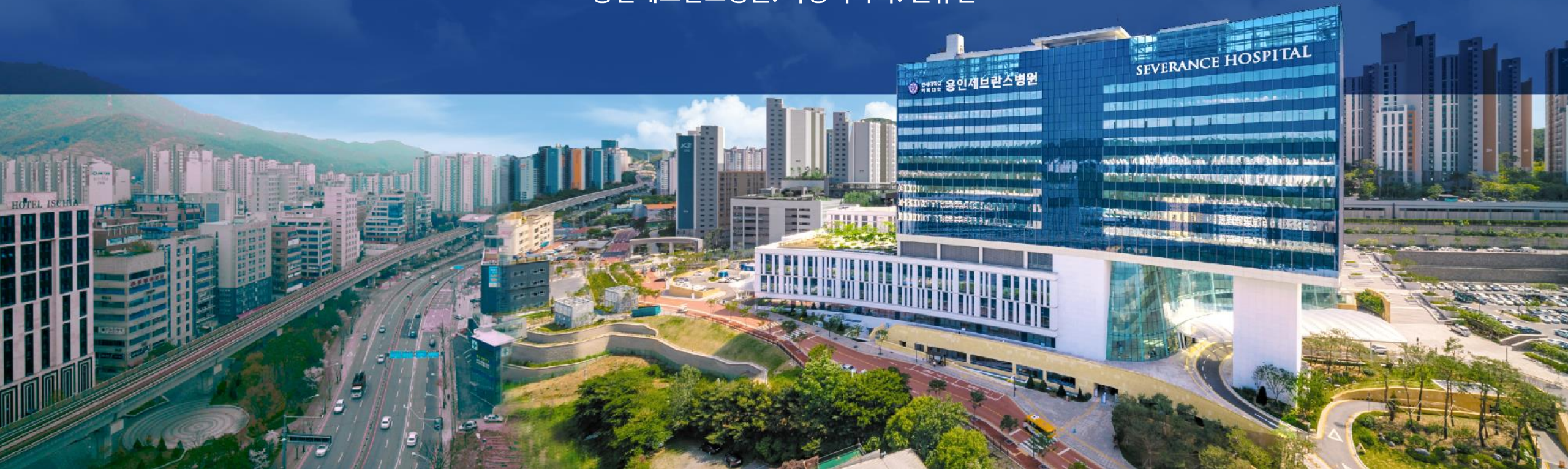


고혈압 가이드라인 최신 지견

2023.3.25

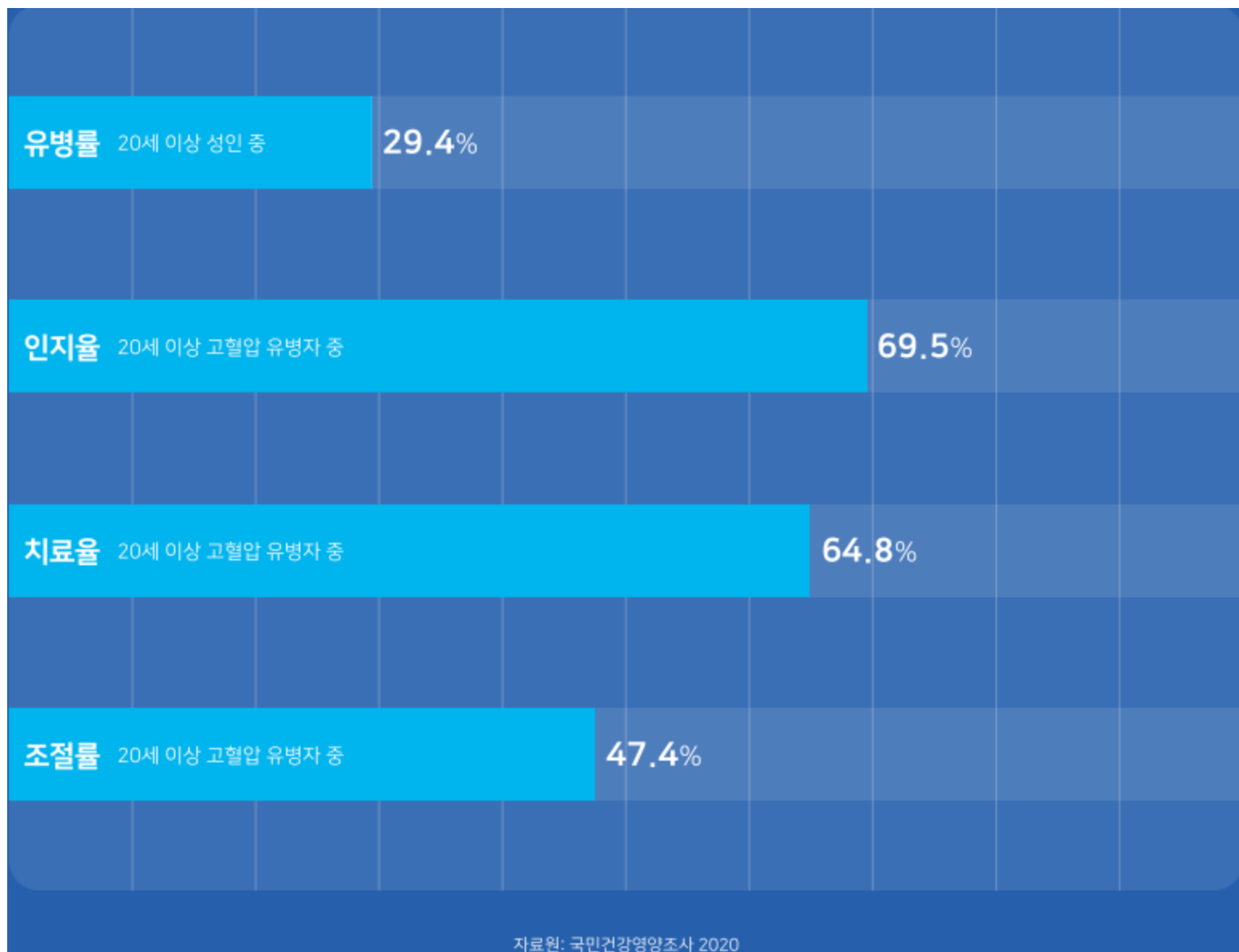
용인세브란스병원. 가정의학과. 권유진



고혈압 인구 현황 요약 (20세 이상)



자료원: 국민건강영양조사 2020, 국민건강보험 빅데이터 2020



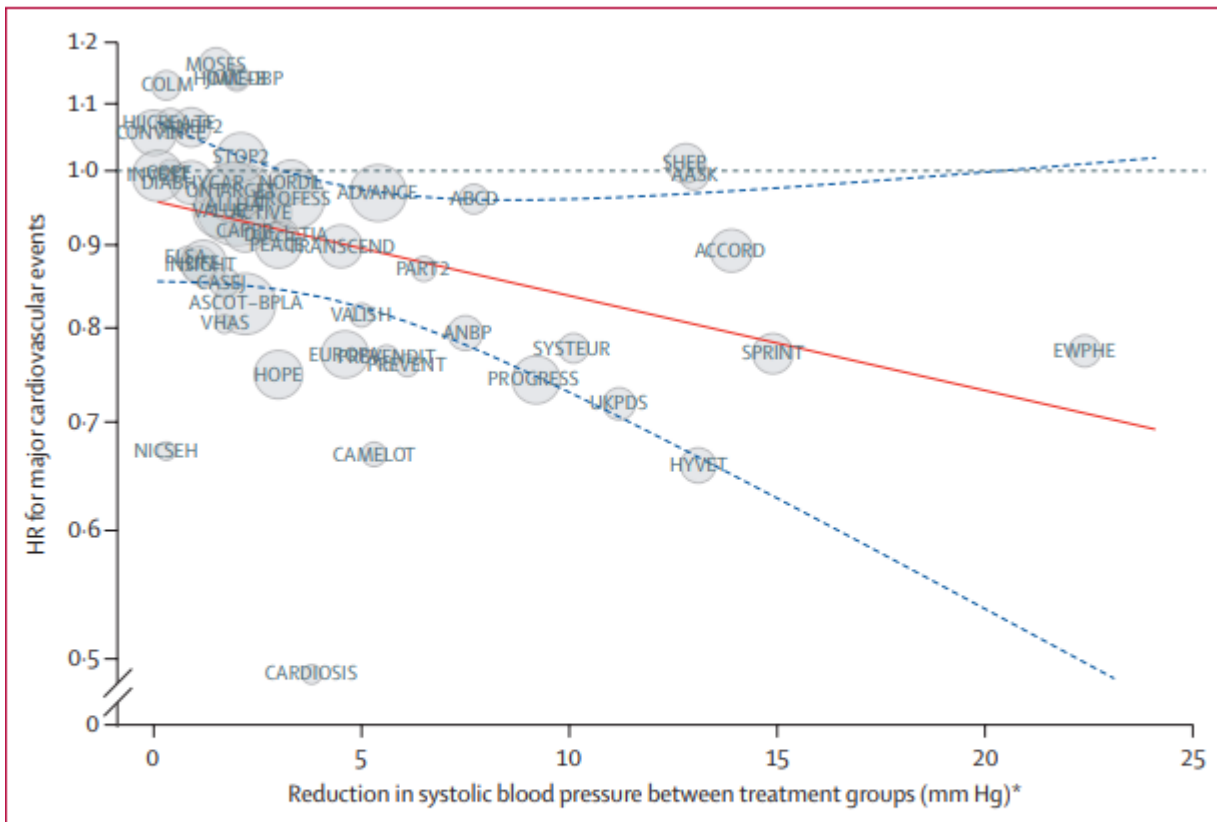
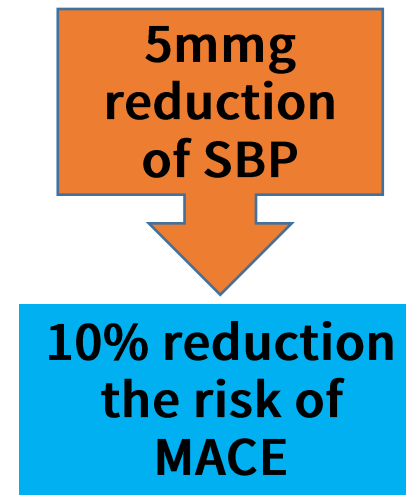


