# Cas clinique
# Un patient hypertendu

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# Cas Clinique: Hypertension artérielle

- Mr R. âgé de 66 ans vient en consultation pour des chffres de pression artérielle élevés: son médecin traitant a retrouvé à trois reprises # 175/110 mm Hg.
- **Antécédents :**

-Tabac : 45 paquets années sevré depuis 1 an

-Diabète de type 2 depuis 11 ans traité par metformine 850mg 2 / jour.

-Hérédité cardio-vasculaire: deux parents et un frère hypertendus

-Hypercholestérolémie depuis 8 ans traitée par Atorvastatine 10 mg/j

- **Antécédents** (suite):

- Arthrose vertébrale étagée traitée par Ibuprofene 2c/j
- Bronchopathie chronique obstructive post tabagique
- Artérite des membres inférieurs.Un doppler vasculaire réalisé il y a trois ans devant une claudication intermittente douloureuse a révélé des sténoses étagées #50% des deux fémorales superficielles, des artères d'aval grêles une infiltration de l'aorte abdominale sans sténose significative ni dilatation .

- **Signes fonctionnels**:

Le patient se plaint de majoration de son essoufflement (dyspnée d’effort à deux étages), de douleurs des mollets apparaissant après une marche de 1 km, de céphalées matinales et de palpitations à prédominance nocturne.

- **Examen clinique**:

-Poids 86 kgs Taille 172 cms

-Sibillants bilatéraux à l’auscultation pulmonaire

-Fréquence cardiaque: 68/mn

-Bruits du coeur : présence d’extrasystoles.Pas de souffle cardiaque.

-Souffle cervical droit

PA : 179/112 couché 168/107 debout

- **Examens complémentaires**:

-Natrémie :142meq/l.Kaliémie :3.9 meq/l

-Créatinémie :18mg/l

-clearance à la créatinine estimée :71ml/mn

-Glycémie 1.49 g/l. HbA1C: 8.2 %

-CT: 2.52g/l. LDL CT: 1.86g/l

-ECG : rythme sinusal.Présence d'extrasystoles supraventriculaires isolées.Signes d'HVG avec indice de Sokolow à 46.

- **Traitement à l’arrivée** :

- Furosémide 40 mg/j
- Bisoprolol 1.25 mg/j

# Questions

- Quel est le risque cardio-vasculaire de ce patient ?
- Quels examens complémentaires jugez -vous utiles ?
- Quelle(s) modification(s) thérapeutique(s) envisagez-vous?

# Definitions of hypertension by office and out-of-office blood pressure levels (mmHg)

| Category | Systolic | | Diastolic |
|---|---|---|---|
| **Office BP** | **≥ 140** | **and/or** | **≥90** |
| Ambulatory BP | | | |
| *** Daytime (or awake)** | **≥ 135** | **and/or** | **≥ 85** |
| *** Nightime (or asleep)** | **≥ 120** | **and/or** | **≥ 70** |
| *** 24-hour** | **≥ 130** | **and/or** | **≥ 80** |
| **Home BP** | **≥ 135** | **and/or** | **≥ 85** |

