

Korean Society for Health Promotion and Disease Prevention

2021년 대한임상건강증진학회 춘계학술대회

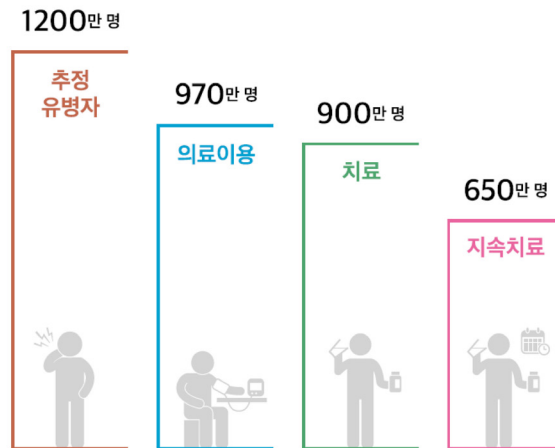
2021. 5. 30 (일)

잘 조절되지 않는 고혈압의 관리

한 병 덕 (고대구로병원)



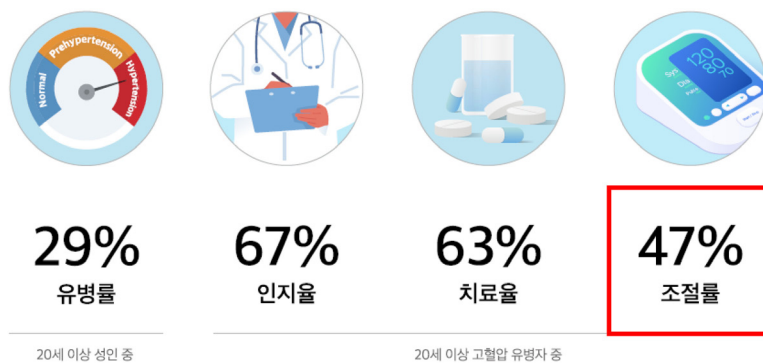
고혈압 인구 현황



자료원 : 국민건강영양조사 2018, 국민건강보험 빅데이터 2018

대한고혈압학회 fact sheet 2020

고혈압 인구 현황



자료원 : 국민건강영양조사 2018, 국민건강보험 빅데이터 2018

대한고혈압학회 fact sheet 2020

Definition of Resistant Hypertension

- **Failure to achieve goal blood pressure** (<140/90 mmHg) in spite of the concurrent use of **3 antihypertensive agents of different classes**
- Ideally, 1 of 3 agents should be a **diuretic**
- Ideally, all agents should be prescribed **at optimal dose amounts**
- **BP controlled but requires ≥ 4 antihypertensive agents** of different drug classes

2018 European Society of Cardiology European Society of Hypertension (ESC/ESH) statement
2018 American Heart Association (AHA) scientific statement

Outcome in resistant hypertension

The Swedish Primary Care Cardiovascular Database (SPCCD)

- 74 751 patients aged 30 years or more
- who were diagnosed with hypertension during 2001–2008.
- All patients from all 48 primary healthcare centers (PHCC's)

Outcome	Imputed dataset incidence rate ratio (95% CI)		Imputed dataset hazard ratio (95% CI)			Complete cases hazard ratio (95% CI)
	Unadjusted	Model 1 ^a	Model 2 ^b	Model 3 ^c	Model 3 ^c	
Total mortality	1.52 (1.40–1.66)	1.10 (1.01–1.20)	1.14 (1.04–1.25)	1.12 (1.03–1.23)	1.08 (0.90–1.28)	
Cardiovascular mortality	1.84 (1.59–2.13)	1.27 (1.10–1.47)	1.23 (1.06–1.44)	1.20 (1.03–1.40)	1.17 (0.87–1.57)	
Ischemic heart disease	1.42 (1.26–1.61)	1.16 (1.02–1.31)	1.12 (0.99–1.27)	1.12 (0.99–1.27)	1.14 (0.92–1.42)	
Angina pectoris	1.50 (1.26–1.78)	1.27 (1.07–1.51)	1.23 (1.03–1.47)	1.24 (1.03–1.48)	1.41 (1.04–1.91)	
Myocardial infarction	1.32 (1.16–1.55)	1.08 (0.93–1.25)	1.03 (0.89–1.20)	1.03 (0.89–1.20)	1.04 (0.81–1.34)	
Heart failure	1.97 (1.74–2.24)	1.31 (1.15–1.49)	1.36 (1.19–1.56)	1.34 (1.17–1.54)	1.39 (1.10–1.67)	
Stroke	1.47 (1.29–1.68)	1.11 (0.97–1.27)	1.04 (0.90–1.19)	1.03 (0.90–1.19)	1.04 (0.81–1.34)	
Transitory ischemic attack	1.39 (1.08–1.79)	1.12 (0.87–1.45)	1.12 (0.86–1.46)	1.12 (0.86–1.46)	0.99 (0.59–1.64)	

