adverse outcomes in patients with coronary heart disease.

The risk-benefit ratio of intensive treatment seems to vary in different patient subgroups

OTHER TRIALS THAT INFLUENCED THE GUIDELINES

SPRINT was important for refining the appropriate targets for blood pressure treatment, but several other trials also influenced the ACC/AHA guidelines (**Table 3**).[20–24]

SHEP and HYVET (the Systolic Hypertension in the Elderly Program[20] and the Hypertension in the Very Elderly Trial)[21] supported intensive blood pressure treatment for older patients by reporting a reduction in fatal and nonfatal stroke risks for those with a systolic blood pressure above 160 mm Hg.

FEVER (the Felodipine Event Reduction study)[22] found that treatment with a calcium channel blocker in even a low dose can significantly decrease cardiovascular events, cardiovascular disease, and heart failure compared with no treatment.

JATOS and VALISH (the Japanese Trial to Assess Optimal Systolic Blood Pressure in Elderly Hypertensive Patients[23] and the Valsartan in Elderly Isolated Systolic Hypertension study)[24] found that outcomes were similar with intensive vs standard treatment.

Ettehad et al[25] performed a meta-analysis of 123 studies with more than 600,000 participants that provided strong evidence supporting blood pressure treatment goals below 130/90 mm Hg, in line with the SPRINT trial results.

BLOOD PRESSURE ISN'T EVERYTHING

Other trials remind us that although blood pressure is important, it is not the only factor affecting cardiovascular risk.

HOPE (the Heart Outcomes Prevention Evaluation)[26] investigated the use of ramipril (an ACE inhibitor) in preventing myocardial infarction, stroke, or cardiovascular death in patients at high risk of cardiovascular events. The study included 9,297 participants over age 55 (mean age 66) with a baseline blood pressure 139/79 mm Hg. Follow-up was 4.5 years.

Ramipril was better than placebo, with significantly fewer patients experiencing adverse end points in the ramipril group compared with the placebo group:

- Myocardial infarction 9.9% vs 12.3%, RR 0.80, $P < .001$
- Cardiovascular death 6.1% vs 8.1%, RR 0.74, $P < .001$
- Stroke 3.4% vs 4.9%, RR = .68, $P < .001$
- The composite end point 14.0% vs 17.8%, RR 0.78, $P < .001$).

Results were even better in the subset of patients who had diabetes.[27] However, the decrease in blood pressure attributable to antihypertensive therapy with ramipril was minimal (3–4 mm Hg systolic and 1–2 mm Hg diastolic). This slight change should not

TABLE 3

Important clinical trials that influenced revised blood pressure guidelines

Trial	Outcomes	Key conclusions
Systolic BP goal < 150 mm Hg		
SHEP[21] (1991)	Cardiovascular events: RR 0.64, 95% CI 0.50–0.82, $P = .0003$ Heart failure: RR 0.51, 95% CI 0.37–0.7, $P < .001$ Strokes: RR 0.64, 95% CI 0.50–0.82, $P = .0003$	Hypertension treatment significantly reduced fatal and nonfatal risk of stroke in patients older than 60 with systolic BP above 160 mm Hg
HYVET[21] (2003)	Stroke events: HR 0.47, 95% CI 0.24–0.93 Stroke mortality: HR 0.57; 95% CI 0.25–1.32 Cardiovascular mortality: HR 1.13, 95% CI 0.66–1.94 Total mortality: HR 1.23, 95% CI 0.75–2.01	Hypertension treatment in patients older than 80 significantly reduced fatal and nonfatal strokes but may increase stroke and cardiovascular mortality
Systolic BP goal < 140 mm Hg		
FEVER[22] (2005)	Average systolic blood pressure 4.2 mm Hg lower in treated group than in placebo group All cardiovascular events: HR 0.73, $P = .0002$ Coronary events: HR 0.68, $P = .015$ Heart failure: HR 0.70, $P = .26$	Hypertension treatment in Chinese participants age ≥ 50 with baseline SBP of 140–180 mm Hg produced only a modest reduction in SBP but substantially reduced cardiovascular events
JATOS[23] (2008)	Standard vs intensive treatment SBP > 160 mm Hg SBP: 135.9 vs 145.6 mm Hg ($P < .001$) Primary end points: morbidity ($P = .99$), mortality ($P = .81$)	A 2-year trial of intensive treatment in Japanese participants age 65 and older with hypertension (SPB > 160 mm Hg) found no significant difference between standard- and intensive-treatment groups in primary end points
VALISH[24] (2010)	Strict vs moderate BP control (< 140 mm Hg vs between 140 and 150 mm Hg) Primary end points: cardiovascular events: HR 0.89, 95% CI 0.60–1.34 SBP: 136.6 vs 142.0 mm Hg ($P < .001$)	A 3-year trial comparing strict vs moderate treatment in reducing cardiovascular mortality and morbidity in elderly patients (ages 70–84) with hypertension (mean SBP = 169.5 mm Hg) found no significant difference between the groups in primary outcome end points