# CUT OFF VALUES

**OFFICE**

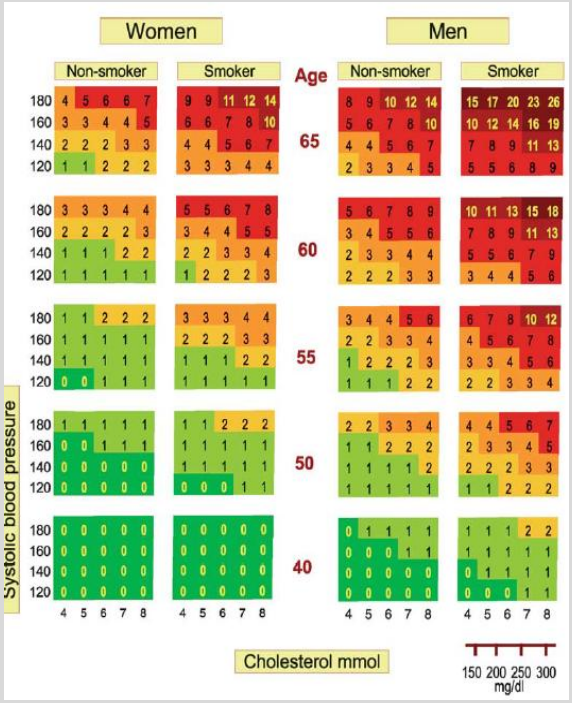
| Two measures sitting | 1-2mn apart Systolic | | after 3-5 mn Diastolic |
|---|---|---|---|
| OPTIMAL | < 120 | and | < 80 |
| NORMAL | 120-129 | and/or | 80-84 |
| HIGH NORMAL | 130-139 | and/or | 85-89 |
| GRADE 1 HT | 140 -159 | and/or | 90 - 99 |
| GRADE 2 HT | 160-179 | and/or | 100-109 |
| GRADE 3 HT | ≥180 | and/or | ≥ 110 |
| Isolated systolic HT | ≥ 140 | and/or | < 80 |

# 2013 ESH-ESC Guidelines for the management of Hypertension
## Evaluation of global CV risk

| Other risk factors, asymptomatic organ damage or disease | Blood Pressure (mmHg) | | | |
|---|---|---|---|---|
| | High normal SBP 130–139 or DBP 85–89 | Grade 1 HT SBP 140–159 or DBP 90–99 | Grade 2 HT SBP 160–179 or DBP 100–109 | Grade 3 HT SBP ≥180 or DBP ≥110 |
| No other RF | | Low risk | Moderate risk | High risk |
| 1–2 RF | Low risk | Moderate risk | Moderate to high risk | High risk |
| ≥3 RF | Low to Moderate risk | Moderate to high risk | High Risk | High risk |
| OD, CKD stage 3 or diabetes | Moderate to high risk | High risk | High risk | High to very high risk |
| Symptomatic CVD, CKD stage ≥4 or diabetes with OD/RFs | Very high risk | Very high risk | Very high risk | Very high risk |

BP = blood pressure; CKD = chronic kidney disease; CV = cardiovascular; CVD = cardiovascular disease; DBP = diastolic blood pressure; HT = hypertension; OD = organ damage; RF = risk factor; SBP = systolic blood pressure.

# Stratification of CV risk in four categories




**SCORE**

- 15% and over
- 10%–14%
- 5%–9%
- 3%–4%
- 2%
- 1%
- < 1%

10-year risk of fatal CVD in populations at **low CVD risk**

| ESH/ESC | Framingham |
|---|---|
| Very high | > 30 % |
| High | 20-30% |
| Moderate | 15-20 % |
| Low | < 15% |

10-year risk of **fatal and non fatal** CVD

# 2013 ESH-ESC Guidelines for the management of Hypertension
## Markers of subclinical organ damage

| Risk factors |
| --- |
| Male sex |
| Age (men ≥55 years; women ≥65 years) |
| Smoking |
| Dyslipidaemia |
| Total cholesterol >4.9 mmol/L (190 mg/dL), and/or |
| Low-density lipoprotein cholesterol >3.0 mmol/L (115 mg/dL), and/or |
| High-density lipoprotein cholesterol: men <1.0 mmol/L (40 mg/dL), women <1.2 mmol/L (46 mg/dL), and/or |
| Triglycerides >1.7 mmol/L (150 mg/dL) |
| Fasting plasma glucose 5.6–6.9 mmol/L (102–125 mg/dL) |
| Abnormal glucose tolerance test |
| Obesity [BMI ≥30 kg/m$^2$ (height$^2$)] |
| Abdominal obesity (waist circumference: men ≥102 cm; women ≥88 cm) (in Caucasians) |
| Family history of premature CVD (men aged <55 years; women aged <65 years) |

