FAFP2 Pharmaceutical care II

# Lecture:
# Cardiovascular system I. - hypertension

## Pharmacist's role in providing pharmaceutical care to patients with arterial hypertension

## Blood pressure measurement

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# Hypertension

- sustained increase in systemic arterial pressure **above 140/90 mmHg**

## Blood pressure (BP) goals:

- all patients with hypertension — decrease BP: **< 140/90 mm Hg**
- patients with diabetes — decrease BP: **< 140/85 mm Hg**
- patients with hypertension with high total cardiovascular (CV) risk:
  *patiets with diabetes mellitus, metabolic sy, patients after myocardial infarction, patients after ictus, renal impairment, proteinuria*
  decrease BP: **< 130/80 mm Hg**
- the elderly patients (over 65 years):
  - systolic BP goal of **140-150 mm Hg**

# Definitions and classification of office blood pressure levels (mmHg)

**WHO, European Society of Hypertension (ESH)**

| Category | Systolic blood pressure (mm Hg) | Diastolic blood pressure (mm Hg) |
|---|---|---|
| Optimal | <120 | <80 |
| Normal | 120-129 | 80-84 |
| High normal (prehypertension) | 130-139 | 85-89 |
| Grade 1 hypertension | 140-159 | 90-99 |
| Grade 2 hypertension | 160-179 | 100-109 |
| Grade 3 hypertension | ≥180 | ≥110 |
| Isolated systolic hypertension | ≥140 | <90 |

# Pharmaceutical care to patients with hypertension

1. Primary prevention of hypertension
2. Detection of hypertension
3. Management of hypertension treatment

## 1. step: Primary prevention of hypertension – pharmacist's role

**Providing information about health life style, non-pharmacological treatment (regimen intervention)**

Contacts to organizations:

- **Centres for weight loss**

- **Centres for quit smoking**

- **Supporting smoking cessation in pharmacies**

# Recommendations for the non-pharmacological treatment of arterial hypertension

a) **Excess of calories**

b) **Excess of saturated fats**

c) **Excess of alcohol**

d) **Excess of salt**

e) **Lack of physical activity**

f) **Smoking**

a) **(Dyslipidemia)**

b) **(Diabetes mellitus)**

## Body weight control

Maintain BMI **< 25 kg/m$^2$** up to 65 years of age

Maintain BMI **< 27 kg/m$^2$** after 65 years of age

## Moderate alcohol consumption

Limit daily alcohol consumption to:

**1 dose** for women and low-weight individuals - max **20g/day**
**2 doses** for men – max **30g/day**

## Moderate salt consumption

Salt (portion/day): **6 g NaCl** (3 000 mg of sodium)

## Dietary patterns

- the DASH diet (Dietary Approach to Stop Hypertension)

| | |
|---|---|
| Fruits (portions/day) | 4-5 |
| Vegetables (portions/day) | 4-5 |
| Milk and dairy products < 1% fat (portions/day) | 2-3 |
| Lean meat, fish and poultry (g/day) | < 180 |
| Oils and fats (portions/day) | 2-3 |
| Seeds and nuts (portions/week) | 4-5 |
| Added sugars (portions/week) | < 5 |
| Whole grains (portions/day) | 6-8 |

## Physical activity

**For all hypertensives – population recommendation – physical activity practice:**

- moderate, continuous (1 x 30 min) or cumulative (2 x 15 min or 3 x 10 min) physical activity (similar to walking)
- at least 30 min/day, 5 to 7 days/week

**Aerobic training**

- at least 3 times/week (ideally 5 times/week)
- minimum of 30 min (ideally 40 to 50 min)

## Positive factor: Kalium (K) - potassium

**Role of pharmacist:**

- ask, if patiet use drugs, that can cause hypocalemia
  - thiazid diuretics
- ask, if patiet use drugs, that can cause hypercalemia
  - ACE- inhibitors, angiotensin II receptor antagonists (ARBs)
- detect, if any organ impairment can increase risk of hypercalemia
  - in decreased renal function
- detect, if physician control blood-kalium level
- recommendation of food with higl level of kalium / potassium

