

A COMPARATIVE STUDY TO EVALUATE THE EFFICACY OF AMLODIPINE WITH BISOPROLOL IN HYPERTENSIVE PATIENTS

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ABSTRACT

Aim and Objectives: The main aim of this study is to evaluate the efficacy of amlodipine and bisoprolol in hypertensive patients and to find out the decreased level of blood pressure (BP)(systolic/diastolic) using amlodipine compared with bisoprolol in hypertensive patients.

Materials and Methods: This study which includes spontaneous prospective monitoring of hypertensive patients undergoing different types of anti-hypertensive treatments were carried out for a period of 6 months by us on both in-patient, as well as out-patients.

Result and Discussion: A total of 76 patients were screened. At the beginning of our study, 1st month reading was taken as the initial value and 6th month value was taken as the final value. Pre-treatment baseline of systolic BP was 154.7±6.1 mmHg and 156±6.7 mmHg in Group I and Group II respectively. Patients receiving amlodipine had mean (±SD) reduction in systolic BP from baseline of 16.7±7.9 mmHg, whereas patients are receiving bisoprolol had a reduction from baseline of 19±5.5 mmHg representing respective decrease of 10.8% and 12%. Treatment with both amlodipine and bisoprolol therapy resulted in a significantly greater reduction in systolic BP.

Conclusion: The percentage reduction of systolic, as well as diastolic in the hypertensive patient, was more in bisoprolol treated group than amlodipine treated. So which suggest that the bisoprolol is having a very good control over systolic and diastolic BP level and simultaneously it is more beneficial for the treatment of hypertension.

Keywords: Amlodipine, Bisoprolol, Anti-hypertensives.

INTRODUCTION

Hypertension is a complex, multisystem disorder in which numerous interrelated factors contribute to elevated blood pressure (BP) [1]. Hypertension is defined as "a conditions BP is elevated to an extent where benefit is obtained from BP lowering." BP is the force of blood against the walls of arteries. BP has two components, the systolic pressure, which is the force that blood exerts on the artery walls when the heart is pumping and the diastolic pressure, which is the residual force that remains when the heart relaxes between beats. BP varies from person to person and by ages. BP rises and falls during the day depending on physical activity, emotions, mental stress and social life" [2].

Bisoprolol

A cardio-selective beta-1 – adrenergic blocker. It is effective in the management of hypertension and angina pectoris [3].

Pharmacology

Bisoprolol is competitive, beta – selective (cardio-selective) adrenergic antagonist. Bisoprolol is used to treat hypertension, arrhythmias, coronary heart disease, glaucoma and I also used to reduce non-fatal cardiac events in patients with heart failure [4]. Activation of (β)-receptors (located mainly in the heart) by epinephrine increases the heart rate, BP and the heart consumes more oxygen. Drugs such as bisoprolol that block these receptors therefore have the reverse effect: They lower the heart rate, BP and hence are used in the condition when the heart itself is deprived of oxygen. They are routinely prescribed in patients with ischemic heart disease. In addition, beta (1) – selective blockers prevent the release of rennin, which is a hormone produced by the kidneys, which lead to constriction of blood vessels. Bisoprolol is lipophile and exhibits no intrinsic sympathomimetic activity (IA) or membrane stabilizing activity.

Mechanism of action

Bisoprolol selectively blocks catecholamine stimulation of beta (1) – adrenergic receptors in the heart and vascular smooth muscle. This result in a reduction of heart rate, cardiac output, systolic and diastolic BP and possibly reflex orthostatic hypotension. Bisoprolol can also competitively block beta (2) – adrenergic responses in the bronchial and vascular smooth muscles, causing bronchospasm.

Adverse reactions

Cardiovascular effects: Angina, myocardial infarction, bradycardia, serious arrhythmias, sudden death, congestive cardiac failure.

Dermatologic effect: Diaphoresis, rash, acne, eczema, skin irritation, pruritus, flushing, alopecia and an exfoliate dermatitis.

Gastrointestinal effects: Abdominal pain, dyspepsia, nausea, vomiting constipation and diarrhea.

Drug interactions

Acarbose - Interaction effect: Hypoglycemia, hyperglycemia or hypertension.

Aceclofenac - Interaction effect: Decreased antihypertensive effect.

Acetohexamide - Interaction effect: Hypoglycemia, hyperglycemia or hypertension.

Dose

A dose of 2.5 mg may be an appropriate starting dose. If the antihypertensive effect of 5 mg is inadequate, the dose may be increased to 10 mg and if necessary to 20 mg once daily.

Amlodipine

A long – acting dihydropyridine calcium channel blocker. It is effective in the treatment of angina pectoris and hypertension.

Pharmacology

Amlodipine is a calcium-channel blocker, and it is used alone or with benazepril, and angiotensin-converting enzyme inhibitor to treat hypertension. Chronic stable angina pectoris and Prinzmetal's variant angina. Amlodipine is similar to the peripheral vasodilator nifedipine and other member of the dihydropyridine class [5].