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## Markers of subclinical organ damage

| Asymptomatic organ damage |
| --- |
| Pulse pressure (in the elderly) ≥60 mmHg |
| Electrocardiographic LVH (Sokolow–Lyon index >3.5 mV; RaVL >1.1 mV; Cornell voltage duration product >244 mV*ms), or |
| Echocardiographic LVH [LVM index: men >115 g/m$^2$; women >95 g/m$^2$ (BSA)][a] |
| Carotid wall thickening (IMT >0.9 mm) or plaque |
| Carotid–femoral PWV >10 m/s |
| Ankle-brachial index <0.9 |
| CKD with eGFR 30–60 ml/min/1.73 m$^2$ (BSA) |
| Microalbuminuria (30–300 mg/24 h), or albumin–creatinine ratio (30–300 mg/g; 3.4–34 mg/mmol) (preferentially on morning spot urine) |

# 2013 ESH-ESC Guidelines for the management of Hypertension
## Markers of subclinical organ damage

| Recommendations | Class [a] | Level [b] |
|---|---|---|
| **Heart** | | |
| An ECG is recommended in all hypertensive patients to detect LVH, left atrial dilatation, arrhythmias, or concomitant heart disease. | I | B |

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| In all patients with a history or physical examination suggestive of major arrhythmias, long-term ECG monitoring, and, in case of suspected exercise-induced arrhythmias, a stress ECG test should be considered. | IIa | C |

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| In all patients with a history or physical examination suggestive of major arrhythmias, long-term ECG monitoring, and, in case of suspected exercise-induced arrhythmias, a stress ECG test should be considered. | IIa | C |
| An echocardiogram should be considered to refine CV risk, and confirm ECG diagnosis of LVH, left atrial dilatation or suspected concomitant heart disease, when these are suspected. | IIa | B |

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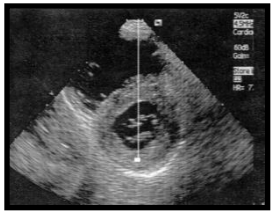

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| An echocardiogram should be considered to refine CV risk, and confirm ECG diagnosis of LVH, left atrial dilatation or suspected concomitant heart disease, when these are suspected. | IIa | B |
| Whenever history suggests myocardial ischaemia, a stress ECG test is recommended, and, if positive or ambiguous, an imaging stress test (stress echocardiography, stress cardiac magnetic resonance or nuclear scintigraphy) is recommended. | I | C |

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## Markers of subclinical organ damage

| Recommendations | Class [a] | Level [b] |
|---|---|---|
| **Arteries** | | |
| Ultrasound scanning of carotid arteries should be considered to detect vascular hypertrophy or asymptomatic atherosclerosis, particularly in the elderly. | IIa | B |
| Carotid–femoral PWV should be considered to detect large artery stiffening. | IIa | B |
| Ankle–brachial index should be considered to detect PAD. | IIa | B |

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Ultrasound scanning of carotid arteries should be considered to detect vascular hypertrophy (CIMT > 0.9 mm) or asymptomatic atherosclerosis, particularly in the elderly.

# 2013 ESH-ESC Guidelines for the management of Hypertension
## Markers of subclinical organ damage

| Recommendations | Class [a] | Level [b] |
|---|---|---|
| **Kidney** | | |
| Measurement of serum creatinine and estimation of GFR is recommended in all hypertensive patients.[d] | I | B |

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| Assessment of urinary protein is recommended in all hypertensive patients by dipstick. | I | B |

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| Assessment of urinary protein is recommended in all hypertensive patients by dipstick. | I | B |
| Assessment of microalbuminuria is recommended in spot urine and related to urinary creatinine excretion. | I | B |

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# 2013 ESH-ESC Guidelines for the management of Hypertension
## Markers of subclinical organ damage

| Recommendations | Class [a] | Level [b] |
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| **Fundoscopy** | | |
| Examination of the retina should be considered in difficult to control or resistant hypertensive patients to detect haemorrhages, exudates, and papilloedema, which are associated with increased CV risk. | IIa | C |