BP = blood pressure; CI = 95% confidence interval; FEVER = Felodipine Event Reduction Study; HYVET = Hypertension in the Very Elderly Trial; HR = hazard ratio; JATOS = Japanese Trial to Assess Optimal Systolic Blood Pressure in Elderly Hypertensive Patients; RR = relative risk; SBP = systolic blood pressure; SHEP = Systolic Hypertension in the Elderly Program; VALISH = Valsartan in Elderly Isolated Systolic Hypertension study

have been enough to produce significant differences in clinical outcomes, a major limitation of this trial. The investigators speculated that the positive results may be due to a class effect of ACE inhibitors.[26]

HOPE 3[28–30] explored the effect of blood pressure- and cholesterol-controlling drugs on the same primary end points but in patients at intermediate risk of major cardiovascular events. Investigators randomized the 12,705 patients to 4 treatment groups:

- Blood pressure control with candesartan (an ARB) plus hydrochlorothiazide (a thiazide diuretic)
- Cholesterol control with rosuvastatin (a statin)
- Blood pressure plus cholesterol control
- Placebo.

Therapy was started at a systolic blood pressure above 140 mm Hg.

Compared with placebo, the rate of composite events was significantly reduced in the rosuvastatin group (3.7% vs 4.8%, HR 0.76, $P = .002$)[28] and the candesartan-hydrochlorothiazide-rosuvastatin group (3.6% vs 5.0%, HR 0.71; $P = .005$)[29] but not in the candesartan-hydrochlorothiazide group (4.1% vs 4.4%; HR 0.93; $P = .40$).[30]

In addition, a subgroup analysis comparing active treatment vs placebo found a significant reduction in major cardiovascular events for treated patients whose baseline systolic blood pressure was in the upper third (> 143.5 mm Hg, mean 154.1 mm Hg), while treated patients in the lower middle and lower thirds had no significant reduction.[30]

These results suggest that intensive treatment to achieve a systolic blood pressure below 140 mm Hg in patients at intermediate risk may not be helpful. Nevertheless, there seems to be agreement that intensive treatment generally leads to a reduction in cardiovascular events. The results also show the benefit of lowering cholesterol.

Bundy et al[31] performed a meta-analysis that provides support for intensive antihypertensive treatment. Reviewing 42 clinical trials in more than 144,000 patients, they found that treating to reach a target systolic blood pressure of 120 to 124 mm Hg can reduce cardiovascular events and all-cause mortality.

The trade-off is a minimal increase in the risk of adverse events. Also, the risk-benefit ratio of intensive treatment seems to vary in different patient subgroups.

It is unclear which blood pressure targets are best in patients with diabetes

WHAT ABOUT PATIENTS WITH COMORBIDITIES?

The debate over intensive vs standard treatment in blood pressure management extends beyond hypertension and includes important comorbidities such as diabetes, stroke, and renal disease. Patients with a history of stroke or end-stage renal disease have only a minimal mention in the AHA/ACC guidelines.

Diabetes

Emdin et al,[32] in a meta-analysis of 40 trials that included more than 100,000 patients with diabetes, concluded that a 10-mm Hg lowering of systolic blood pressure significantly reduces the rates of all-cause mortality, cardiovascular disease, coronary heart disease, stroke, albuminuria, and retinopathy. Stratifying the results according to the systolic blood pressure achieved (≥ 130 or < 130 mm Hg), the relative risks of mortality, coronary heart disease, cardiovascular disease, heart failure, and albuminuria were actually lower in the higher stratum than in the lower.

ACCORD (the Action to Control Cardiovascular Risk in Diabetes)[33] study provides contrary results. It examined intensive and standard blood pressure control targets in patients with type 2 diabetes at high risk of cardiovascular events, using primary outcome measures similar to those in SPRINT. It found no significant difference in fatal and nonfatal cardiovascular events between the intensive and standard blood pressure target arms.

