

THERAPEUTIC OPTIONS IN HEART FAILURE PATIENTS

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Abstract

Introduction: Heart failure (HF) is among the most common medical condition, and its evolution is becoming epidemic. Aim: HF has a negative prognosis, and a marked increase in rehospitalization, despite the multitude of existing drug therapies. Material and method: A total of 582 patients admitted consecutively in our clinic were evaluated during hospitalization and after discharge. The patients included have heart failure as first or secondary diagnosis. Results: Treatment of HF includes non-pharmacological, pharmacological and invasive strategies to improve substrate and HF manifestations. Despite the optimal treatment, in current clinical practice we also find patients with negative prognosis and low quality of life. Conclusion: The major goals of treatment in heart failure are to improve prognosis, to reduce mortality, to alleviate symptoms and reduce morbidity by reversing or slowing the cardiac and peripheral dysfunction.

Key words: heart failure, surgical treatment, negative prognosis, mortality.

INTRODUCTION

Heart failure (HF) is a syndrome caused by a structural and / or functional cardiac abnormality, leading to a reduction in cardiac flow and increased intra-cardiac pressure. HF is characterized by typical symptoms (dyspnea, leg edema and fatigue) that may be accompanied by clinical signs (increased jugular vein pressure, pulmonary rales). [Ponikowski P, et al., 2016]

HF has an impact on cardiovascular morbidity, quality of life and economy (increased treatment and follow-up costs). [Steward S, et al., 2003]

Management of patients with HF is based on identifying and treating associated risk factors in development of HF (arterial hypertension, diabetes mellitus, dyslipidemia, obesity, smoking and others), comorbidities and worsening factors. Treatment is based on non-pharmacological agents, drugs, interventional cardiology techniques and surgical treatment. [McMurray JJ, et al., 2012]

The current heart failure guide emphasizes the idea of prophylactic treatment and clearly sets out recommendations for preventing or delaying the onset of heart failure in patients with risk factors or the prevention of sudden death in patients with asymptomatic HF. [Ponikowski P, et al., 2016]

Non-pharmacological therapy includes salt restriction (below 3g / day for HF patients in advanced stages and under 1.5-2g / day in HF patient that also have arterial hypertension); fluid restriction (1,500-2,000ml); reduction on kalium intake (salt substitutes must be used with caution, as they may contain potassium); physical effort within the tolerability limit; weight control; discouraging smoking; respiratory prothesis (continuous positive airway pressure, used in patients with HF and obstructive sleep apnea). [Ponikowski P, et al 2016] [Tiny Jaarsma, 2006.]

Pharmacological agents used in HF patients are diuretics, vasodilators, inotropic agents, beta-blockers, digoxin, ivabradine, anticoagulants when need it, or newer therapies such as sacubitril (neprilisine inhibitor) [McMurray JJV, et al., 2014] or stem cell therapy [Paterna S, et al., 2009] polyunsaturated fatty acids n-3. [Inamdar AA, Inamdar AC, 2016] A novelty about drug therapy is Empaglifosin in patients with diabetes and heart failure. [Zinman, B., et al.,2015]

The objectives of treatment in HF patients are to improve clinical status, functional capacity and quality of life, prevent repeated hospitalizations and to reduce mortality. [Abraham WT, Hasan A,2009; Yancy VW, et al., 2013]

Some of the most important goals are to reduce the length of stay and subsequent readmission, to prevent organ system damage and to appropriately manage the co-morbidities that may contribute to poor prognosis. [Inamdar AA, Inamdar AC, 2016]

Invasive therapies include electrophysiological treatments - cardiac resynchronization, pacemaker implantation and debridement; interventional or surgical myocardial revascularization procedures; repair or valve replacement. [Yancy CW, et al., 2013]

Surgical treatment is chosen in many patients in order to prevent sudden cardiac death. When the HF reaches the terminal stage, despite the maximum drug therapy, when the prognosis is severe and there is no other therapeutic alternative, the patients have a cardiac transplant indication. Awaiting transplantation, patients should be provided with artificial hearts or ventricular assist devices, the latter being even used as permanent therapy. [Ponikowski P, et al., 2016]

AIMS

HF is the economic, social and medical burden of our century. HF has a negative prognosis, and a marked increase in rehospitalization, despite the multitude of existing drug therapies.