Figure 2: Association between the intensity of blood pressure reduction and relative treatment effects for prevention of major cardiovascular events

The centre of the bubbles indicates the HR for each trial, with the size of the bubble inversely proportional to the respective SE. The solid red line is the fitted regression line; the dashed blue lines indicate 95% CI; and the dashed grey line indicates HR=1.0. HR=hazard ratio. *Excluding the first 12 months after randomisation.

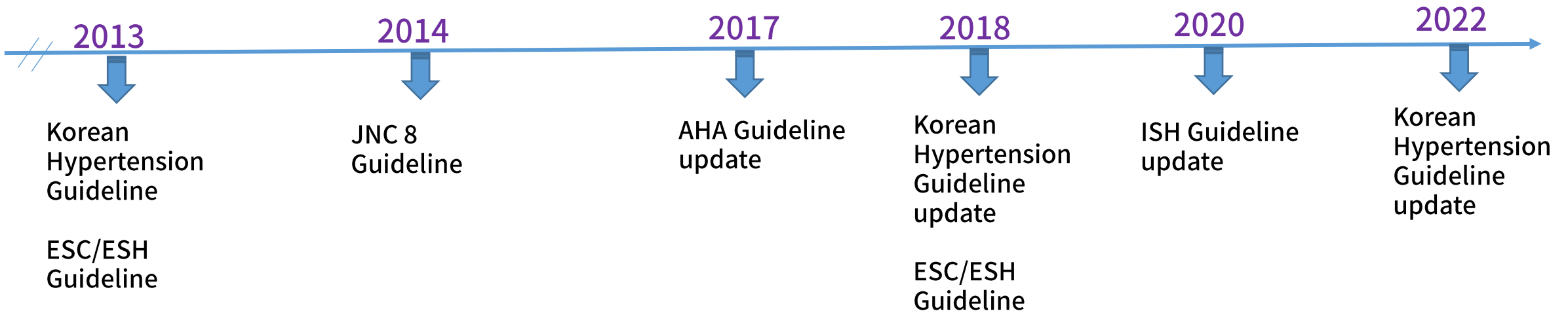


Guideline

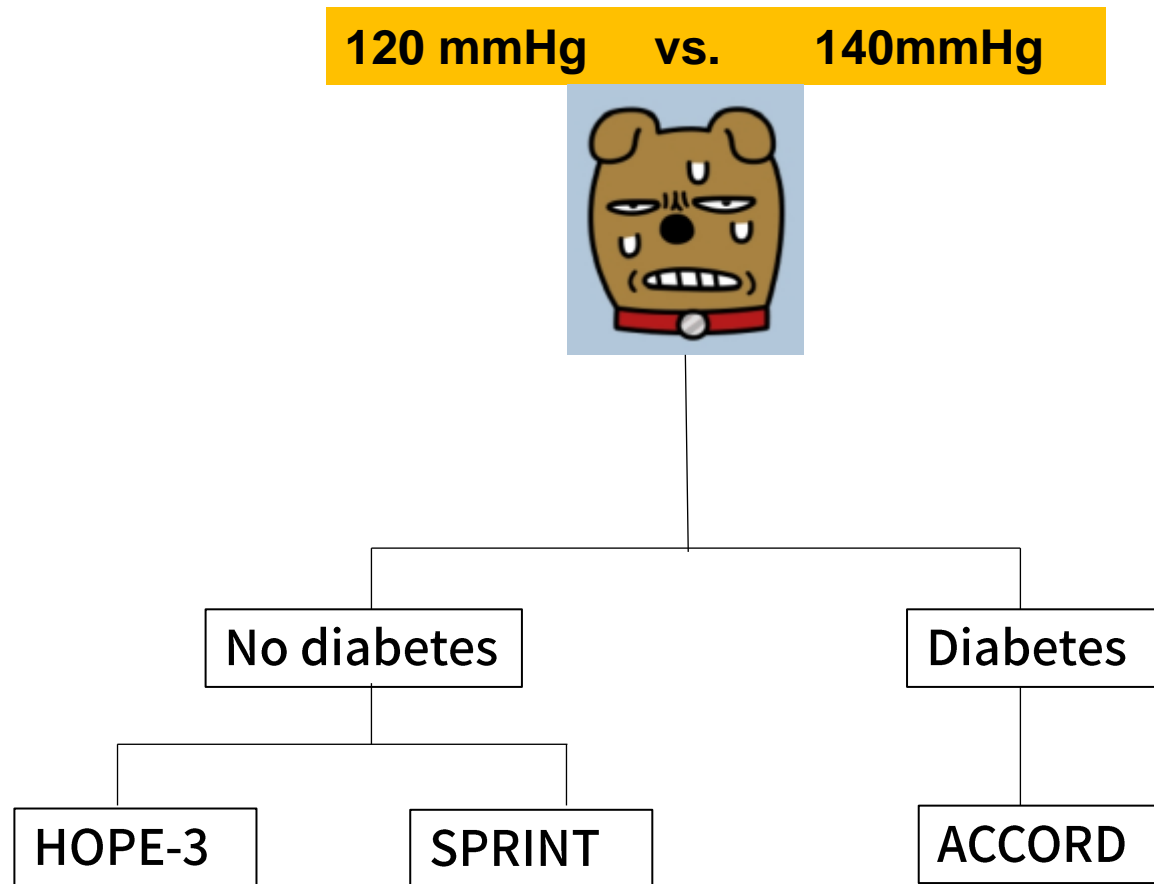
Guidelines are “ systemically developed evidence-based statements which assist providers, recipients and other stake holders **informed decisions** about appropriate health interventions.”

Purpose of Guidelines...

- In the United States, BP guidelines were initiated in 1977 with the first Joint National Committee report .
- European guidelines appeared later, but the intent of both was to inform practicing physicians about available data regarding BP in the context of cardiovascular (CV) risk and how to manage both BP and CV risk.



- What is the optimal Systolic BP control?