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# Treatment strategies - Recommended lifestyle changes

- Salt restriction
- Moderation of alcohol consumption
- High vegetable / fruit consumption / low fat diet
- Weight reduction / maintenance
- Regular physical exercise
- Smoking cessation

# Choice of drugs

- Antihypertensive drugs necessary in most cases
- Major drug classes have by and large a similar antihypertensive effect
- “Although meta-analyses occasionaly claim superiority of one class for some outcomes, this largely depends on selection bias of trials - The largest meta-analyses do not show clinically relevant between-class differences”

# BP-Lowering Regimens Based on Different Drug Classes and Total Major CV Events in Younger and Older Patients

| | No. of events/patients | | Difference in SBP/DBP (mmHg) | Risk ratio (95%CI) | Risk ratio (95%CI) | P for homogeneity |
|---|---|---|---|---|---|---|
| | 1st listed | 2nd listed | | | | |
| **ACEI vs D or BB** | | | | | | |
| Age < 65 | 819/ | 1066/1201 | 1.3/0.1 | | 1.05 (0.96-1.14) | |
| Age ≥ 65 | 9448 | 2 | 2.0/0.5 | | 1.01 (0.95-1.06) | 0.44 |
| **CA vs D or BB** | 1795/1078 | 2525/1442 | | | | |
| Age < 65 | 3 | 9 | 1.1/-0.2 | | 1.06 (0.98-1.14) | |
| Age ≥ 65 | | | 0.5/-0.4 | | 1.02 (0.97-1.06) | 0.38 |
| **ACEI vs CA** | 1165/20358 | 1430/2323 | | | | |
| Age < 65 | 2653/2120 | 6 | 0.9/0.6 | | 0.91 (0.78-1.06) | |
| Age ≥ 65 | 4 | 3363/2498 | 1.0/1.0 | | 0.98 (0.92-1.05) | 0.37 |
| **ARB vs others** | | 1 | | | | |
| Age < 65 | 548/ | | -1.7/-0.3 | | 0.89 (0.75-1.05) | |
| Age ≥ 65 | 5130 | 568/ | -2.0/-1.2 | | 0.91 (0.81-1.02) | 0.78 |
| | 1583/ | 4919 | | | | |
| **ACEI or CA vs BB** | 8170 | 1608/ | | | | |
| Age < 65 | | 8140 | 0.2/ 0.1 | | 1.03 (0.88-1.20) | |
| Age ≥ 65 | 183/ | | -0.8/-0.2 | | 0.94 (0.84-1.06) | 0.38 |
| | 742 | 204/ | | | | |
| | 438/ | 722 | | | | |
| | 3167 | 487/ | | | | |
| | | 3171 | | | | |


www.escardio.org/guidelines

*BPLTTC, BMJ 2008; 336: 1121*

# Choice of antihypertensive drugs

- Current Guidelines reconfirm that the following drug classes are all suitable for initiation and maintenance of antihypertensive treatment either as monotherapy or in some combination with each other (IA)
  - Diuretics (thiazides / chlorthalidone / indapamide)
  - Beta-blockers
  - Calcium antagonists
  - ACE-inhibitors
  - Angiotensin receptor blockers