METHODS

In our study, we included 582 patients with HF hospitalized in the Cardiology Clinic from January 2014 until December 2014 with a follow-up period of 2.3 years through specialized ambulatory. Patient observation charts have been studied taking into account demographic criteria and the type of treatment indicated or instituted. All patients who had a primary or secondary diagnosis of CHF with a therapeutic indication and who were not discharged on disciplinary criteria were enrolled in the study. Patients who met the inclusion criteria but died during the specified observation range were also included in the study.

The follow-up of patients was based on invasive therapeutic options and how many patients have performed the therapeutic indications. The follow-up period has attempted to track the efficacy of established or indicated treatment, improvement in cardiac symptoms, and patient responsiveness.

The data was processed by the MedCalc Software, Maria-kerke, Belgium and SPSS INC, Chicago, IL, USA. Continuous variables were analyzed for normalization and compared using the *t* Student test; they were expressed by mean value \pm standard and median deviation. For comparison of parameter averages in the two groups, the Mann-Whitney U method and the Wilcoxon method W are used. The degree of correlation (*r*) between the studied parameters was evaluated by calculating the correlation coefficient Pearson. A value of statistical significance $p < 0.05$ was considered significant.

RESULTS

Access to interventional therapies is still difficult, existing drug treatments should be recommended and maximally used.

A significant percentage of patients who followed therapeutic indications benefited from an improvement in symptomatology and quality of life.

Cardiac invasive treatment option for HF patients include: implantable cardioverter-defibrillator (ICD), cardiac resynchronization (CRT), percutaneous coronary intervention (PCI), ventricular restoration, aortic-coronary bypass surgery, valvular replacement, left ventricular assist device (LVAD) and / or transplantation of the heart.

ICD implantation has considerably reduced the risk of sudden death in patients with CHF due to malignant arrhythmic events but only 79.45% managed to benefit from it.

All the data from our study is highlighted in table 1.

Table 1

Clinical parameters of patients included in our study (these are expressed in percent)

Type of procedure			Therapeutic primary indication (number)	Performed the procedure (percent)	<i>p</i>
ICD			73	79.45	0.024
CRT			68	91.17	0.009
PCI	Balloon dilation		4	100	0.001
	At least 1 stent		161	98.75	0.05
	Cardiovascular surgery		32	78.12	0.04
Cardiac surgery	Aorto-coronary by pass		82	76.82	0.012
	Valvular replacement	Surgical	103	93.20	0.001
		Interventional (TAVI, MitraClip)	1	100	0.04
	Surgical LV reduction (Batista, Dor, ventriculectomy, external LV remodeling)		8	0	0.67
LVAD			44	2.27	0.05
Heart Transplant			7	0	0.05

ICD has demonstrated its effectiveness and superiority to antiarrhythmic medication in the primary and secondary prevention of sudden death and malignant rhythm disorders. [Abraham WT, Hasan A, 2009; McMurray JJ, et al., 2012]

The American Heart Association recommends that, prior to implantation of a ICD, the arrhythmia concerned be life threatening and arrhythmia causes such as acute myocardial infarction, myocardial ischaemia, electrical imbalances, metabolic or drug toxicity have been eliminated.

Of the 68 patients who received the indication for resynchronization therapy, 91.17% done the procedure.

ICD associated with cardiac resynchronization therapy (CRT-D) is the correlation of the electrical treatment of ventricular tachyarrhythmias with the optimization of atrioventricular and biventricular contractility synchronicity among patients with moderate-severe HF NYHA II-IV with reduced left ventricular ejection fraction. [Yancy VW, et al., 2013]

Although the benefits of CRT-D among patients with moderate-to-severe HF and those with ventricular asynchrony have been demonstrated, it should be noted that it has not been beneficial in patients with diabetic heart failure or those with mild HF. [Yancy VW, et al., 2013; McMurray JJ, et al., 2012]

As a primary indication for 197 patients, with a significant coronary stenosis, was PCI procedure. From these, 4 patients were resolved with PTCA, and 161 received at least one stent. A number of 32 patients are recommended for cardiovascular surgery.

Removing the significant stenosis (>50-70%) can improve heart function and sometimes improve or even solve HF cases. If the atherosclerotic lesions are significant, or the left coronary artery is affected, the patient will be guided for cardiovascular surgery to perform the aortic-coronary bypass.

From the total number of patients included in our study, 82 patients were guided to the surgery department, from which 76.82% went through bypass surgery.