ACCORD Trial (Action to Control Cardiovascular risk in diabetes)

N Engl J Med 2010;362:1575-85

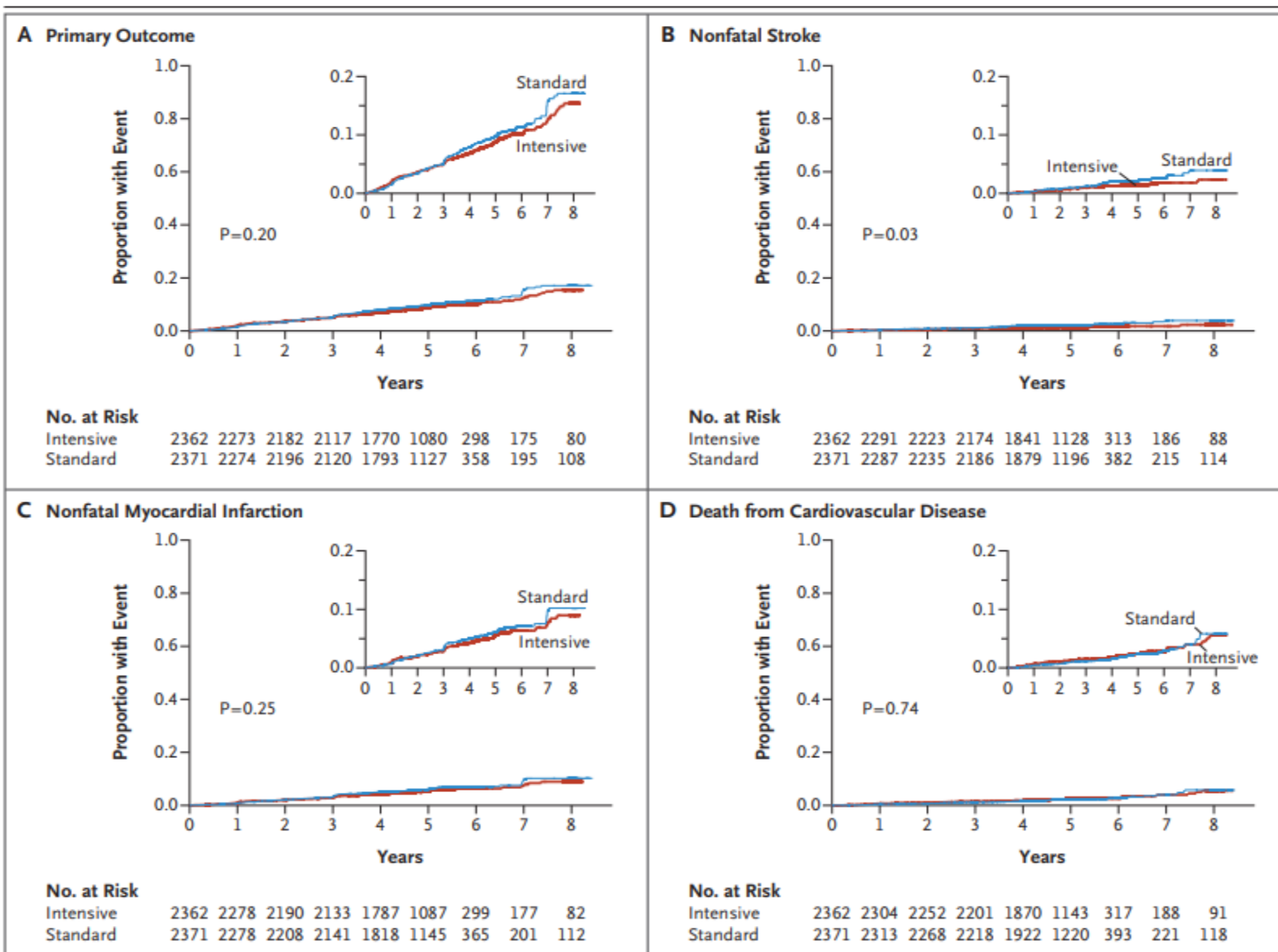
ORIGINAL ARTICLE

Effects of Intensive Blood-Pressure Control in Type 2 Diabetes Mellitus

The ACCORD Study Group*

- **Inclusion criteria: T2DM patients**
- ≥ 40 years with CVD or
- ≥ 55 years with one of
 - - atherosclerosis
 - - albuminuria
 - - LVH
- - at least 2 risk factors (dyslipidemia, HTN, smoking and obesity)
- End point: nonfatal MI, Stroke, CV death

Is goal SBP <120 mmHg better than 140 mmHg in diabetic patients?



- 4,733 patients with T2DM aged 40-79years with prior evidence of CVD or multiple CVD risk factors
- Average BP during f/u
- Standard :135mmHg (goal BP <140mmHg)
- Intensive: 119.3mmHg (goal BP <120mmHg)

A) No significant difference in the primary cardiovascular outcome or the rate of death from any cause.

Figure 2. Kaplan-Meier Analyses of Selected Outcomes. Shown are the proportions of patients with events for the primary composite outcome (Panel A) and for the individual components of the primary outcome (Panels B, C, and D). The insets show close-up versions of the graphs in each panel.

ChatGPT... says..



The optimal target blood pressure for diabetic patients is a topic of ongoing debate and may vary based on individual patient characteristics and comorbidities. However, based on current evidence, a goal SBP (systolic blood pressure) of <120 mmHg may be more beneficial than a goal SBP of 140 mmHg for diabetic patients.



Several clinical trials have demonstrated that intensive blood pressure control, with a target SBP of <120 mmHg, reduces the risk of cardiovascular events, stroke, and diabetic nephropathy in diabetic patients compared to a less intensive target SBP of <140 mmHg. These trials include the ACCORD (Action to Control Cardiovascular Risk in Diabetes) trial, the SPRINT (Systolic Blood Pressure Intervention Trial) trial, and the ADVANCE (Action in Diabetes and Vascular Disease: Preterax and Diamicron Modified Release Controlled Evaluation) trial.

However, it is important to note that intensive blood pressure control may also increase the risk of adverse events, such as hypotension, syncope, and electrolyte abnormalities. Therefore, the decision to pursue intensive blood pressure control should be individualized based on the patient's overall health status, comorbidities, and preferences. It is important to discuss the risks and benefits of different blood pressure targets with your healthcare provider to determine the most appropriate treatment plan for you.

SPRINT (Systolic blood pressure intervention trial) study

N Engl J Med 2015;373:2103-16

A Randomized Trial of Intensive versus Standard Blood-Pressure Control

The SPRINT Research Group*

Inclusion criteria

≥ 50years old

SBP: 130-180mmHg

CVD risk; at least one

: Clinical or subclinical CVD

:CKD eGFR 20-60

: FRS for 10year risk ≥15%

: ≥75years old

Exclusion criteria

Stroke

Diabetes mellitus

Polycystic kidney diseases

CHF

Proteinuria >1g/d

CKD eGFR < 20

Q) Is goal SBP < 120mmHg better than 140mmHg in non-diabetic high risk hypertensive population?

SPRINT (Systolic blood pressure intervention trial) study

N Engl J Med 2015;373:2103-16

9361 Patients: High risk patients without DM (SBP>130mmHg and CVD risk)

The primary composite outcome: myocardial infarction, acute coronary syndromes, stroke, heart failure, death from CVD