## High-potassium foods (more than 200 mg per serving) - fruit, vegetables, others

- 1 medium banana (425)
- ½ of a papaya (390)
- ½ cup of prune juice (370)
- ¼ cup of raisins (270)
- 1 medium mango (325) or kiwi (240)
- 1 small orange (240) or ½ cup of orange juice (235)
- 1 medium pear (200)

- 1 medium baked potato, with skin (925)
- 1 baked medium sweet potato, with skin (450)
- ½ cup of tomato or vegetable juice (275), or 1 medium raw tomato (290)
- ½ cup of mushrooms (280)
- ½ cup of cooked zucchini (220) or winter squash (250)
- ¼ of a medium avocado (245)
- ½ cup of broccoli (230)

- ½ cup of cooked pinto beans (400) or lentils (365)
- 1 cup of soy milk (300)
- 3 ounces of baked or broiled salmon (319)
- 6 ounces of yogurt (260 to 435)
- 1 cup of nonfat, low-fat, or whole milk (350 to 380)

## Positive factor: calcium (Ca), magnesium (Mg)

- risk patient for high income of Ca, Mg:
  - patient with decreased renal functions

## Positive factor: chrome (Cr)

- high income of chrome in food can prevent:
  - diabetes mellitus
  - atherosclerosis

## 2. step: Detection of hypertension – pharmacist's role
## Blood pressure measurement

- hypertension must be diagnosed by physician !
- pharmacist can support patient's compliance by assisting in blood pressure measurement:
  - BP measurement in pharmacy
  - providing advice for correct patient's BP measuremet in home

## Frequency of BP measuremet

- beginning of BP measurement, in each change of drugs, before visit a physician:
  - **2 x morning and 2 x evening**
  - **in interval: 1 – 2 minutes**
  - **1 week**

- BP measurement between visit a physician:
  - **1 week (quarterly)**
  - or: **always 1 – 2 days per a week, constantly**

- 30 min before measuring do not:
  - consume caffeine, alcohol
  - smoke
  - exercise
  - use drugs

## Tonometers

- validated, calibrated devices, with cuff size adequate to arm circumference
- fully automatic devices
- recommendation of validation: once per 2 years
  - www.dableducational.org

Devices for self blood pressure measurement (SBPM) according to various characteristics:

- more suitable devices **upper arm devices** than **wrist devices**
- more suitable devices with **history** than **without history**
- more suitable devices devices with 2 principles of **measurement of BP** than only with 1 principles
- e. g. Tensoval Duo

## Tonometers – cuff selection

| Arm circumference (cm) | Cuff size (cm) | Designation |
|---|---|---|
| 22 – 26 | 12 x 22 | Small adult |
| 27 – 34 | 16 x 30 | Adult |
| 35 – 44 | 16 x 36 | Large adult |
| 45 - 52 | 16 x 42 | Adult tight |

## Types of tonometres



## Blood pressure measurement - technique

- to allow the patients to sit for 3–5 minutes before beginning BP measurement
- do not talk during measurement
- always use the same tonometer

- sitting, supported back, arm supported at heart level
- cuff at heart level - left hand, 1-2 cm above elbow (cubital) fossa

- measured at least 2x (ideally 3x) a 2-minute break
- count average from all measurements (2nd and 3rd)

- repeat - if measured values of each **differed by> 5 mmHg**

- measurement at the end drug of dose-interval

- avoid the influence of „white coat syndrome“

## BP levels – pharmacist's interventions

| Systolic and diastolic BP (mmHg) | Pharmacist's interventions |
|---|---|
| SBP < 120 or DBP < 75 | **BP is optimal.** No interventions needed.<br>Repeat BP measurement after 2 years, in patients over 75 years after 1 year. |
| SBP < 120-130 or DBP < 75-85 | **BP is normal**<br>Repeat BP measurement after 1 year. |
| SBP < 130-139 or DBP < 85-89 | **High normal BP**<br>Repeat BP measurement after some months.<br>Provide patient with non-pharmacological treatment recommendations. |
| SBP < 140-199 or DBP < 90-109 | **Elevated BP**<br>Recommend visit physician.<br>Provide patient with non-pharmacological treatment recommendations. |
| SBP < 200-219 or DBP < 110-119 | **High elevated BP**<br>Recommend immediate visit physician. |
| SBP > 220 or DBP > 120 | Recommend immediate visit physician or call rescue service. |