Mechanism of action

Amlodipine is a calcium channel blocking agent. It inhibits the influx of extracellular calcium across the myocardial and vascular smooth muscle cell membranes. The decrease in intracellular calcium inhibits the contractile processes of the myocardial smooth muscle cells, causing dilation of the coronary and systemic arteries, increased oxygen delivery to the myocardial tissue, decreased total peripheral resistance, decreased systemic BP, and decreased afterload. Another possible mechanism is that amlodipine inhibits vascular smooth muscle. Carbonic anhydrase I activity with consecutive pH increase, which may be involved in intracellular calcium influx through calcium channel.

Adverse reactions

Cardiovascular effects: Peripheral edema, flushing, reflex tachycardia.

Dermatologic effect: Alopecia, dermatitis, flushing, rash.

Endocrine/metabolic effects: Breast swelling and discomfort with bilateral, tender nodules.

Gastrointestinal effects: Gingival hyperplasia, abdominal pain.

Drug interactions

Amiodarone - Interaction effect: Bradycardia, atrioventricular block and/or sinus arrest.

Amprenavir - Interaction effect: Increased plasma concentration of amlodipine.

Atazanavir - Interaction effect: An increased risk of cardiotoxicity.

Dosage

Hypertension or angina: 2.5-10 mg once daily (initial treatment can start as low as 2.5 mg per day, titer up to 10 mg per day as necessary) [6].

MATERIALS AND METHODS

The present study was conducted in Private Hospital, Erode, Tamil Nadu. The above hospital is specialized for cardiac and neuro-therapy and it is famous for its excellent out-patients facilities maintained by qualified specialists. The hospital is having capacity of 60 beds for in-patient hospitalization along with supported qualified staff. The hospital is well equipped, and service provided to patients including all the biochemical, clinical pathology and microbiology investigations facilities are available.

The above work carried out in the hospital was approved by the Dean/Chairman of the hospital, and it was informed to all physicians, surgeons and other healthcare professionals of the hospital. Thus, the protocol of the study which included aim, objective, methodology and prepared proforma was submitted to the hospital.

The approval from the chairman of the hospital was obtained with the expert guidance of clinical pharmacy professionals, senior and junior physicians of the departments selected for the study in the hospital. It was permitted to utilize the hospital facilities to make a follow-up prescription, in the selected departments. Patients were intimated about use of patient records, and all the health care professional were also informed about the project work.

In the present study, 76 diagnosed patients of hypertension, attending the private hospital, in the age range of 30-80 years were selected

initially the diagnosis of hypertension was done by the qualified doctors and was based on instrument like sphygmomanometer, aneroid manometer, stethoscope and clinical as well as biochemical examination. The complete history and detailed physical examination of each patient were recorded with the help of proforma already prepared. A BP (systolic and diastolic) reading was collected from hypertensive patients by using a sphygmomanometer.

In this study all the data were recorded in proforma which includes the information's regarding patients detail patients detail such as name, age, sex, height, weight, IP number, body mass index, DOA, DOD, social history, family history, laboratory investigations, BP (systolic and diastolic) and medication of hypertensive patients.

SELECTION OF PATIENTS

The study participants were out-patients and in-patients with hypertension according to the inclusion and exclusion criteria.

Inclusion criteria

- Subjects of either sex having hypertension
- Age 30-80 years
- Patients are taking amlodipine bisoprolol
- Newly diagnosed patients.

Exclusion criteria

- Pregnancy women
- Breast-feeding
- Other Anti-hypertensive group patients
- Nonhypertensive patients

RESULTS AND DISCUSSION

The study was designed to find out the effect of amlodipine and bisoprolol in the hypertensive patient. A total 76 patients were screened. At the beginning of our study, first month reading was taken as the initial value and 6th month value was taken as the final value.

Table 1 shows age-wise distribution among the patients.

Out of the selected 76 patients, 11 patients (14%) were in the age group of 30-39 years, 21 patients (28%) were in age group of 40-49 years, 25 patients (33%) were in the age group of 50-59 years, 13 patients (17%) were in the age group of 70-79 years. According to this data, 50-59 age group of patients were mostly affected by hypertension.

Of these 76 patients, 49 patients (64%) were males, and 27 patients (36%) were females indicating that men were more likely to have hypertension than women (Table 2).

According to personal habits in men 3 patients (6%) were only smokers, 4 patients (8%) were only alcoholics, 26 patients (53%)

Table 1: Age-wise distribution (n=76)

Age in years	Number of patients (%)	Percentage
30-39	11 (14)	14
40-49	21 (28)	28
50-59	25 (33)	33
60-69	13 (17)	17
70-79	6 (8)	8

Table 2: Sex-wise distribution (n=76)

Sex	Number of patients (%)	Percentage
Male	49 (64)	64
Female	27 (36)	38

were smoker and alcoholics, 16 patients (33%) non-smoker and non-alcoholic. Smoker and alcohol habitual patients were mostly suffered by hypertension (Table 3).

Out of selected 76 patients, 12 male patients (24.5%) and 9 female patients (33.4%) come under the category of vegetarian, while 37 males (75.5%) and 18 females (66.6%) comes under non-vegetarian category. According this data, non-vegetarian patients were more affected by hypertension (Table 4).

