Effect of beta blocker therapy on survival in severe heart failure

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Abstrak

Agen penghambat beta telah menunjukkan penurunan resiko perawatan atau kematian pasien dengan gagal jantung ringan sampai sedang, tetapi hanya sedikit diketahui mengenai manfaat atau keamanan agen ini pada gagal jantung berat. Dilaporkan satu kasus penggunaan penghambat beta pada gagal jantung berat dengan fraksi ejeksi kurang dari 25%. Laporan manfaat penghambat beta terhadap kesakitan dan kematian pasien dengan gagal jantung ringan sampai sedang juga ditemukan pada pasien dengan gagal jantung berat seperti yang dilaporkan pada kasus ini. ***(Med J Indones 2002; 11: 174-5)***

Abstract

Beta-blocking agents have been shown to reduce the risk of hospitalization and death in patients with mild to moderate heart failure, but little is known about the efficacy or safety of these agents in severe heart failure. A case of beta blocker administration in severe heart failure with ejection fraction less than 25% is reported. The reported benefits of beta blockers with regard to morbidity and mortality in patients with mild to moderate heart failure were also found in the patient with severe heart failure as reported in this case. ***(Med J Indones 2002; 11: 174-5)***

Keywords: *beta-blocking agents, heart failure, ejection fraction*

An improvement in heart failure with beta-blockers was first described by Waagstein in 1975, but beta-blockers are by no means a standard way of treating heart failure. However, evidence is increasing that they have a useful role.[1] A beta-blocker is now recommended for the management of heart failure within the National Service Framework for Coronary Heart Disease and in the Sign Management of Heart Failure guidelines.[2] Three major trials of beta-blockers in heart failure (USCP, CIBIS-II, MERIT-HF) using carvedilol, bisoprolol, and metoprolol CR respectively, were stopped prematurely after statistically significant evidence of reduced mortality and morbidity in the treated group.[3-5] The development of a new generation of beta-blockers with additional vasodilating properties makes further large studies essential.[1]

Case Report

A 35 year old Indonesian female was refered to the National Cardiovascular Center Harapan Kita due to severe short of breath 4 hours after Sectio Caesarean. She had history of hypertension during pregnancy which was under medication. On physical examination, we found the overall signs of congestive heart failure such as tachycardia, tachypneu, increased jugular venous pressure, pulmonary crackles, S_3 gallop, uncompensated metabolic acidosis, and cardiomegaly on chest x-ray. We performed echocardiography study and found left ventricular dilatation, poor cardiac wall motion, and ejection fraction (18%). She was diagnosed as severe congestive heart failure due to Peripartum Cardiomyopathy. We optimalized her condition with conventional triple therapy of heart failure (digitalis, diuretics & ACE Inhibitors), and after she had been in clinical euvolemia, we added a beta blocker into the standard therapy of heart failure. We have administered a titrated dose of carvedilol from 2 X 3.125 mg for 2 months followed by 2 X 6.25 mg for 3 months without any adverse effects, and we have observed the improvement of ejection fraction (38%), NYHA functional class (IV to II), and physician and patient global assessment scores across all heart failure classes (LVD-36) from 89% to 50%.

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DISCUSSION

For a long time beta-blockers were considered contraindicated in heart failure patients. In the 1980's, the consequences of increased catecholamine levels in heart failure and downregulation of beta-1 adrenergic receptor in the failing human myocardium were recognized. These observations led to therapeutic approaches designed to address chronic and excessive activation of the sympathetic nervous system by employing beta-adrenergic receptor antagonists. From the 1980s until the mid 1990s, a number of small studies with selective and nonselective beta-blockers administered in various regiment were conducted. Their primary endpoints were effects on exercise tolerance, hemodynamic profile, functional class, left ventricular function and morbidity.[7]

A novel vasodilating beta-blocker reduces peripheral vascular resistance by blocking arterial α_1-adrenoseptors, thereby producing vasodilation, while preventing reflex tachycardia by blocking cardiac β_1 and β_2-adrenoceptors.[8] Vasodilator action of carvedilol may reduce the potential cardio-depressant effect and the risk of early decompensation with initial treatment.[9]

Patients treated with carvedilol in the USCP improved their ejection fraction, NYHA functional class, and physician and patient global assessment scores across all heart failure classes (except for quality of life improvement in the severe heart failure group).[7] The benefits of carvedilol with regard to morbidity and mortality in patients with mild to moderate heart failure were also found in the patients with severe heart failure who were evaluated in the Carvedilol Prospective Randomised Cumulative Survival (COPERNICUS) trial.[10] A large study of carvedilol versus metoprolol (COMET), added to conventional treatment, is planned.[11]

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USCP = United States Carvedilol Heart Failure Program
CIBIS II = Cardiac Insufficiency Bisoprolol Study II
MERIT-HF = Metoprolol controlled release (CR)/ extended release (XL) Randomised Intervention Trial in Congestive Heart Failure
ACE = Angiotensin Converting Enzyme
NYHA = New York Heart Association
LVD-36 = Left Ventricular Dysfunction 36 questionnaires