The surgical risk associated with coronary artery bypass grafting (CABG) in patients with ischemic cardiomyopathy has been substantially reduced in the last years thanks to the developments in cardiac surgery. [Delmo WEM, R Hetzer, 2013]

Left ventricular size is an important prognostic factor for long-term survival in patients with ischemic cardiomyopathy. Ventricular reconstruction is therefore an option for patients with ventricular dilatation and this could slow or prevent progressive heart failure in these patients. [Rylski B, Beyersdorf, 2013]

The most common surgical indication to improve HF symptomatology was valve replacement. We recommended valvular replacement to 103 patients, and from these, 93.20% had at least one valve replace. In carefully selected cases, with a valve substrate, minimally invasive valvular replacement, namely TAVI and MitraClip, was indicated.

Valvular replacement can be done using metallic (or mechanical) prostheses, biological or tissue prosthesis. [Catherine OM, et al., 2008]

In the case of mechanical valvular prostheses, anticoagulation and periodic echocardiography are indicated to detect possible complications. [Grunkemeier LG, et al., 1998]

In the last years, interventional prosthetic techniques have been developed in patients with specific indications (TAVI, MitraClip).

Although 44 patients had an indication for LVAD, only 1 patient received it.

LVAD is a device similar to a battery-powered mechanical pump. It is surgically implanted and helps maintain the heart pump function (when it is not effective). The device is also used in patients with end-stage heart failure, when cardiac transplantation is no longer an option. The newer models are portable, being used by patients for months, giving them an acceptable level of quality of life (until receiving a new heart).

Only 7 patients were proposed for cardiac transplant but none benefited from this therapeutic option. Even if 7 patients met the criteria for heart transplantation, none of our patients received the heart transplant from the study lot.

Cardiac transplantation has proved a viable solution among patients with advanced heart failure. A correct selection of candidates, rigorous administration of long-term immunosuppression, and the control of adverse effects of the latter, reduce the number of patients eligible for cardiac transplantation.

In our study, the mortality rate at one month after discharge was 10,13%; after one year it rises at 22,50%. At the end of the follow up period, cardiovascular mortality was 32,30%.

From the cohort 17 patients (2.92%) were lost to follow up.

DISCUSSIONS

Despite the optimal treatment, in current clinical practice we also find patients with negative prognosis and low quality of life.

HF is a syndrome with a high prevalence of comorbidities and multiple chronic conditions, but most guidelines are developed for patients with a single disease. Nevertheless, the coexistence of additional diseases such as arthritis, renal insufficiency, diabetes mellitus, or chronic lung disease with the HF syndrome should logically require a modification of treatment, outcome assessment, or follow-up care. [CW Yancy, et al., 2012]

Mortality after discharging HF patients is 10.4% at one month, 22% at one year, and 42.3% at 5 years. Each renewal increases the mortality rate by another 20-22%. [Roger VL., 2002].

Admissions, is responsible for 10% of occupied beds and is responsible for almost 2% of national health spending, especially due to hospitalization costs. [Stewart S, et al., 2012]

Early studies investigating the short-term effect of biventricular pacing in patients with advanced heart failure (NYHA III-IV) who are in sinus rhythm showed a statistically significant mean reduction of one NYHA functional class and improved quality of life. [Cleland JG, et al., 2012]

Coronary artery disease with severely impaired left ventricular function is the main cause of heart failure in 27.5% of all patients considered for heart transplantation. The surgical risk associated with coronary artery bypass grafting (CABG) in patients with ischemic cardiomyopathy has been substantially reduced in recent years thanks to the developments in cardiac surgery. [Delmo WEM, R Hetzer,2013]

It is unlikely that there will be enough donor hearts for these patients if, or when, heart failure eventually ensues. [Delmo WEM, R Hetzer,2013]

CONCLUSIONS

The two major goals of treatment in heart failure are to improve prognosis and reduce mortality and to alleviate symptoms and reduce morbidity by reversing or slowing the cardiac and peripheral dysfunction.

Despite the optimal medical treatment, in current clinical practice we also find patients with negative prognosis and a low quality of life. Although having access to a variety of therapeutic options as well as interventional and surgical therapies, mortality remains high among patients with ICD.

The therapies under study bring promise in reducing the rate of respiration and a decrease in mortality and implicitly a cost reduction, but the individual treatment of each patient with CHF is the one that can benefit from this point of view.

Advanced stages of HF require frequent hospitalization due to the presence of severe HF and or associated co-morbid conditions, which require strict implementation of an appropriately individualized multidisciplinary approach and quality measures to reduce re-admissions.

Despite the marked progress of medical, interventional and surgical therapies, HF is accompanied by an unfavorable prognosis.

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