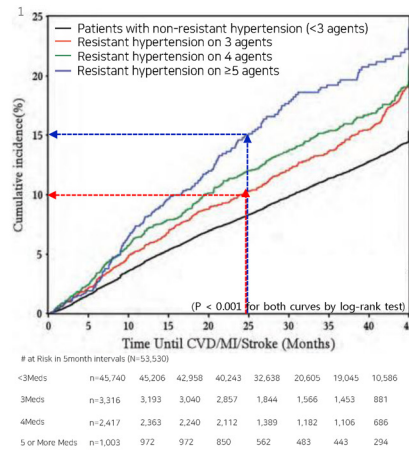
Results from the Swedish Primary Care Cardiovascular Database. Imputed dataset and complete cases. The Poisson and the Cox regression analysis for mortality and cardiovascular outcomes. CI, confidence interval.

^aModel 1 adjusted for age, sex, smoking, diabetes mellitus, atrial fibrillation and BMI.

^bModel 2 adjusted for age, sex, smoking, diabetes mellitus, atrial fibrillation, BMI and SBP.

^cModel 3 adjusted for age, sex, smoking, diabetes mellitus, atrial fibrillation/flutter, BMI, SBP, estimated glomerular filtration rate, LDL, cancer, country of birth, level of education and annual income.

Resistant hypertension & CV Event



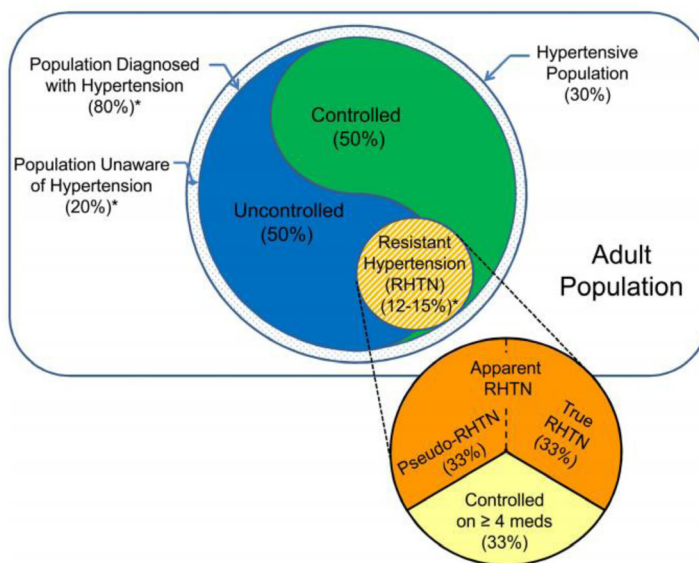
2 Cardiovascular Outcomes among patients in the Primary Outcomes Analysis According to Resistance Status

Outcome	Resistant	Nonresistant	Total
Death	54 (2.1)	290 (1.9)	344 (1.9)
Myocardial infarction	9 (0.4)	81 (0.5)	90 (0.5)
Stroke	15 (0.6)	76 (0.5)	91 (0.5)
Congestive Heart failure	10 (0.4)	43(0.3)	53 (0.3)
Chronic kidney disease	365(14.5)	1607 (10.4)	1972 (10.9)
Total events	453 (18.0)	2097 (13.5)	2550 (14.1)
Total patients	2521	15515	18036

4

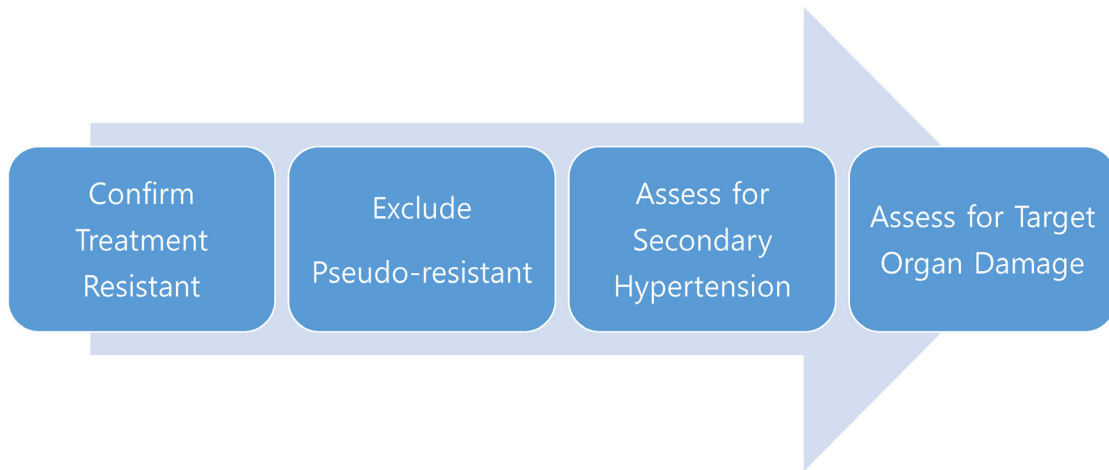
1) Circulation, Volume 125, Issue 13, 3 April 2012, Pages 1635-1642
2) International Journal of Cardiology 2017, Volume 236, 226-231

