

# Antihypertensives

Medicaments aimed on decreasing the pathologically increased blood pressure ( $\geq 140/90$ ). The importance of usage of antihypertensives has several aspects. Even though they do not lead to the treatment of causes of the disease, but only to the symptomatic therapy they are still beneficial for:

- **prevention** of vein damage and the creation of atherosclerosis
- decreasing **morbidity** (possible complications with kidney damage, high heart load etc.) and **mortality** in general

Treatment using hypertensives is based on long term significant reduction of *incidence* of complications and overall mortality. Therapy is obliged to follow strict rules.

## Non-pharmacological treatment

- Restriction of salt intake (less than 6 g NaCl per day)
- Reduction of body mass
- Termination of smoking and limitation of alcohol consumption
- Relaxation, limitation of stressful situations, regular sport activity
- Increased intake of  $K^+$ ,  $Ca^{2+}$ ,  $Mg^{2+}$  and omega-3 unsaturated fatty acids

## Pharmacological treatment

There are four categories of antihypertensives based on their effect (the "ABCD" rule might be applied):

- **A - ACEI** ( ACE inhibitors - (Angiotensin-converting-enzyme inhibitors) ) **ARBs** (AT<sub>1</sub> receptors blockers for angiotensin II) ( Angiotensin II receptor blockers))
- **B -  $\beta$ -blockers** (a class of medications that are predominantly used to manage abnormal heart rhythms, and to protect the heart from a second heart attack)
- **C -  $Ca^{2+}$  -blockers** (lower blood pressure by preventing calcium from entering the cells of a heart and arteries)
- **D - Diuretics** ( promote an increased production of urine)

**$\alpha$ -blockers** and substances affecting CNS are mostly used in combined treatments that act to restore blood pressure values to pre-treatment levels.

## Strategies of pharmacological treatment

In case of light hypertension the treatment is initiated by a **monotherapy**, using ACEI,  $\beta$ -blockers,  $Ca^{2+}$ -blockers or diuretics with respect to concomitant diseases of a patient. The strategy of treatment is chosen according to the individual condition of the patient. General rules are:

- **ACEI** - patients with heart failure, dysfunction of the left ventricle, hypertrophy of the left ventricle, diabetes mellitus accompanied with proteinuria and hyperlipoproteinemia
- **$\beta$ -blockers** - patients younger than 70 years and patients with heart ischemia
- **$Ca^{2+}$ -blockers** - patients with peripheral arterial disease (ischemia of a limb), angina pectoris, hyperlipidemia and diabetes mellitus
- **Diuretics** are convenient for patients 70+ years old with a contraindication of the use of  $\beta$ -blockers. We use combined preparations (f.e. thiazide diuretic + calcium saving diuretic) during monotherapy in order to avoid unwanted hypocalcemia. Thiazide diuretics used for women 40+ years old and for elder men decrease the incidence of pathological fractures - a retention of calcium.

It is possible to use a **combination** in case of failure of the monotherapy.

Well tolerated and effective **combinations** are:<sup>[1]</sup>

1. Diuretic + ACEI / blocker of AT<sub>1</sub> receptors,



Urapidil - an example of antihypertensive for iv application

2. Blocker of  $\text{Ca}^{2+}$  canals (dihydropyridine type) +  $\beta$ -blocker,
3. Blocker of  $\text{Ca}^{2+}$  canals + ACEI / blocker of  $\text{AT}_1$  receptors,
4. Diuretic +  $\beta$ -blocker,
5.  $\alpha$ -blocker +  $\beta$ -blocker

## Links

### Related articles

- Blood Pressure

### Resources

- MARTÍNKOVÁ, Jiřina, Stanislav MIČUDA a Jolana CERMANOVÁ. *Vybrané kapitoly z klinické farmakologie pro bakalářské studium : Kardiovaskulární systém* [online]. ©2000. [cit. 2010-07-01]. <<https://www.lfhk.cuni.cz/farmakol/predn/bak/kapitoly/prednasky/kardio-bak.ppt/>>.

### References

1. DÍTĚ, P., et al. *Vnitřní lékařství*. 2. vydání. Praha : Galén, 2007. ISBN 978-80-7262-496-6.