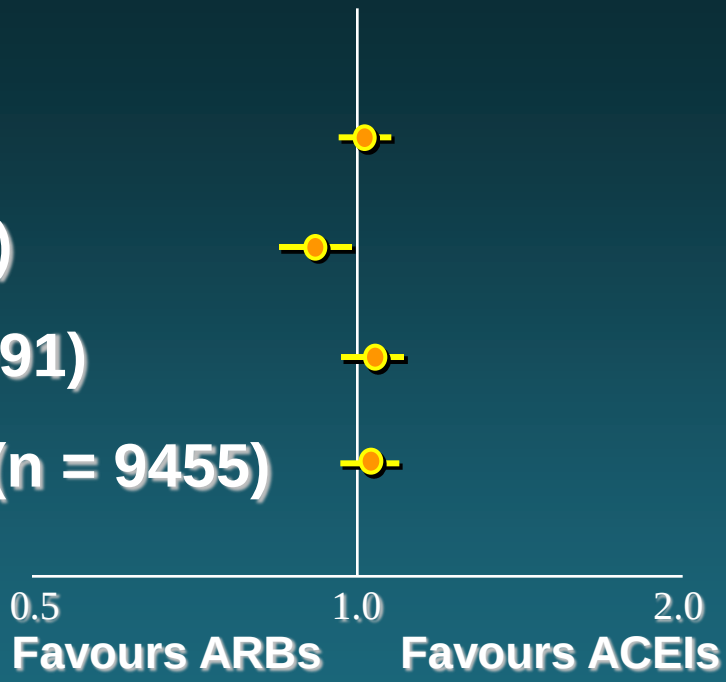
# Advantages of a Large vs a Restricted Number of Drug Options

- A drug class controls BP in only a small fraction of patients
- Patients unresponsive to one drug class may respond to another
- A larger number of options increases the chance of early successful treatment / BP control

# Which diuretic?

- There is strong evidence of CV protection by
  - HCTZ
  - Chlorthalidone
  - Indapamide

# Comparisons between ARBs (n = 31632) and ACEIs (n = 31777)




Trials ELITE / ELITE II / OPTIMAAL / DETAIL / VALIANT / ONTARGET

*Reboldi, Angeli, Cavallini, Gentile, Mancia, Verdecchia, J Hypert 2008; 26: 1282*

# Treatment strategies after initial drug

What to do if the selected drug

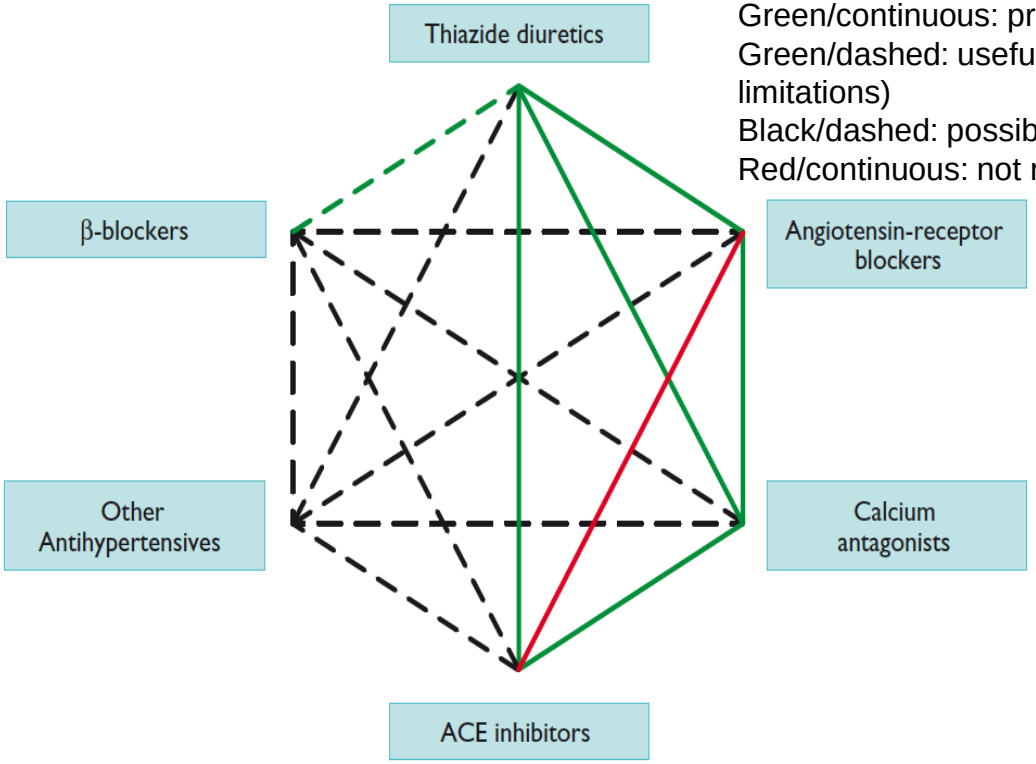
- Elicits serious side effects
- Does not lower BP at all
- BP is reduced but not controlled

| Increase the dose | Move to another monotherapy | Add a second drug |
|---|---|---|
| Not recommended | Possible, but with inconveniences | Recommended |