Intervention: SBP <120mmHg

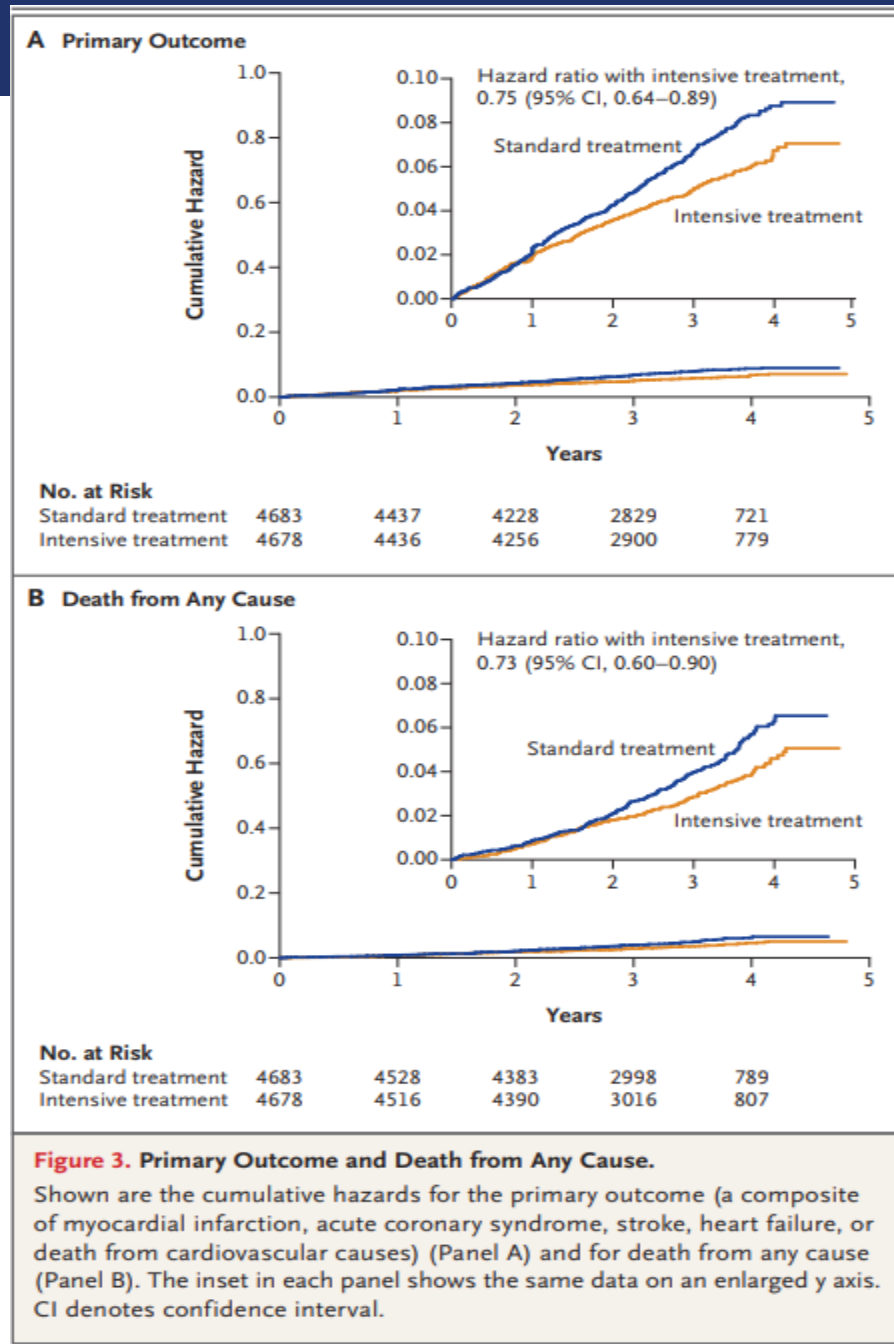
Comparison: SBP <140mmHg

Average SBP during follow-up

Standard: 134.6mmHg (Goal SBP <140mmHg)

Intensive: 121.5mmHg (Goal SBP <120mmHg)

A) Yes, 27% less mortality and 25% less cardiovascular events.



HR 25%

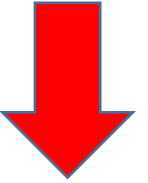


Table 3. Serious Adverse Events, Conditions of Interest, and Monitored Clinical Events.

Variable	Intensive Treatment (N = 4678) <i>no. of patients (%)</i>	Standard Treatment (N = 4683) <i>no. of patients (%)</i>	Hazard Ratio	P Value
Serious adverse event*	1793 (38.3)	1736 (37.1)	1.04	0.25
Conditions of interest				
Serious adverse event only				
Hypotension	110 (2.4)	66 (1.4)	1.67	0.001
Syncope	107 (2.3)	80 (1.7)	1.33	0.05
Bradycardia	87 (1.9)	73 (1.6)	1.19	0.28
Electrolyte abnormality	144 (3.1)	107 (2.3)	1.35	0.02
Injurious fall†	105 (2.2)	110 (2.3)	0.95	0.71
Acute kidney injury or acute renal failure‡	193 (4.1)	117 (2.5)	1.66	<0.001
Emergency department visit or serious adverse event				
Hypotension	158 (3.4)	93 (2.0)	1.70	<0.001
Syncope	163 (3.5)	113 (2.4)	1.44	0.003
Bradycardia	104 (2.2)	83 (1.8)	1.25	0.13
Electrolyte abnormality	177 (3.8)	129 (2.8)	1.38	0.006
Injurious fall†	334 (7.1)	332 (7.1)	1.00	0.97
Acute kidney injury or acute renal failure‡	204 (4.4)	120 (2.6)	1.71	<0.001
Monitored clinical events				
Adverse laboratory measure§				
Serum sodium <130 mmol/liter	180 (3.8)	100 (2.1)	1.76	<0.001
Serum sodium >150 mmol/liter	6 (0.1)	0		0.02
Serum potassium <3.0 mmol/liter	114 (2.4)	74 (1.6)	1.50	0.006
Serum potassium >5.5 mmol/liter	176 (3.8)	171 (3.7)	1.00	0.97
Orthostatic hypotension¶				
Alone	777 (16.6)	857 (18.3)	0.88	0.01
With dizziness	62 (1.3)	71 (1.5)	0.85	0.35

Benefit >> Harm
Of Intensive BP
control

HOPE (Heart outcomes prevention evaluation)-3 Trial

N Engl J Med 2016;374:2009-20

Q) Is further BP reduction in moderate cardiovascular risk hypertensive patients with SBP around 140mmHg beneficial?

A) No significant difference in mortality or total cardiovascular events.

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Blood-Pressure Lowering in Intermediate-Risk Persons without Cardiovascular Disease