This study demonstrates that hypertension associated with some other diseases which include 15 patients (20%) were only with the endocrine disorder, 16 patients (21%) were only with cardiovascular disorder 23 patients (30%) are both endocrine and cardiovascular disorder, 8 patients (11%) were only with other disease, remaining 14 patients (18%) were without associated diseases. From this data, most of the hypertensive patients associated with both endocrine and cardiovascular disorder (Table 5).

Out of the selected 76 patients, 42 patients (55%) were having family history of hypertension and the remaining 34 patients (45%) were not having family history. Family history may also be one of the risk factor for developing hypertension (Table 6).

According to BMI 33 patients (43%) were in normal weight, 30 patients (40%) were in overweight and 13 patients (17%) were in obesity. This is indicating that over-weight and obesity also one of the risk factors of hypertension (Table 7).

Pre-treatment baseline of systolic BP were 154.7±6.1 mmHg and 156±6.7 mmHg in Group I and Group II respectively. Patients are receiving Amlodipine had mean (±SD) reduction in Systolic BP from baseline of 16.7±7.9 mmHg, whereas patients are receiving

bisoprolol had a reduction from baseline of 19±5.5 mmHg representing respectively decrease of 10.8% and 12% (Tables 8 and 9). Treatment with both amlodipine (p: 0.00010 and bisoprolol therapy (p: 0.0001) resulted in a significantly greater reduction in systolic BP [7,8].

Mean baseline diastolic BP level were 96.7±5.9 mmHg and 97.8±5.7 mmHg in group I and group II respectively. Amlodipine significantly lowered mean (±SD) diastolic BP level was 8.1±6.2 mmHg (or) 7.8% from baseline (p: 0.001), whereas bisoprolol significantly decreased diastolic BP level was 10.3±5.3 mmHg (or) 10.5% from baseline (p: 0.0001). The reduction in diastolic BP level observed with amlodipine and bisoprolol were statistically significant (Tables 9 and 10).

CONCLUSION

Our study shows that both amlodipine and bisoprolol reduced the systolic as well as diastolic BP significantly (p: 0.0001).

The percentage reduction of systolic, as well as diastolic in the hypertensive patient, was more in bisoprolol treated group than amlodipine treated. So which suggest that the bisoprolol is having a very good control over systolic and diastolic BP level and simultaneously it is more beneficial for the treatment of hypertension [9].

The study concludes monotherapy of bisoprolol was found highly sensitive as compared with Amlodipine for hypertensive patients. Suggesting that bisoprolol is more effective and beneficial for the hypertensive treatment as compared with amlodipine.

Table 3: Personal habits (male) (n=76)

Social habits	Number of patients (%)	Percentage
Only smoker	3 (6)	6
Only alcoholic	4 (8)	8
Smoker and alcoholic	26 (53)	53
Non-smoker and non-alcoholic	16 (33)	33

Table 4: Food habits (n=76)

Social habits	Male (n=49) (%)	Female (n=27) (%)
Vegetarian	12 (24.5)	9 (33.4)
Non-vegetarian	37 (75.5)	18 (66.6)

Table 5: Associated diseases of the patients (n=76)

Diseases	Number of patients (%)	Percentage
Endocrine disorder (DM, hyperthyroidism)	15 (20)	20
Cardiovascular disorder (Angina, MI)	16 (21)	21
Both (endocrine and cardiovascular disorder)	23 (30)	30
Others (Epilepsy, RA)	8 (11)	11
Patient without associated disease	14 (18)	18

Table 6: Family history of hypertensive patients (n=76)

Family history	Number of patients (%)	Percentage
Yes	42 (55)	55
No	34 (45)	45

Table 7: BMI wise distribution (n=76)

BMI categories	Number of patients (%)	Percentage
Normal weight=18.5-24.9	33 (43)	43
Over weight=25-29.9	30 (40)	40
Obesity=BMI of 30 or greater	13 (17)	17

BMI: Body mass index

Table 8: Systolic BP

Parameter	Amlodipine (n=36) (mean±SD)			Bisoprolol (n=40) (mean±SD)		
	Initial (mmHg)	Final (mmHg)	p value	Initial (mmHg)	Final (mmHg)	p value
Systolic BP	154.7±6.1	138.1±6.2	0.0001	156±6.7	137.3±5.9	0.0001

SD: Standard deviation, BP: Blood pressure

Table 9: Percentage reduction

Parameter	Amlodipine (n=36) %	Bisoprolol (n=40) %
Systolic BP	-10.8	-12.0
Diastolic BP	-7.8	-10.5

Table 10: Diastolic BP

Parameter	Amlodipine (n=36) (mean±SD)			Bisoprolol (n=40) (mean±SD)		
	Initial (mmHg)	Final (mmHg)	p value	Initial (mmHg)	Final (mmHg)	p value
Diastolic BP	96.7 ± 5.9	89.7 ± 2.8	0.0001	97.8 ± 5.7	87.5 ± 4.3	0.0001

SD: Standard deviation, BP: Blood pressure

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