True Resistant Hypertension?

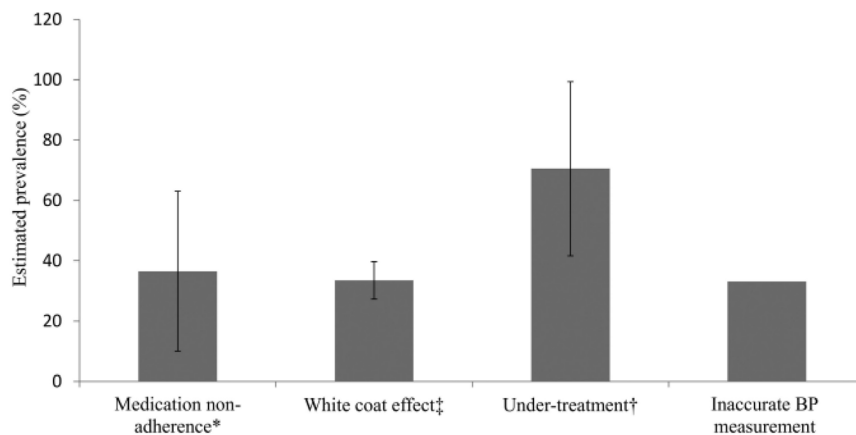


J Hum Hypertens. 2014 Aug; 28(8): 463-468.

Evaluation of Resistant Hypertension



Causes of Pseudo-Resistant Hypertension



J Am Soc Hypertension 2016; 10:493-499

Pseudoresistance

- Poor Blood Pressure Technique
- Poor Adherence
- White-Coat Effect

Lifestyle Factors

- Obesity
- Dietary Salt
- Alcohol

Drug-related causes

- Nonnarcotic analgesics
 - Nonsteroidal antiinflammatory agents, including aspirin
 - Selective COX-2 inhibitors
- Sympathomimetic agents (decongestants, diet pills, cocaine)
- Stimulants (methylphenidate, dexamethylphenidate, dextroamphetamine, amphetamine, methamphetamine, modafinil)
- Alcohol
- Oral contraceptives
- Cyclosporine
- Erythropoietin
- Natural licorice
- Herbal compounds (ephedra or ma huang)

Circulation. 2008;117:e510-e526.

Secondary causes

- Common
 - Obstructive sleep apnea
 - Renal parenchymal disease
 - Primary aldosteronism
 - Renal artery stenosis
- Uncommon
 - Pheochromocytoma
 - Cushing's disease
 - Hyperparathyroidism
 - Aortic coarctation
 - Intracranial tumor

Circulation. 2008;117:e510-e526.

Patient Characteristics Associated with Resistant Hypertension

- Older age
- High baseline blood pressure
- Obesity
- Excessive dietary salt ingestion
- Chronic kidney disease
- Diabetes
- Left ventricular hypertrophy
- Black race
- Female sex
- Residence in southeastern United States

Circulation. 2008;117:e510-e526.