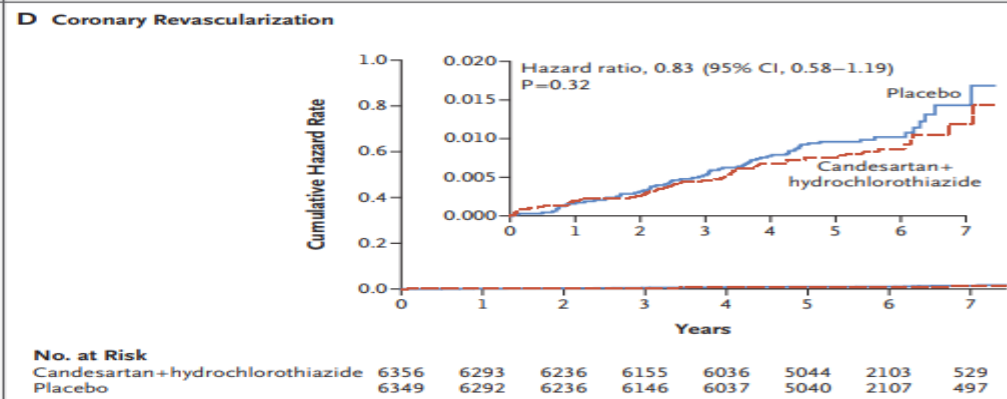
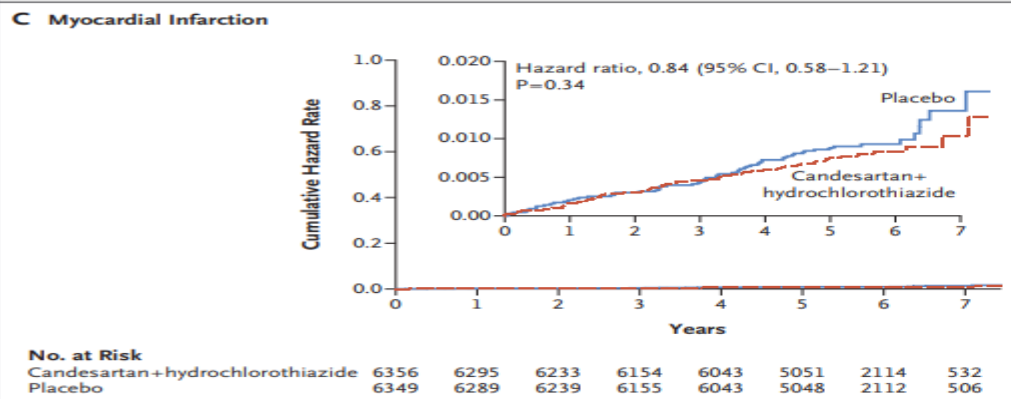
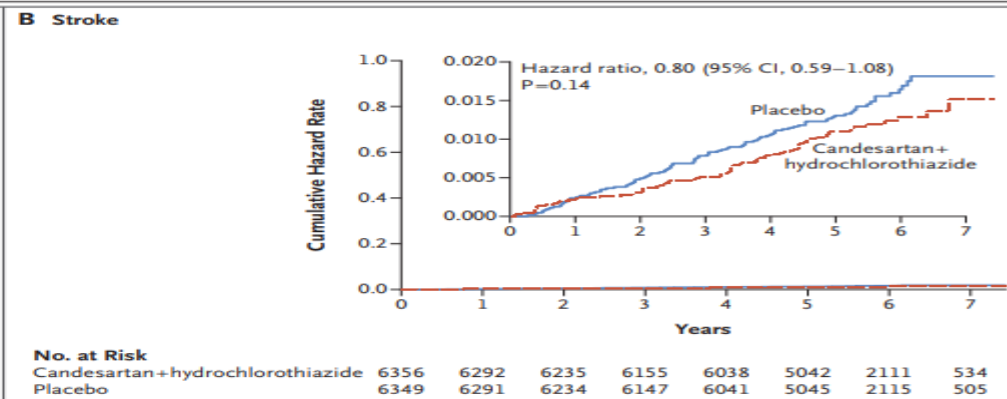
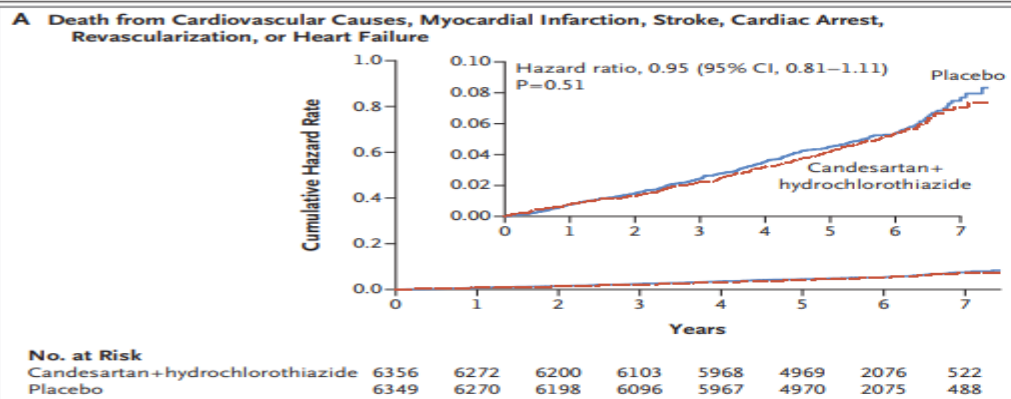
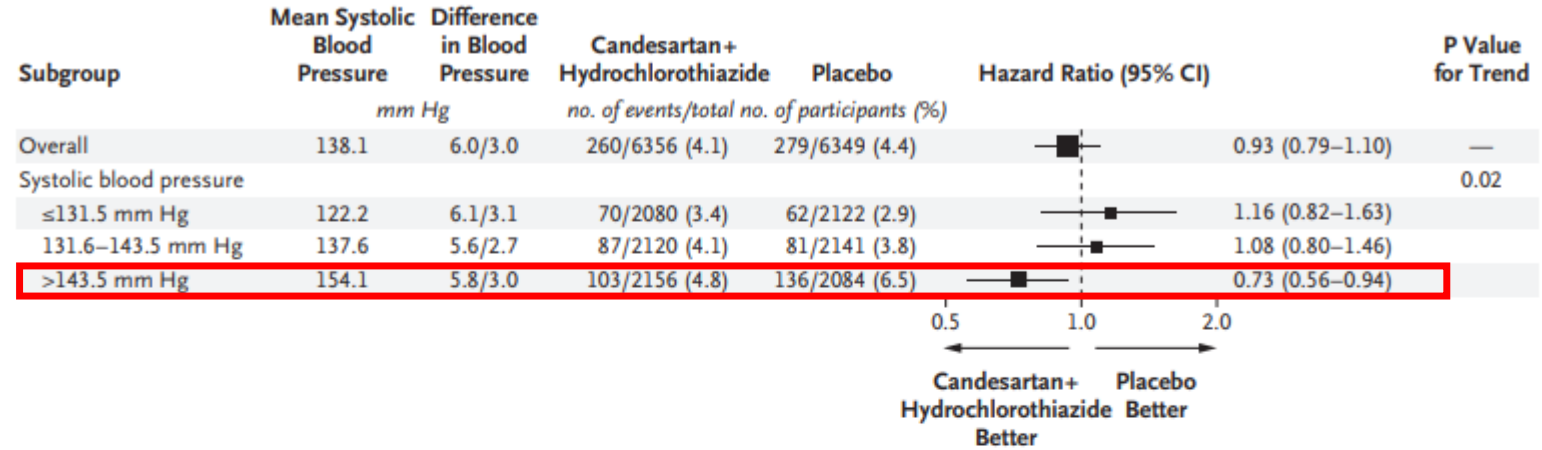


Figure 2. Cumulative Incidence of Major Cardiovascular Events, According to Trial Group. Shown are the Kaplan–Meier curves for the second coprimary outcome, which was the composite of death from cardiovascular causes, nonfatal myocardial infarction, nonfatal stroke, resuscitated cardiac arrest, revascularization, or heart failure (Panel A), for fatal and nonfatal stroke (Panel B), for myocardial infarction (Panel C), and for coronary revascularization (Panel D). Coronary revascularization was not a prespecified outcome. Insets show the same data on an enlarged y axis.

HOPE -3 Trial

A First Coprimary Outcome



B Second Coprimary Outcome

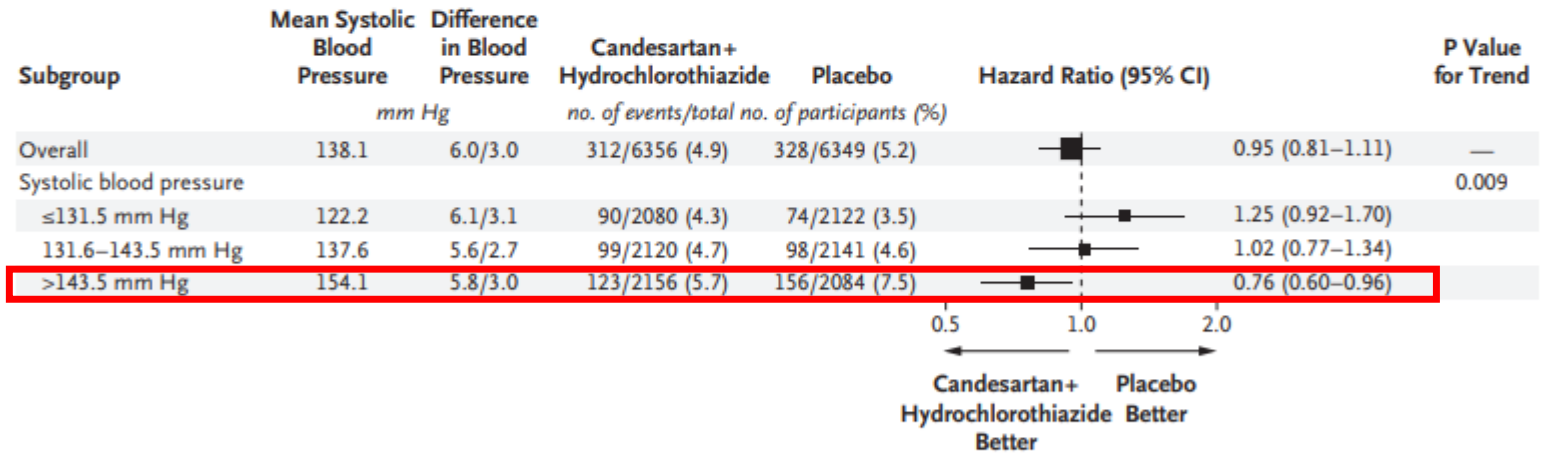


Figure 3. Forest Plots, According to Subgroup of Systolic Blood Pressure for the Coprimary Outcomes.

The difference in blood pressure refers to the average difference of the systolic and diastolic blood pressures between the two groups during the trial, with the active-treatment group having lower mean values. The first coprimary outcome (Panel A) was the composite of death from cardiovascular causes, nonfatal myocardial infarction, and nonfatal stroke; the second coprimary outcome (Panel B) was the composite of these events plus resuscitated cardiac arrest, heart failure, or revascularization. Measurements of the systolic blood pressure at baseline were missing for two participants in the placebo group. The size of each square is proportional to the number of events.

HOPE -3 Trial



The optimal blood pressure goal for moderate cardiovascular risk hypertensive patients with SBP around 140mmHg is an area of ongoing research and debate. Current guidelines from various organizations, such as the American College of Cardiology/American Heart Association (ACC/AHA), recommend a blood pressure goal of less than 130mmHg for most hypertensive patients, regardless of their cardiovascular risk.



However, recent clinical trials, such as the ACCORD BP trial and the SPRINT trial, have suggested that a more aggressive blood pressure control goal of less than 120mmHg may provide additional benefits in reducing the risk of cardiovascular events in certain high-risk hypertensive patients, including those with a history of cardiovascular disease or other high-risk factors.