## 3. step: Management of hypertension treatment – pharmacist's role

### 3. 1. Patient's pharmacotherapy monitoring

- **Communication with patient in pharmacy:**

a) **reason of treatment**

b) patient's benefit of **proper BP value**

c) **asymptomatic process** of hypertension

d) **side effects** of antihypertensive drugs

e) **whole-life antihypertensive treatment**

f) **regiment intervention**

g) **self BP measurement**

## Drugs, that can induce or deteriorate hypertension

- **nonsteroidal anti-inflammatory drugs (NSAIDs)**
- **corticosteroids**
- **antidepressants**
- **estrogens**
- **sympathomimetics**
- **sibutramin**
- **Panax Ginseng extractum**
- **mineral waters with lots of minerals (natrium)**

## 3. 2. Non-pharmacological treatment (lifestyle changes)

- **Salt restriction**
- **Moderation of alcohol consumation**
  - **140 g per week** for men
  - **80 g per week** for women
- **Other dietary changes**
  - **vegetables, low-fat dairy products, dietary and soluble fibre, whole grains and protein from plant sources**
  - **fresh fruits**
  - **restriction of fat income -** saturated fats replace by **non-saturated fats**
    - daily income of saturated fats: **max 33 %**
    - daily income of cholesterol: **max 300 mg**
- **Weight reduction**
- **Regular physical exercise**
- **Smoking cessation**

## 3. 3. Proper recommendation of OTC, food supplements

- **omega-3 polyunsaturated fatty acids**
  - daily dose: **3 g**

- **eicosapentaenoic acid (EPA)** recommended daily dose: **1 g**
- **docosahexaenoic acid (DHA)** recommended daily dose: **1 g**

- **dietary and soluble fibre**

# Antihypertensive drugs

- monotherapy vs. drug combination strategies ?

