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ORIGINAL ARTICLE

Effectiveness of Beta Blockers against Hypertrophic Cardiomyopathy

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ABSTRACT

Aim: To evaluate the effectiveness of beta blockers against hypertrophic cardiomyopathy.
Study design: Retrospective study
Place and duration of study: Department of Medicine, Islam Medical College, Sialkot from 01-10-2020 30-01-09-2021.
Methodology: One hundred and thirty six confirmed hypertrophic cardiomyopathy cases within the age of 3-75 years were enrolled. Different types of beta blocker used and its efficacy result and side effects were documented. The average efficacy was assessed for each beta blocker uptil 5 years' survival rate.
Results: High doses of beta blocker were indicated for hypertrophic cardiomyopathy patients in majority of the cases. The efficacy of various beta blockers shows that cardio-selective blocker is much better in efficacy. Left ventricle outflow tract (LVOT) with a value greater or equal to 50 mmHg was observed in patients at or greater than 70 years.
Conclusion: Beta blockers are effective in hypertrophy cardiomyopathy cases depending upon the left ventricle out flow tract for better outcome.
Key words: Beta blockers, Cardiomyopathy, Efficacy, Therapeutic interventions

INTRODUCTION

Hypertrophic Cardiomyopathy (HCM) is the disease of heart muscles in which heart muscles get thickened abnormally, it makes harder for the heart to pump blood normally. It is the most common genetic cardiomyopathy characterized by heterogeneous morphology, complex pathophysiology and variable clinical manifestations[1-4]. It is also regarded as rare malignant disease. The spectrum of HCM has expanded over the recent years due to its increasing prevalence and clinical profile[3,5]. Hypertrophic cardiomyopathy is ranging from severe manifestations to absence of morphological expression[6,7].

Present pharmacological interventions have not shown enough results to modify or reduce the symptomology of HCM[8,9] except diltiazem in preventing LV remodeling[10]. Only present therapy to reduce long term prognosis of this rare disease is implantable cardiac defibrillator (ICD), which is known as myectomy[8]. However, pharmacological therapies play a subsequent role in reducing the risk disease complications and disease implications. Targeted goals of these therapies is to control of HCM symptoms, treatment of LV dysfunction, reduction of intraventricular gradients, control of atrial fibrillation, heart failure, prevention of cardioembolism and ventricular arrhythmias.

Few hypertrophic cardiomyopathic patients were included in randomized control trial to evaluate the efficacy of different drugs used against this disease[8]. Scientific community is hoping for disease specific/better treatment plans and options[11,12].

This study is aimed to design to find the efficacy of beta-blockers in the treatment or reducing symptomology of hypertrophic cardiomyopathy.

MATERIALS AND METHODS

This retrospective study was carried out at from 1st October 2020 to 30th September 2021 after IRB permission. The present study was conducted on 136 hypertrophic cardiomyopathy confirmed cases within the age 3-75 years who visit the indoor outdoor patients were enrolled. The required past data analysis for assessing the efficacy of beta blockers in HCM patients. This research was approved from the ethical institutional committee. Patient's demographic information as well as type of beta blocker used, its efficacy result and side effects was documented as an overall picture of all the enrolled patients. Those patients who were only suffering from hypertension and not HCM were not included in this study. The average efficacy was assessed for each beta blocker uptil 5 yrs survival rate. The data was entered in SPSS.

RESULTS

The mean age was 35±10.1 years. High doses of beta blocker were indicated for HCM patients in majority of the cases. Indication of beta blockers were either angina, dyspnoea reduction, ventricular-ectopic beats control, ventricular response control in AF patients or in heart failure cases (Table 1)

Table 1: Indications for beta blockers

Beta blocker	Indications	Initial dose	Maximum dose
Propranolol	Angina, dyspnoea reduction, ventricular-ectopic beats control, ventricular response control in AF patients control of	40 mg BD	80 mg TDS
Atenolol	Like propranolol	25 mg QD	150 mg QD
Nadolol	Like propranolol, in NSVT, SCD incidence prevention	40 mg QD	80 mg BD
Metoprolol	Like propranolol	50 mg QD	100 mg BD
Bisoprolol	Systolic dysfunction treatment and terminal Heart Failure patients	1.25 mg QD	15 mg QD