For moderate cardiovascular risk hypertensive patients with an SBP around 140mmHg, the decision to pursue further blood pressure reduction should be based on individual patient factors, such as their overall health status, comorbidities, and other risk factors. Healthcare providers should work with their patients to determine an appropriate blood pressure goal and regularly monitor and adjust treatment as needed to reduce the risk of complications.

It is important to note that more aggressive blood pressure control goals may also be associated with a higher risk of adverse effects, such as hypotension and electrolyte imbalances. Therefore, blood pressure goals should be individualized based on a patient's overall health status and

 Regenerate response

	JNC7 (2003, USA)	JNC8 (2014, USA)	ESH/ESC (2013, Europe)	KSH (2013, Korea)
General	<140/90		<140/90	<140/90
General <60		<140/90		
General ≥60		<150/90		
Elderly <80			140-150/<90	SBP: 140-150
Elderly ≥80			140-150/<90	DBP >60
DM	<130/80	<140/90	<140/85	140/85
CKD	<130/80	<140/90	<140/90 Proteinuria <130/90	<140/90 Proteinuria <130/85

CENTRAL ILLUSTRATION Comparison of American and European Society Definitions and Management of Hypertension





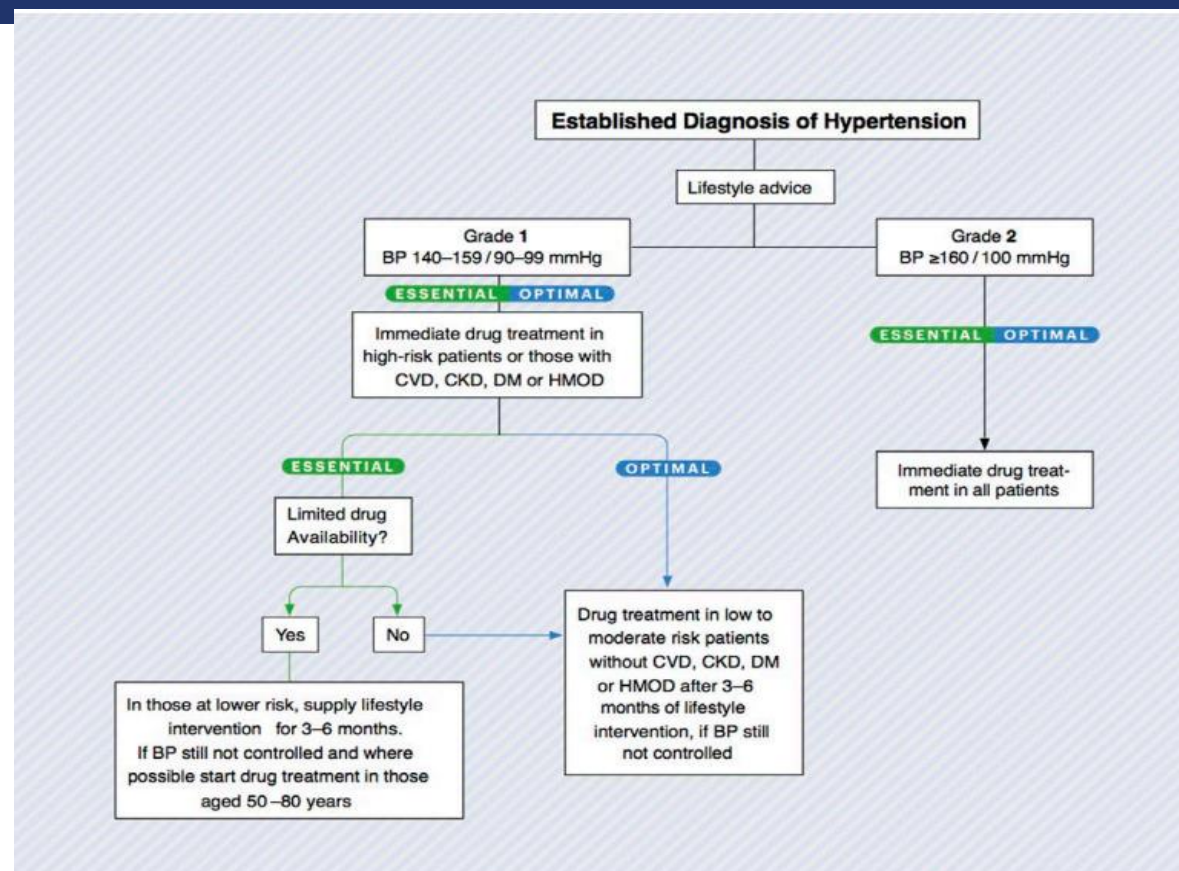
Guideline Differences	 American College of Cardiology/American Heart Association (ACC/AHA)			 European Society of Cardiology/European Society of Hypertension (ESC/ESH)		
	Systolic (mm Hg)	and/or	Diastolic (mm Hg)	Systolic (mm Hg)	and/or	Diastolic (mm Hg)
Level of blood pressure (BP) defining hypertension						
Office/Clinic BP	≥ 130		≥ 80	≥ 140		≥ 90
Daytime mean	≥ 130		≥ 80	≥ 135		≥ 85
Nighttime mean	≥ 110		≥ 65	≥ 120		≥ 70
24-hour mean	≥ 125		≥ 75	≥ 130		≥ 80
Home BP mean	≥ 130		≥ 80	≥ 135		≥ 85
BP targets for treatment	< 130/80 mm Hg			Systolic targets < 140 mm Hg and close to 130 mm Hg		
Initial Combination Therapy	Initial single-pill combination therapy in patients > 20/10 mm Hg above BP goal			Initial single-pill combination therapy in patients ≥ 140/90 mm Hg		
Hypertensive requiring intervention	> 130/80 mm Hg			≥ 140/90 mm Hg		
Guideline Similarities	 ACC/AHA			 ESC/ESH		
Importance of home BP monitoring	<ul style="list-style-type: none"> • Take BP at home, twice in the morning and twice in the evening, in the week before clinic • Bring the BP machine in annually for validation 					
Therapy	<ul style="list-style-type: none"> • Restrict beta blockers to patients with comorbidities or other indications • Initial single pill combination as initial therapy 					
Follow-up	<ul style="list-style-type: none"> • Detect poor adherence and focus on improvement • BP telemonitoring and digital health solutions recommended 					

TABLE 4 Blood Pressure Goals in Patients With Hypertension According to Clinical Conditions

Category	ESC/ESH 2018	AHA/ACC 2017
Age \geq 65 yrs	130 to <140/70 to 79 mm Hg	<130/<80 mm Hg
Diabetes	Close to 130 (or lower if tolerated/ 70 to 79 mm Hg	<130/<80 mm Hg
Coronary artery disease	Close to 130 (or lower if tolerated/ 70 to 79 mm Hg	<130/<80 mm Hg
Chronic kidney disease (eGFR <60 ml/min/1.73 m ²)	130 to <140/70 to 79 mm Hg	<130/<80 mm Hg
Post-stroke	Close to 130 (or lower if tolerated/ 70 to 79 mm Hg	<130/<80 mm Hg

eGFR = estimated glomerular filtration rate; other abbreviations as in [Table 1](#).

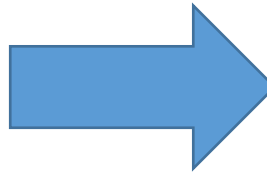


ESSENTIAL	Target BP reduction by at least 20/10mmHg, ideally to <140/90 mmHg	Aim for BP control within 3 months
OPTIMAL	<65 years : BP target <130 / 80 mmHg if tolerated (but >120 / 70 mmHg). ≥65 years : BP target <140 / 90 mmHg if tolerated but consider an individualised BP target in the context of frailty, independence and likely tolerability of treatment.	