# Preferred drug combinations

- Randomized comparisons between drug combinations / vs monotherapy/placebo only in few trials (ADVANCE / FEVER / ACCOMPLISH)
- In all other trials
  - Treatment started with one drug / other drugs added
  - 2nd-3th … drugs chosen among those not used in other treatment arms

# Possible combinations of antihypertensive drug classes




Green/continuous: preferred
Green/dashed: useful (with some limitations)
Black/dashed: possible but less well tested
Red/continuous: not recommended

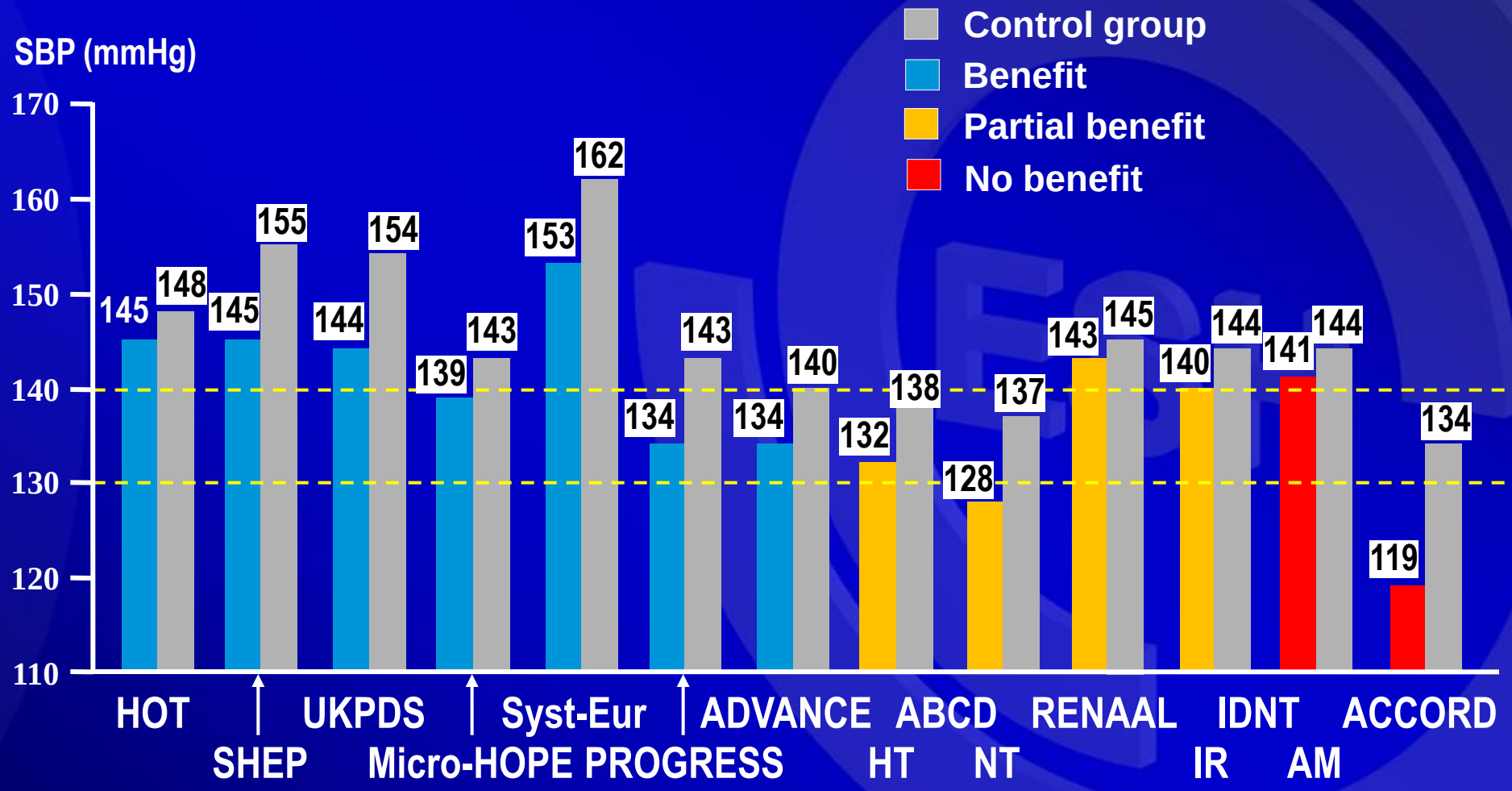
Only dihydropyridines to be combined with β-blockers (except for verapamil or diltiazem for rate control in AF)
Thiazides + β-blockers increase risk of new onset DM
ACEI + ARB combination discouraged (IIIA)