Despite those results, the ACC/AHA guidelines still advocate for more intensive treatment (goal < 130/80 mm Hg) in all patients, including those with diabetes.[1]

The ADA position statement (September 2017) recommended a target below 140/90 mm Hg in patients with diabetes and hypertension.[8] However, they also noted that lower systolic and diastolic blood pressure targets, such as below 130/80 mm Hg, may be appropriate for patients at high risk of cardiovascular disease "if they can be achieved without undue treatment burden."[8] Thus, it is not clear which blood pressure targets in patients with diabetes are the best.

Stroke

In patients with stroke, AHA/ACC guidelines[1] recommend treatment if the blood pressure is 140/90 mm Hg or higher because antihypertensive therapy has been associated with a decrease in the recurrence of transient ischemic attack and stroke. The ideal target blood pressure is not known, but a goal of less than 130/80 mm Hg may be reasonable.

In the Secondary Prevention of Small Subcortical Strokes (SPS3) trial, a retrospective open-label trial, a target blood pressure below 130/80 mm Hg in patients with a history of lacunar stroke was associated with a lower risk of intracranial hemorrhage, but the difference was not statistically significant.[34] For this rea-

son, the ACC/AHA guidelines consider it reasonable to aim for a systolic blood pressure below 130 mm Hg in these patients.[1]

Renal disease

The ACC/AHA guidelines do not address how to manage hypertension in patients with end-stage renal disease, but for patients with chronic kidney disease they recommend a blood pressure target below 130/80 mm Hg.[1] This recommendation is derived from the SPRINT trial,[15] in which patients with stage 3 or 4 chronic kidney disease accounted for 28% of the study population. In that subgroup, intensive blood pressure control seemed to provide the same benefits for reduction in cardiovascular death and all-cause mortality.

TREAT PATIENTS, NOT NUMBERS

Blood pressure targets should be applied in the appropriate clinical context and on a patient-by-patient basis. In clinical practice, one size does not always fit all, as special cases exist.

For example, blood pressure can oscillate widely in patients with autonomic nerve disorders, making it difficult to strive for a specific target, especially an intensive one. Thus, it may be necessary to allow higher systolic blood pressure in these patients. Similarly, patients with diabetes or chronic kidney disease may be at higher risk of kidney injury with more intensive blood pressure management.

Treating numbers rather than patients may result in unbalanced patient care. The optimal approach to blood pressure management relies on a comprehensive risk factor assessment and shared decision-making with the patient before setting specific blood pressure targets.

OUR APPROACH

We aim for a blood pressure goal below 130/80 mm Hg for all patients with cardiovascular disease, according to the AHA/ACC guidelines. We aim for that same target in patients without cardiovascular disease but who have an elevated estimated cardiovascular risk (> 10%) over the next 10 years.

We recognize, however, that the benefits of aggressive blood pressure reduction may not be as clear in all patients, such as those with diabetes. We also recognize that some patient subgroups are at high risk of adverse events, including those with low diastolic pressure, chronic kidney disease, a history of falls, and older age. In those patients, we are extremely judicious when titrating antihypertensive medications. We often make smaller titrations, at longer intervals, and with more frequent laboratory testing and in-office follow-up.

Our process of managing hypertension through intensive blood pressure control to achieve lower systolic blood pressure targets requires a concerted effort among healthcare providers at all levels. It especially requires more involvement and investment from primary care providers to individualize treatment in their patients. This process has helped us to reach our treatment goals while limiting adverse effects of lower blood pressure targets.

MOVING FORWARD

Hypertension is a major risk factor for cardiovascular disease, and intensive blood pressure control has the potential to significantly reduce rates of morbidity and death associated with cardiovascular disease. Thus, a general consensus on the definition of hypertension and treatment goals is essential to reduce the risk of cardiovascular events in this large patient population.

Intensive blood pressure treatment has shown efficacy, but it has a small accompanying risk of adverse events, which varies in patient subgroups and affects the benefit-risk ratio of this therapy. For example, the cardiovascular benefit of intensive treatment is less clear in diabetic patients, and the risk of adverse events may be higher in older patients with chronic kidney disease.

Moving forward, more research is needed into the effects of intensive and standard treatment on patients of all ages, those with common comorbid conditions, and those with other important factors such as diastolic hypertension.

Finally, the various medical societies should collaborate on hypertension guideline development. This would require considerable planning and coordination but would ultimately be useful in creating a generalizable approach to hypertension management.

Blood pressure targets should be applied in the proper clinical context, on a patient-by-patient basis

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