THE KOREAN SOCIETY OF HYPERTENSION

2018년 고혈압 진료지침



THE
KOREAN
SOCIETY
OF HYPERTENSION

2022년 고혈압 진료지침

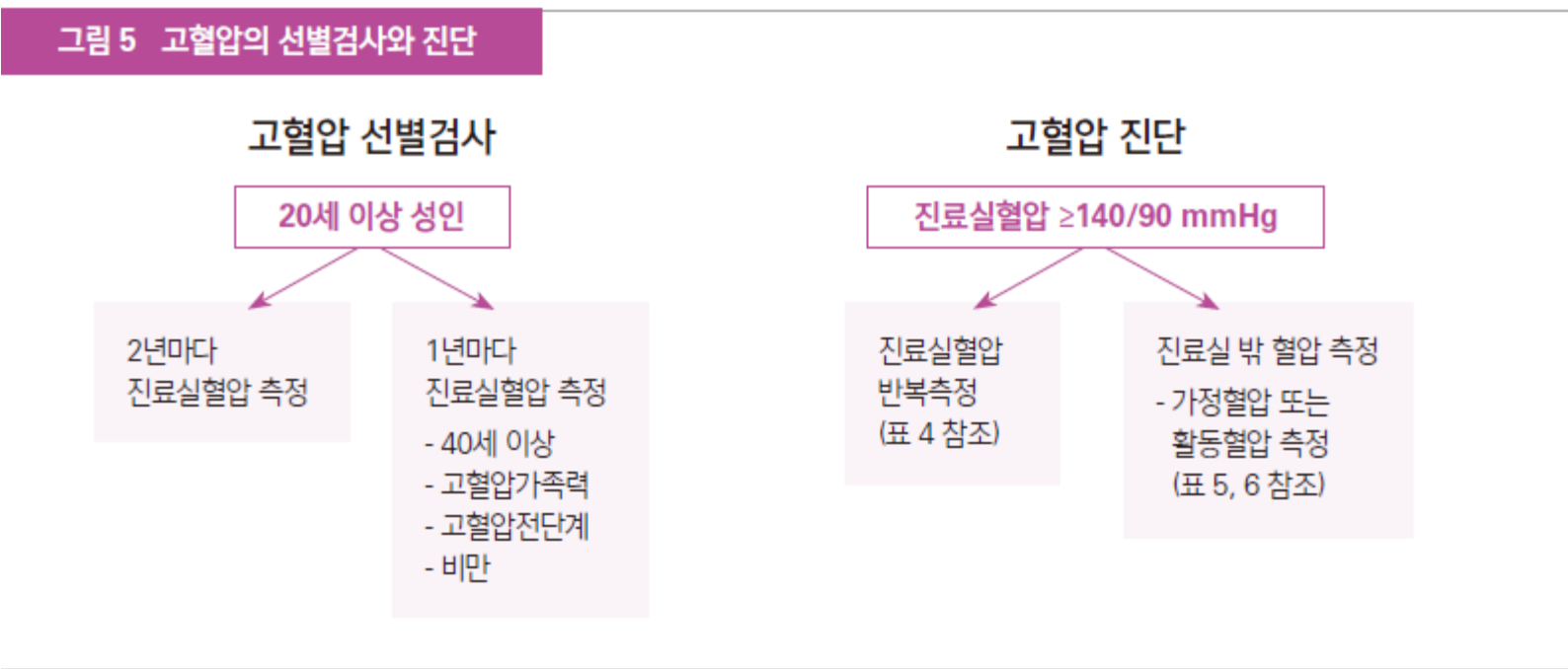
Focused Update of the 2018 KSH Guideline



Hypertension

신규 추가 사항	2022년 진료지침	권고 등급/근거수준
고혈압의 선별 진료	20세 이상 모든 성인을 대상으로 표준 혈압 측정 방법을 이용한 고혈압 선별검사를 권고한다.	1B
혈압의 분류 (치료 중인 혈압)	고혈압 치료 상태에서도, 이러한 현상이 나타날 수 있는데 백의비조절 고혈압은 고혈압으로 치료중인 환자에서 진료실 혈압은 높으나 진료실 밖 혈압은 높지 않은 경우로, 가면 비 조절 고혈압은 고혈압 치료 환자에서 진료실 혈압은 높지 않으나, 진료실 밖 혈압은 높은 경우로 정의한다.	
대응 혈압	고혈압의 진단과 치료에 동일한 대응 혈압 (corresponding blood pressure)을 적용한다. 진료실 수축기혈압은 140 mmHg 는 가정혈압, 주간 활동혈압 135mmHg 로 진료실 혈압이 130mmHg 이하일때의 주간 활동혈압과 가정혈압은 평균적으로 거의 진료실 혈압과 동일하다.	
고혈압의 혈액검사	혈청 크레아티닌을 이용하여 신기능을 평가하는 데 어려움이 예상되는 경우에는 시스타틴 C를 측정하고 시스타틴 C 를 이용한 사구체 여과율을 함께 평가할것을 권고한다.	
약물 치료	고혈압 약제 투여 횟수를 줄이면 치료 지속성이 좋기 때문에 특별한 사유 (저항성 고혈압, 아침 고혈압, 약물 조정중인 환자)가 없는 한 하루 한번 투여를 권고한다. 장기간 동일성분, 동일용량 안정적으로 투여중인 환자에서 고정 병용약제의 투여가 단일 약제의 병용요법보다 치료 지속성이 좋으므로 고려한다.	1B
고령환자	고령환자에서 중저위험군은 아스피린의 일차 사용을 시작하지 않음	IIIA

신규 추가 사항	2018년 진료지침	2022년 진료지침	권고 등급/ 근거수준
고혈압의 선별 진료	기술 없음	20세 이상 모든 성인을 대상으로 표준 혈압 측정 방법을 이용한 고혈압 선별검사를 권고한다.	1B



신규 추가 사항	2018년 진료지침	2022년 진료지침	권고 등급/ 근거수준
혈압의 분류 (치료 중인 혈압)	기술 없음	고혈압 치료 상태에서도, 이러한 현상이 나타날 수 있는데 백의비조절 고혈압은 고혈압으로 치료중인 환자에서 진료실 혈압은 높으나 진료실 밖 혈압은 높지 않은 경우로, 가면 비 조절 고혈압은 고혈압 치료 환자에서 진료실 혈압은 높지 않으나, 진료실 밖 혈압은 높은 경우로 정의한다.	

백의 고혈압과 가면 고혈압

백의 고혈압

진료실 혈압이 140/90 mmHg 이상이고

가정혈압 또는 주간활동혈압이 135/85 mmHg 미만인 경우로 정의



☑ 진료실과 진료실 밖에서 모두 혈압이 높으면 '지속성 고혈압'이라 정의

가면 고혈압

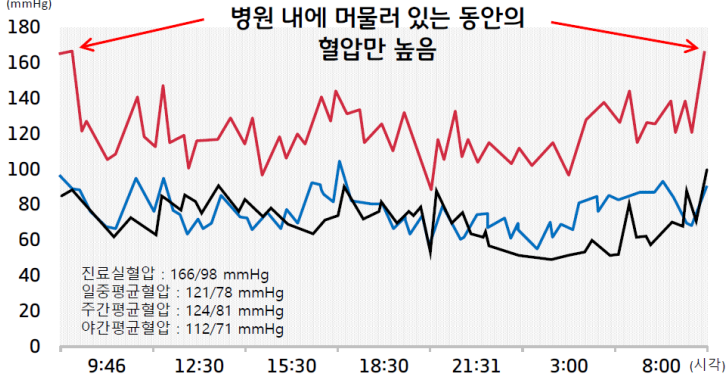
진료실혈압이 140/90 mmHg 미만이고

가정혈압 또는 주간활동혈압은 135/85 mmHg 이상인 경우로 정의



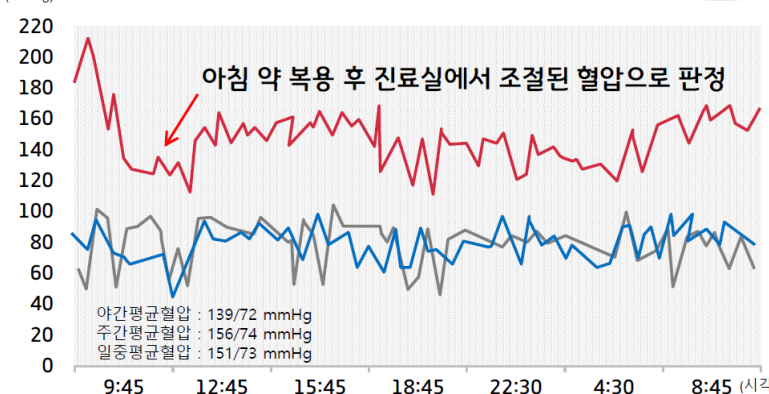
백의 고혈압

혈압 (mmHg)



가면 고혈압

혈압 (mmHg)



가면 고혈압은 지속성 고혈압과 예후가 유사하거나 오히려 더 나쁘다.