Monotherapy

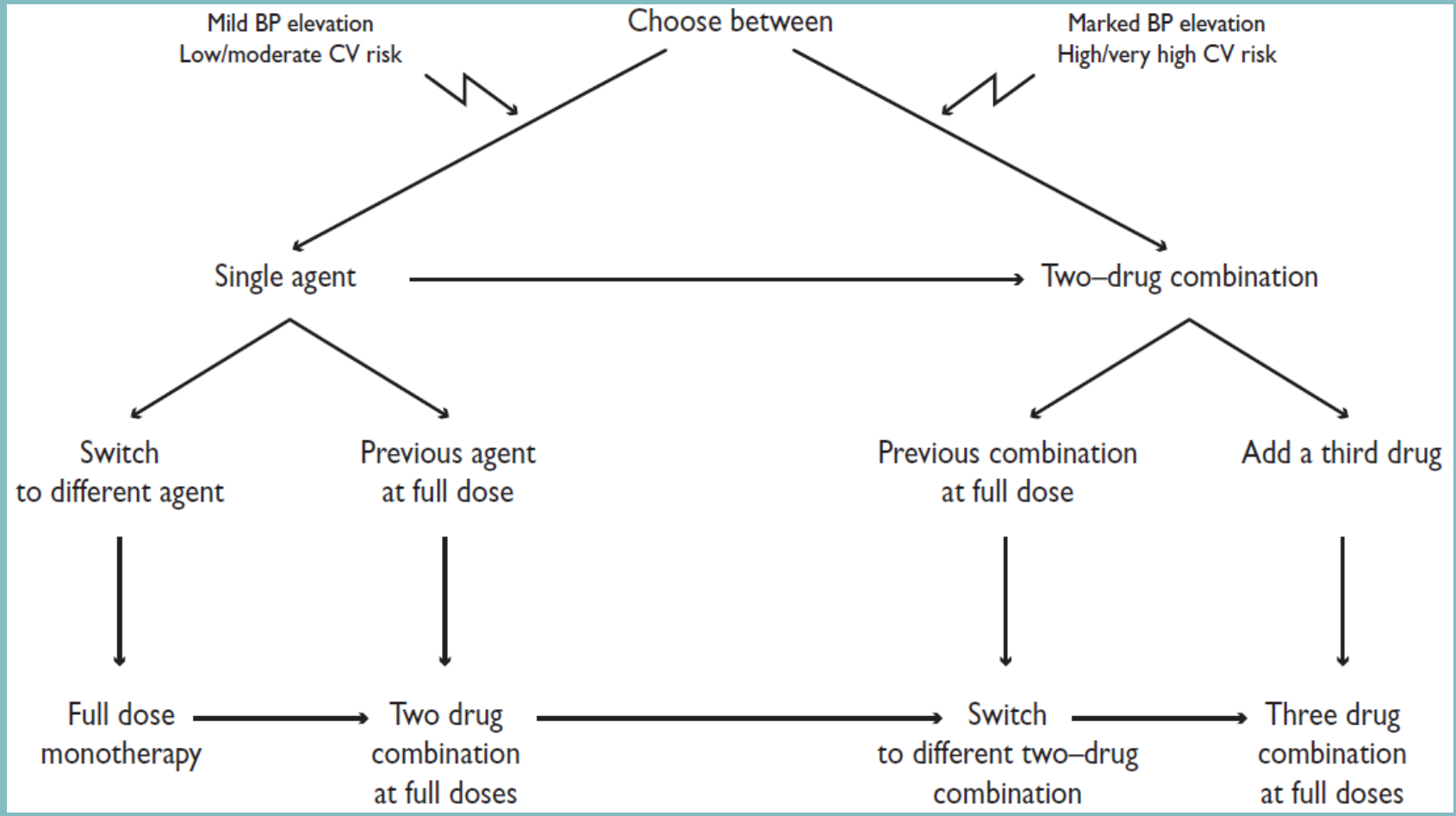
Combination therapy

- **fixed-dose** / **single-pill** combinations

- preferring drug combinations that are effective in reducing CV outcomes:
  - CV morbidity
  - CV mortality

# Monotherapy vs. drug combination strategies to achieve target BP

**ESH 2013 guidelines for the management of arterial hypertension**



## Preferred drugs in hypertension therapy

- **angiotensin-converting enzyme inhibitors (ACE-inhibitors)**
- **angiotensin II receptor blockers, AT1-receptor antagonists (sartans, $AT_1$-inhibitors)**
- **calcium antagonists**
- **diuretics**
- **beta-blockers**

