

Pharmacological Management of Congestive Heart Failure

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Objectives

List major drug groups used in treatment of
heart failure

Explain mechanism of action of digitalis and its major effects

Explain the nature and mechanism of digitalis toxic effects

Describe the clinical implications of diuretics, vasodilators, ACE inhibitors and other drugs that lack positive inotropic effects in heart failure

Describe the strategies used in the treatment of heart failure

What is heart failure

Chemistry of cardiac glycosides

CARDIAC

↑ force of contraction &
Cardiac Output

↓ Heart rate

↓ Refractory period (RP)

& ↑ Conduction velocity
(CV) in atria/ventricles

↑ RP & ↓ CV in AV node

Increased automaticity

ECG: ↑ PR interval, ↓

QT interval

EXTRA CARDIAC

Kidney:

Due to improvement in circulation
and renal perfusion
Retained salt and water is gradually
excreted

CNS:

Nausea, vomiting

Congestive heart failure

Cardiac arrhythmias

Atrial fibrillation

Atrial flutter

Paroxysmal supraventricular tachycardia

Stop digitalis

Oral or parenteral

potassium supplements

For ventricular arrhythmias:

Lidocaine IV drug of choice

For supraventricular arrhythmia:

Propranolol may be given IV or orally

For AV block and bradycardia

Atropine 0.6 -1.2 mg IM

Digoxin antibody

Amrinone & milrinone are selective
phosphodiesterase III inhibitors

↑ cAMP levels

The PDE III isoenzyme is specific for
intracellular degradation of cAMP

in heart, blood vessels and
bronchial smooth muscles.

Inodilators

IV administration for short term
treatment of severe heart failure

Milrinone is more potent than
amrinone and does not produce
thrombocytopenia

Other inotropic drugs

Dopamine

Dobutamine

Almost all symptomatic
Patients treated with a
diuretic

High ceiling diuretics
(loop diuretics)
preferred

Low dose therapy for maintenance

They increase salt and
water excretion &
reduce blood volume

Reduce preload & venous pressure
Improve cardiac performance & relieve edema

Angiotensin converting enzyme inhibitors

Captopril, enalapril, ramipril, lisinopril

Act by

Reduction of after load

Reduction of preload

Reversing the compensatory changes

ACE inhibitors are the
most preferred drugs
for treatment of
Congestive cardiac
failure

Losartan , candesartan,
valsartan, telmisartan

Block AT_1 receptor on
the heart, peripheral
vasculature and kidney

As effective as ACE
inhibitors

Used mainly in patients
who cannot tolerate
ACE inhibitors because
of cough, angioedema,
neutropenia

Drugs used in heart
failure

Chronic heart failure

Diuretics

Aldosterone receptor

antagonist

ACE inhibitors

Angiotensin receptor

blockers

Cardiac glycosides

Vasodilators

Acute heart failure

Diuretics

Vasodilators

Dopamine, dobutamine

Amrinone

Summary