Table 2: Beta blockers and their side effects

Beta Blocker	Efficacy	Features	Side effects
Propranolol	Drug of choice in neonates/infants	Short - half-life	Depression, chronotropic-incompetence AV decrease and asthma formation
Atenolol	Drug of choice in HC with hypertension	-------	Hypotension chronotropic-incompetence asthma
Nadolol	Effective in obstruction control	Increase patient compliance in QD	Chronotropic-incompetence, AV conduction reduction
Metoprolol	Not useful in hypertrophic obstructive cardiomyopathy	Short half-life	Asthma
Bisoprolol	Not useful in hypertrophic obstructive cardiomyopathy	-------	Chronotropic-incompetence asthma

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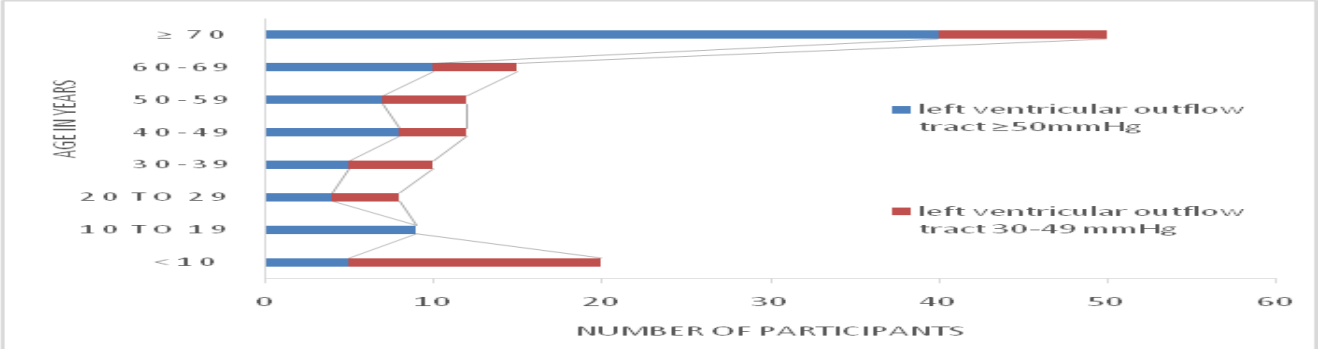
Fig. 1: LVOT values among HCM patients



Beta blockers have various side effects due to its treatment. These include depression, asthmatic attacks, hypotension, chronotropic incompetence as well as AV conduction reduction. The efficacy of various beta blockers shows that cardioselective blocker is much better in efficacy (Table 2).

In patients with higher LVOT rate the beta blockers did not work well and showed poor health prognosis. As an additional information it was observed that the left ventricle outflow tract (LVOT) with a value greater or equal to 50mm Hg was observed in patients at or greater than 70 years while lesser LVOT than 50mm Hg was observed in paediatric cases at highest peak (Fig. 1).

DISCUSSION

Beta adrenergic blockers remain an important pharmacological intervention in the treatment of hypertrophic cardiomyopathy. It can be used for with and without outflow obstructions. Beta blockers shown great pharmacologic properties for the reduction of physiologic outflow obstruction, risk of ventricular arrhythmias, angina and dyspnea. These effects are achieved by reducing heart rate which leads to elevated diastolic filling time, decrease in ventricular stiffness and inotropy.[13]

Different beta blockers are used for the treatment of hypertrophic cardiomyopathy[13], propranolol was the first introduced BAB in the earliest trials.[14-17] Other trial compared the result of two beta blockers; nadolol and verapamil (calcium channel blocker). Nadolol shows better result in symptomatic relief as compared to verapamil[18], while bisoprolol proved effectiveness against gradient on provocation reduction.[19] It is widely accepted that non vasodilating beta blockers prove great efficacy in avoiding obstruction in HCM patients2.0

Long-term consequences of beta blockers are still undefined but it is considered potential therapy and standard care in with and without outflow obstruction patients.[13] Patient symptomology and stability is took into consideration while deciding treatment and rhythm control strategy by beta blockers. Insufficient data and literature is available to assess patient' outcomes in each strategy. Certain medication should be avoided while using beta blockers including digoxin.[20] On the other, hand, few beta blockers showed better efficacy when use in combination with other[20.21].

CONCLUSION

Beta blockers are effective in hypertrophy cardiomyopathy cases depending upon the left ventricle out flow tract for better outcome.

Conflict of interest: Nil

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