Cardiology Cases and Systematic Reviews

Commentory

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Underlying Disease – Specific Heart Failure Treatment

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Citation: Peters S (2021) Underlying Disease – Specific Heart Failure Treatment. Cardiol Cases Syst Rev 3:009.

Volume 3	Issue 1
Pages	28-30
Received	July 09, 2021
Accepted	August 21, 2021
Published	August 23, 2021

Introduction

Acute or chronic heart failure is one of the most important entites among cardiac diseases. The treatment of heart failure become to be more and more disease - specific as new treatment options develop over time. Heart failure can occur due to ischemic cardiomyopathy, non-ischemic cardiomyopathy like specific forms of cardiomyopathies like dilated, hypertrophic, restrictive and arrhythmogenic one and special cardiomyopathies like acquired takotsubo cardiomyopathy.

Hypertrophic Cardiomyopathy

Hypertrophic cardiomyopathy is characterized by the risk of sudden cardiac death and developing heart failure. Beneath therapeutic options like beta blocking agents, verapamil, surgical myectomy and septal ablation therapy a new pharmacologic agent is on the horizon: Mavacamten. Approval of mavacamten is supposed in the first period of 2021.

Beneficial effects of mavacamten can be considered for hypertrophic obstructive disease [1] and also for hypertrophic non-obstructive cardiomyopathy [2]. Especially for hypertrophic non-obstructive cardiomyopathy new options like ranolazin failed.

Arrhythmogenic Cardiomyopathy

Arrhythmogenic cardiomyopathy is characterized by fibro fatty replacement of myocytes. Fibrosis is the main feature causing ventricular arrhythmias, the risk of sudden cardiac death and progressive heart failure [3]. In order to prevent fibrosis ramipril is tested in the BRAVE study still waiting for the results [4]. The combination of valsartan and sacubitril had beneficial effects on soluable ST2 [5] and should be tested in a next step.

In phosphohlamban mutations leading to dilated cardomyopathy or arrhythmogenic cardiomyopathy the compound of fibrosis in higher than in plakophilin-2 mutations [6]. Neither mineralocorticoid antagonists nor beta blocking agents are able to prevent fibrosis [7]. A study to assess the effect of eplerenon has been started at the University Hospital of Groningen, The Netherlands, to test the hypothesis, whether eplerenon is more effective than spironon lacton [8]. Newer non-mineralocorticoid agents, called finerenon, should be tested as a next step. To use entresto should be a further attempt.

Amyloid Cardiomyopathy

Cardiac amyloidosis is characterized by fibril deposition in the myocardium which leads to structural and functional abnormalities and heart failure. Amyloid cardiomyopathy can lead to aortic valve dysfunction and pericardial effusion [9]. Cardiac light-chain amyloidosis and here ditary or wild-type transthyretin amyloidos is are the most prevalent forms of amyloid cardiomyopathy [10]. In transthyretin amyloid cardiomyopathy the amyloid stabilizer tafamidis leads to a significant reduction of mortality and cardiovascular morbidity [11]. Neurologic complications can be significantly reduced by patisiran and inotersen [12,13]. The question is whether these two drugs are effective in heart disease, too. Studies are started.

Fabry Disease

Fabry disease is a lysosomal storage disorder caused by mutations of the *GLA* gene that lead to a deficiency of the enzymatic activity of α-galactosidase [14]. Available therapies for fabry disease include enzyme replacement therapy agalsidase alfa and agalsidase beta [15] and the chaperone migalastat [16].

Dilated Cardiomyopathy and Ischemic Cardiomyopathy

The by far largest group of heart failure patients are the group of ischemic cardiomyopathy and dilated cardiomyopathy. Therapeutic improvements are obtained by ACE inhibitorsor AT1 recept or blockers [17], beta blocking agents [18], mineralocorticoid antagonists [19], the combination of valsartan and sacubitril (entresto) [20] and the relatively newly developed sodium-glucose cotransporter (SGLT2) inhibitors [21,22]. In dramatically reduced ejection fraction a rather low, but significant effect can be obtained by omecamtiv mecarbil [23] and danicamtiv [24]. Vericiguat, an oral soluble guanylate cyclase stimulator, reduced the composite end point of cardiovascular deathor HF hospitalization vs. placebo [25].

In 2021 a new guideline for the treatment of heart failure is planned from the European Society of Cardiology suggesting the use of SGLT 2 inhibitors, empaglifocin and dapaglifocin, which reduce mortality and morbidity in heart failure.

A major problem is to treat heart failure with preserve dejection fraction, a problem which is revelant for at least 60% of cases. Spironolacton and sacubitril/valsartan just missed significant results. Ejection fractions between 50 to 57% and women, in general, had significant results. The guideline update should include these changes, too.

Both the diagnosis and treatment of heart failure with preserve dejection fraction, as well as management of advanced HF and acute HF, remain challenging.

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