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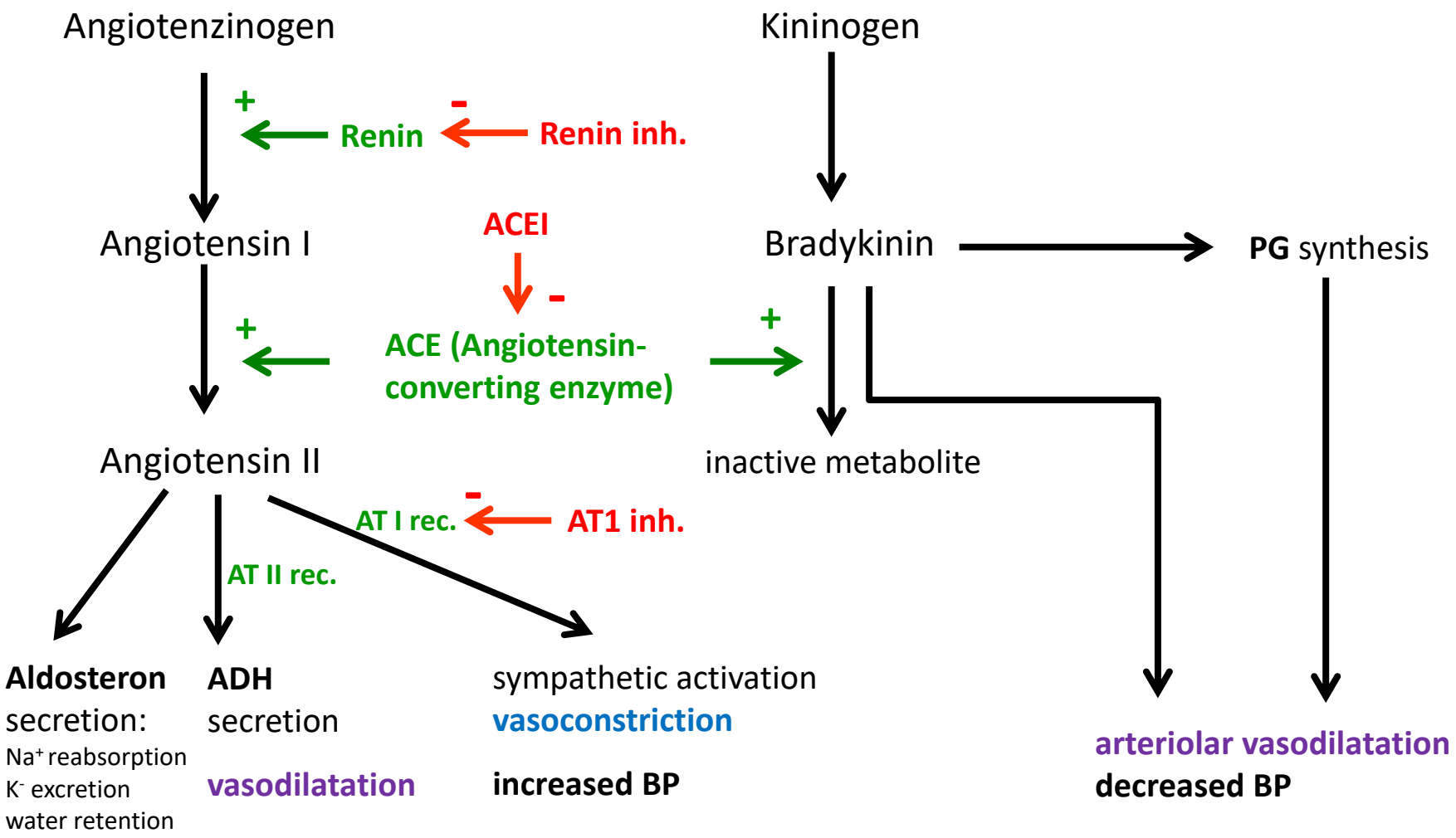
- **alpha receptor blockers** and **centrally acting agents**
  - combination therapy
- direct renin inhibitor: **aliskiren**

# Renin-Angiotensin-Aldosterone system



## Preferred drug combinations

### Fixed-dose combinations of two drugs

- **ACE-inhibitor / $AT_1$-inhibitor + diuretics**
- **ACE-inhibitor / $AT_1$-inhibitor + calcium antagonist**

- **diuretics + calcium antagonist**

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- **ACE-inhibitor + $AT_1$-inhibitor**
- **ACE-inhibitor / $AT_1$-inhibitor + beta-blocker**
- **diuretics + beta-blocker**
- **calcium antagonists (verapamil / diltiazem) + beta-blocker**

## Fixed-dose combinations of three drugs

- combination with diuretics:
  - **ACE-inhibitor / $AT_1$-inhibitor + calcium antagonist + diuretics**

- combination with hypolipidemic agent:
  - **ACE-inhibitor + calcium antagonist + statin**
  - **perindopril + amlodipin + atorvastatin** (LIPERTANCE)