# 2007 ESH/ESC Guidelines - BP Thresholds / Goals (mmHg)

| | General hypertensive population | High / very high CV risk patients (CAD, cerebrovasc. disease / DM / Renal disease) |
|---|---|---|
| Threshold | ≥ 140/90 | |
| Goal | < 140/90 (and lower if tolerated) | ≥ 130/85 < 130/80 |

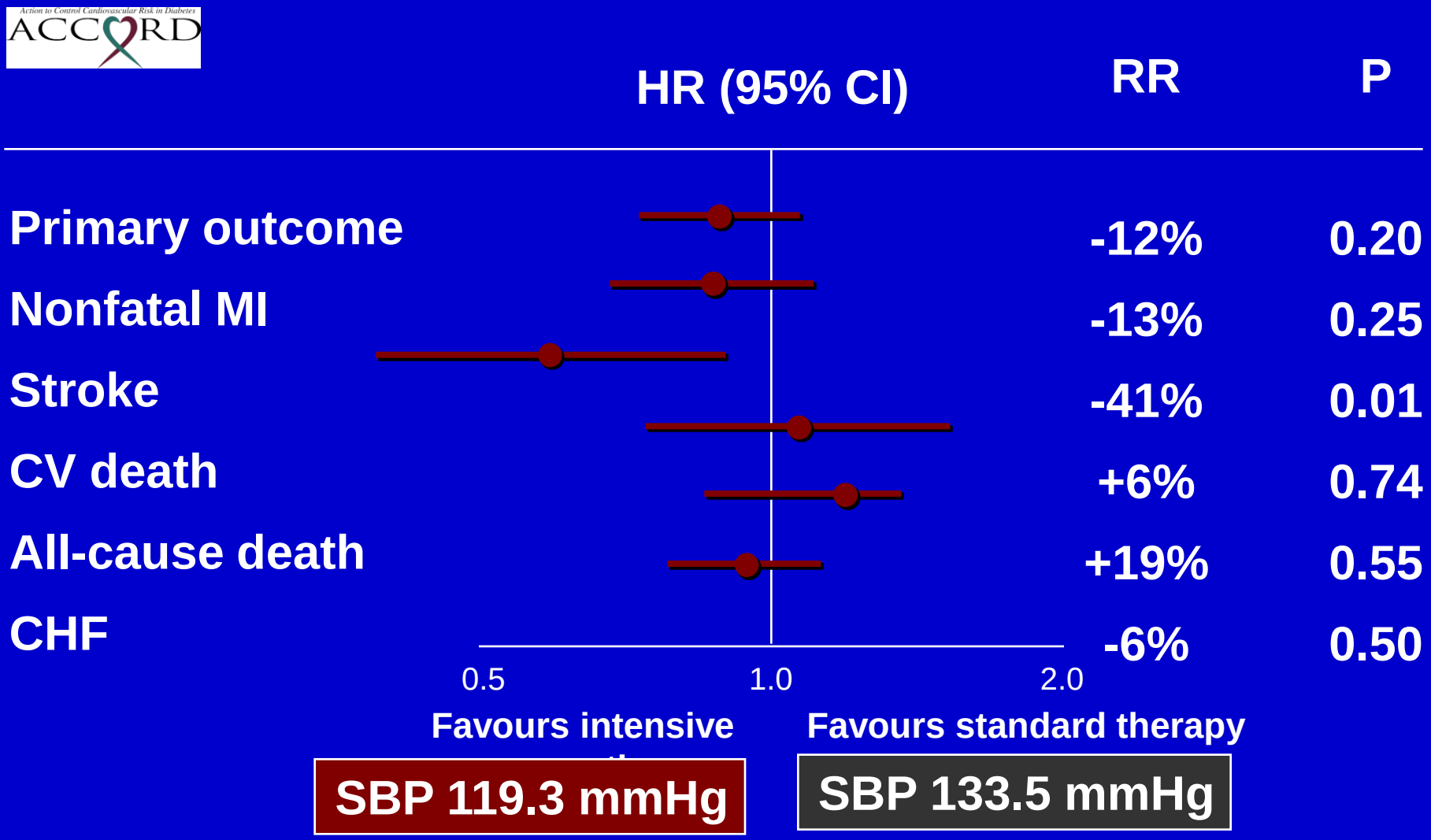
Threshold / Goal identical in the elderly (up to 80 yrs of age)