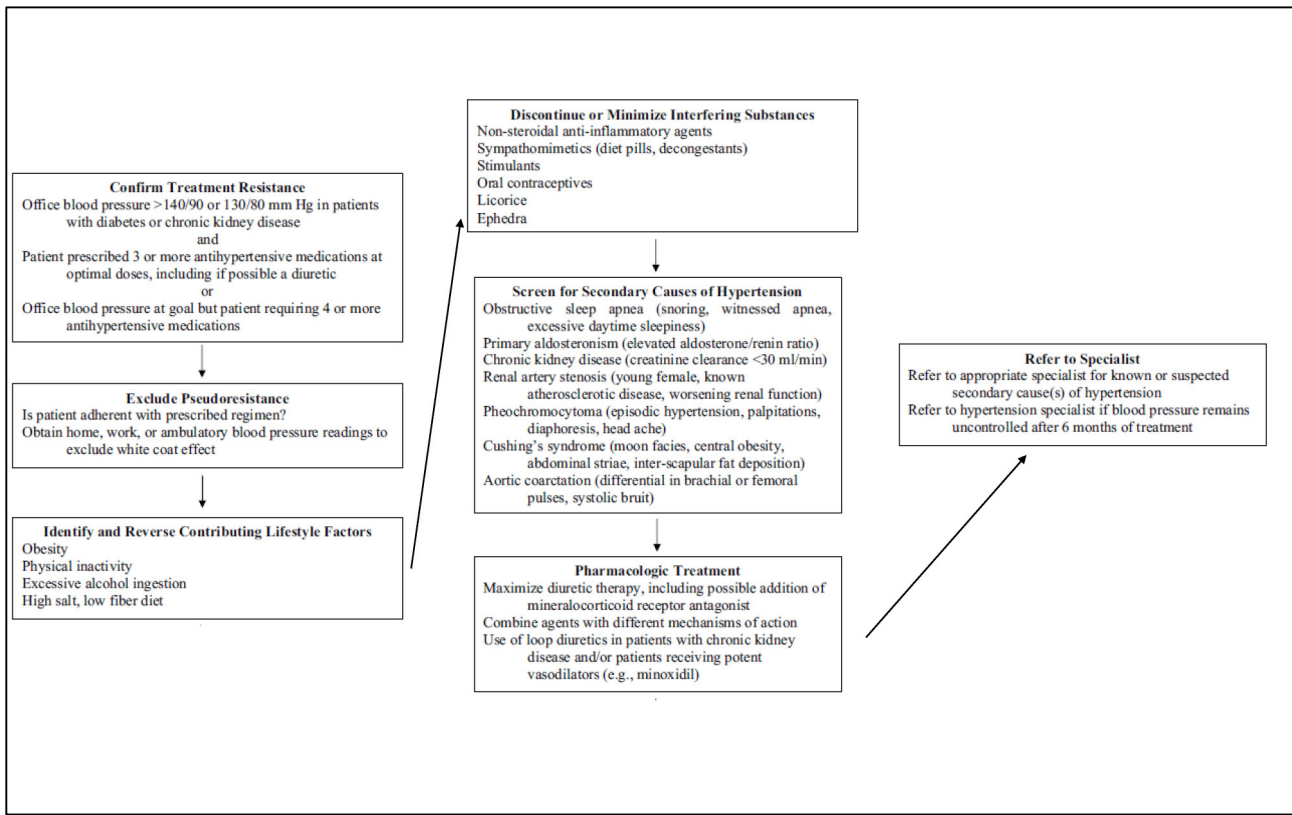
대한고혈압학회 진료지침

권고 내용	권고등급	근거수준	참고문헌
저항성 고혈압의 진단을 위해 약 순응도를 확인하고 가정혈압 또는 24시간 활동혈압 측정을 권고한다.	I	B	192
저항성 고혈압은 알도스테론길항제를 추가하여 치료할 것을 고려한다.	Ila	B	174

1. 복약 순응도를 확인한다.
2. 백의고혈압을 배제한다. - 가정혈압 또는 활동혈압 측정
3. 3가지 서로 다른 기전의 약을 충분한 용량으로 사용함에도 조절이 되지 않을 시 이뇨제 용량을 증량하거나 교체한다.
4. 콩팥기능이 떨어진 경우 티아지드계 대신 루프 이뇨제를 사용한다.
5. 필요시 spironolactone, amiloride, doxazosin을 추가 할 수 있다.
6. ACEi / ARB를 복용중인 환자에게 spironolactone 또는 amiloride를 처방한 경우 1-2주내 칼륨수치를 확인한다.

Evaluation

- Medical History
- Assessment of Adherence
- Blood Pressure Measurement
- Physical Examination
- Ambulatory Blood Pressure monitoring
- Biochemical Evaluation
- Noninvasive Image



Treatment Recommendation

복약순응도 !!!

비약물적 치료

- Weight loss
- Dietary Salts Restriction
- Increased Physical Activity
- Ingestion of a High-Fiber, Low-Fat Diet
- Moderation of Alcohol Intake

➔ 기초부터, 다시 확인

Treatment of Secondary causes of Hypertension

- Common
 - Obstructive sleep apnea
 - Renal parenchymal disease
 - Primary aldosteronism
 - Renal artery stenosis
- Uncommon
 - Pheochromocytoma
 - Cushing's disease
 - Hyperparathyroidism
 - Aortic coarctation
 - Intracranial tumor

Circulation. 2008;117:e510-e526.

Pharmacological Treatment

- **Withdrawal of Interfering Medications**
- **Diuretic Therapy**
- **Combination Therapy**
- **Mineralocorticoid Receptor Antagonists**

감사합니다.