24 시간 내내 높은 혈압 사망률 1.6배 증가



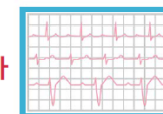
가면 고혈압 사망률 2.8배 증가



진료실 혈압이 높을 때 사망률 1.02배 증가



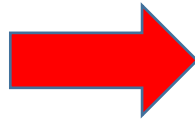
지속성 고혈압 사망률 1.8배 증가



6.3. 백의고혈압과 가면고혈압

권고 내용	권고 등급	근거 수준	참고 문헌
진료실 밖 혈압 측정(활동혈압 측정 또는 가정혈압 측정)을 이용하여 백의고혈압을 진단하는 것을 권고한다.	I	A	53)56)
고혈압으로의 이행을 확인하기 위하여 백의고혈압환자는 가정혈압 또는 활동혈압의 주기적 측정을 고려한다.	IIa	B	80)81)
약물치료 중 진료실혈압이 잘 조절되지 않을 때 백의비조절고혈압을 배제하기 위하여 가정혈압 또는 활동혈압을 측정을 고려한다.	IIa	C	82)83)
혈압 측정 시, 반복적으로 고혈압전단계 또는 정상혈압이면서 장기 손상을 보여 가면고혈압의 가능성이 높은 환자에서 가면고혈압을 진단하고, 예후를 예측하기 위하여 가정혈압 또는 활동혈압 측정을 고려할 수 있다.	IIb	B	63)64)
약물치료 중 진료실혈압은 고혈압전단계이나 장기 손상이나 심뇌혈관질환의 위험도가 높은 경우에는, 치료중인 환자에서의 가면고혈압을 배제하고, 예후를 측정하기 위하여 가정혈압 또는 활동혈압 측정을 고려할 수 있다.	IIb	C	63)

■ 백의고혈압과 가면고혈압

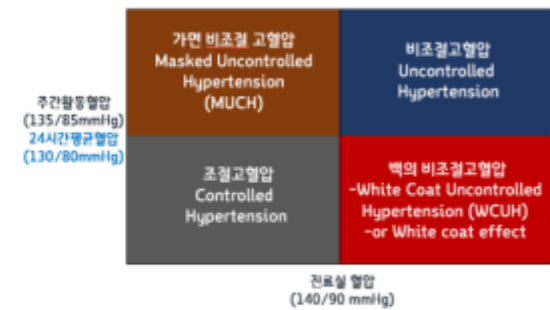


활동혈압을 이용한 혈압의 분류(2022 고혈압진료지침)

■ 고혈압치료를 받지 않는 대상자



■ 고혈압치료를 받는 대상자



○진단 : 백의비조절고혈압(권고등급 IIa, 근거수준 C), 가면비조절고혈압(권고등급 IIb, 근거수준 C)로 진단을 위한 진료실 밖 혈압 측정 권고함

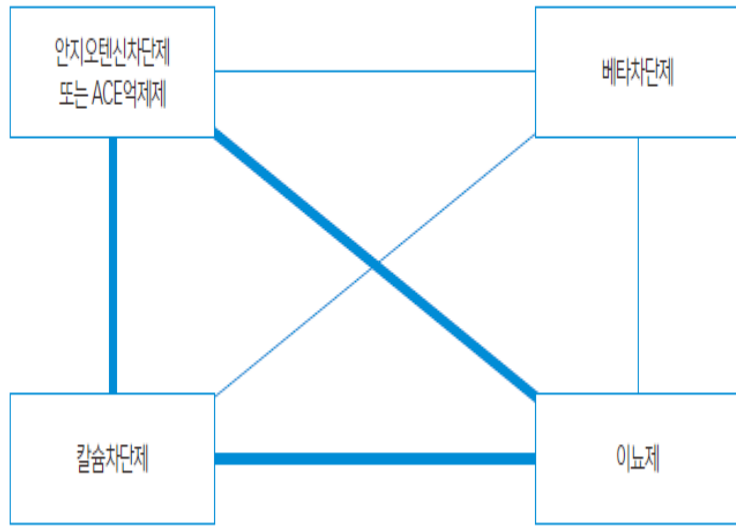
신규 추가 사항	2018년 진료지침	2022년 진료지침	권고 등급/ 근거수준
대응 혈압	기술 없음	고혈압의 진단과 치료에 동일한 대응 혈압 (corresponding blood pressure)을 적용한다. 진료실 수축기혈압은 140 mmHg 는 가정혈압, 주간 활동혈압 135mmHg 로 진료실 혈압이 130mmHg 이하일때의 주간 활동혈압과 가정혈압은 평균적으로 거의 진료실 혈압과 동일하다.	

표 8 대응혈압

	진료실혈압	24시간 활동혈압 일일평균혈압	24시간 활동혈압 주간평균혈압	가정혈압
수축기혈압(mmHg)	140	130	135	135
수축기혈압(mmHg)	130	125	130	130

신규 추가 사항	2018년 진료지침	2022년 진료지침	권고 등급/ 근거수준
약물 치료	기술 없음	고혈압 약제 투여 횟수를 줄이면 치료 지속성이 좋기 때문에 특별한 사유 (저항성 고혈압, 아침 고혈압, 약물 조정중인 환자)가 없는 한 하루 한번 투여를 권고한다. 장기간 동일성분, 동일용량 안정적으로 투여중인 환자에서 고정 병용약제의 투여가 단일 약제의 병용요법보다 치료 지속성이 좋으므로 고려한다.	1B

그림 9 권장되는 병용요법(굵은선: 우선 권장되는 병용요법, 가는선: 가능한 병용요법)



10.9. 치료 지속성

권고 내용	권고 등급	근거 수준	참고 문헌
고혈압 약제 투여 횟수를 줄이면 치료 지속성이 좋기 때문에 특별한 사유(저항성 고혈압, 아침고혈압, 약물 조정 중인 환자 등)가 없는 한 하루 한번 투여를 권고한다.	I	B	285)286)
장기간 동일 성분, 동일 용량 안정적으로 투여 중인 환자에서 고정 병용 약제의 투여가 단일약제의 병용요법 보다 치료 지속성이 좋으므로 고려한다.	IIa	B	287)288)

변경사항

2022년 진료지침

권고 등급/근거수준

1. 올바른 혈압 측정 방법 및 진료실 밖 혈압 측정 강조

권고 내용	권고 등급	근거 수준	참고 문헌
진료실혈압을 표준적인 방법으로 반복적으로 측정하여 고혈압을 진단하도록 권고한다.	I	C	43/44)
수은혈압계는 검증된 비수은혈압계로 대체하도록 권고한다.	I	A	47)
권고 내용	권고 등급	근거 수준	참고 문헌
고혈압, 백의고혈압 및 가면고혈압을 진단하고, 치료 효과를 판정하고, 예후를 예측하기 위하여 활동혈압 측정을 권고한다.	I	A	45/59) 63/64)

2. 더 강화된 목표 혈압 제시

표 14 고혈압 치료의 목표 혈압

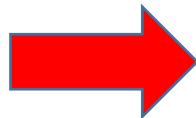
임상상황	수축기혈압(mmHg)	이완기혈압(mmHg)	권고등급/근거수준
합병증이 없는 고혈압			
· 중저위험도 고혈압	<140	<90	I/A
· 노인 고혈압	<140	<90	I/A
· 고위험도 고혈압*	<130	<80	IIa/B
· 당뇨병			
- 중저위험도 당뇨병	<140	<90	I/A
- 고위험도 당뇨병#	<130	<80	IIa/B
합병증이 동반된 고혈압			
· 심혈관질환 ¹	<130	<80	IIa/B
· 만성콩팥병, 알부민뇨 없음	<140	<90	I/A
- 알부민뇨 동반	<130	<80	IIa/B
- 당뇨병 동반	<130	<80	IIa/B
· 뇌졸중	<140	<90	I/B
- 열공성 뇌경색	<130	<80	IIa/B

*무중상징기손상 또는 심뇌혈관질환 위험인자가 3개 이상 동반된 경우
#무중상징기손상 또는 심뇌혈관질환 위험인자가 1개 이상 동반된 경우
1 관상동맥질환, 말초혈관질환, 복부대동맥류, 심부전 또는 좌심실비대

2018년 지침

임상상황	수축기혈압 (mmHg)	이완기혈압 (mmHg)
합병증이 없는 고혈압	<140	<90
노인고혈압	<140	<90
당뇨병		
심혈관질환 없음*	<140	<85
심혈관질환 있음*	<130	<80
고위험군 [†]	≤130	≤80
심혈관질환*	≤130	≤80
뇌졸중	<140	<90
만성콩팥병		
-알부민뇨 없음	<140	<90
-알부민뇨 동반됨 [‡]	<130	<80

*50세이상의 관상동맥질환, 말초혈관질환, 대동맥질환, 심부전, 좌심실비대
† 고위험군 노인은 노인고혈압 기준을 따름, ‡ 미세알부민뇨 포함



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