

# Treatment of chronic heart failure

Heart failure is a state, when the heart is not able to pump enough blood.

The drugs used for treatment of chronic heart failure are divided into two groups:

## Drugs reducing strain on myocardium

- ACE inhibitors,
- AT1 - receptor blockers,
- Other vasodilators,
- Beta-blockers,
- Diuretics.

## Drugs with positive inotropic effects

- Heart glycosides,
- Other drugs with positive inotropic effects.

## Drugs reducing strain on myocardium

### ACE inhibitors

- Angiotensin converting enzyme inhibitors. They work by decreasing the concentration of circulating angiotensin II, leading to reduced degradation of bradykinin, which stimulates vasodilatory NO synthase.
- Simultaneously suppresses the sympathetic nervous system - they are also used in the treatment of arterial hypertension.
- There is an increase in cardiac output, which improves organ perfusion.

### Contraindications

Pregnancy, hyperkalaemia, bilateral renal artery stenosis, angioneurotic edema.

### Side effects

Irritant cough, skin rash, angioneurotic edema.

### Examples

Enalapril, lisinopril, perindopril, ramipril.

### AT1 receptor blockers

- They antagonize the action of angiotensin on AT1 receptors (the difference from ACE inhibitors is, that they do not lead to a delayed degradation of bradykinin, which is responsible for ACE inhibitors side effects).
- They are recommended for intolerance to ACE inhibitors.

### Contraindications

Pregnancy, hyperkalaemia, bilateral renal artery stenosis.

### Examples

Losartan, valsartan, telmisartan, candesartan.

### Other vasodilators

- A wide group of substances whose mechanism and site of action differ.
- We divide them into arterial, venous and combined vasodilators (arteries and veins).

### Examples

Dihydralazine, nitroprussid.

## Beta-blockers (<https://www.wikilectures.eu/w/Beta-blockers>)

- They suppress the sympathoadrenal system, reduce the heart rate and prolong diastole.
- They are used in stabilized patients.

### Contraindications

More pronounced bradycardia, AV conduction disorders, hypotension, bronchial asthma.

### Examples

Metoprolol, succinate, carvedilol, bisoprolol, nebivolol.

## Diuretics

- Used only with congestion in small or large circulation.
- Indicated especially in mild and moderate heart failure - swelling occurs.

### Contraindications

Patients without swelling, circulatory overload and dyspnoea.

### Side effects

Hypokalaemia (loop and thiazide diuretics only).

### Examples

- *loop* - furosemid,
- *thiazide* - hydrochlorthiazid,
- *aldosterone receptor inhibitors* - spironolaktol.

## Drugs with positive inotropic effects

### Cardiac glycosides

- These are cardiotonics, which are substances that increase myocardial contractility.
- They induce ionic changes caused by inhibition of  $\text{Na}^+ / \text{K}^+ \text{-ATPase}$  in cardiomyocytes.
- They alleviate symptoms, but do not improve the prognosis of the disease.

### Side effects

They are relatively common - anorexia, nausea, bradycardia, etc.

### Examples

Digoxin.

### Other drugs with positive inotropic effects.

- These are drugs given for short periods in acute conditions (long-term use has a negative effect).
- Indications are acute heart failure or exacerbation of chronic failure.

## Sympathomimetics

### Examples

Dopamin, dobutamin.

## Inhibitors of phosphodiesterase III

- I.v. application especially in acute heart failure.

#### Examples

Amrinon, milrinon.

#### Calcium sensitizers

- They increase the sensitivity of troponin C to calcium.
- They are used as adjunctive therapy in acutely decompensated chronic heart failure.

#### Examples

Levosimendan.

## References

### References

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