# Achieved blood pressure in diabetes mellitus




Adapted from Mancia et al. *J Hypertens* 2009; 27: 2121-2158.

# ACCORD-BP: primary and secondary outcomes




*Cushman W, et al. N Engl J Med 2010*
*Nilsson PM (Editorial)*

# Blood Pressure Targets in Subjects With Type 2 Diabetes Mellitus/Impaired Fasting Glucose

## Observations From Traditional and Bayesian Random-Effects Meta-Analyses of Randomized Trials

Sripal Bangalore, MD, MHA; Sunil Kumar, MD; Iryna Lobach, PhD; Franz H. Messerli, MD

***Background***—Most guidelines for treatment of hypertension recommend a blood pressure (BP) goal of <140/90 mm Hg, and a more aggressive goal of <130/80 mm Hg for patients with diabetes mellitus. However, in the recent Action to Control Cardiovascular Risk in Diabetes (ACCORD) trial, a lower BP was not beneficial. The optimal BP target in subjects with diabetes mellitus or those with impaired fasting glucose/glucose tolerance is therefore not well defined.

***Methods and Results***—We performed PUBMED, EMBASE, and CENTRAL searches for randomized clinical trials from 1965 through October 2010 of antihypertensive therapy in patients with type 2 diabetes mellitus or impaired fasting glucose/impaired glucose tolerance that enrolled at least 100 patients with achieved systolic BP of ≤135 mm Hg in the intensive BP control group and ≤140 mm Hg in the standard BP control group, had a follow-up of at least 1 year, and evaluated macrovascular or microvascular events. We identified 13 randomized clinical trials enrolling 37 736 participants. Intensive BP control was associated with a 10% reduction in all-cause mortality (odds ratio, 0.90; 95% confidence interval, 0.83 to 0.98), a 17% reduction in stroke, and a 20% increase in serious adverse effects, but with similar outcomes for other macrovascular and microvascular (cardiac, renal, and retinal) events compared with standard BP control. The results were similar in a sensitivity analysis using a bayesian random-effects model. More intensive BP control (≤130 mm Hg) was associated with a greater reduction in stroke, but did not reduce other events. Meta–regression analysis showed continued risk reduction for stroke to a systolic BP of <120 mm Hg. However, at levels <130 mm Hg, there was a 40% increase in serious adverse events with no benefit for other outcomes.

***Circulation 2011; 123: 2799-2810***