Original Article

DRUG UTILIZATION PATTERNS OF ANTIHYPERTENSIVES IN VARIOUS WARDS IN A TERTIARY CARE HOSPITAL IN TAMILNADU

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ABSTRACT

Abstract: Drug utilisation study on Antihypertensive datas are useful for implementation of rational use of drugs among population. AIM : The aim of the study is to conduct the prescribing survey of antihypertensives in moderate to severe hypertension and in hypertensive complications by the physicians of a tertiary care hospital. Objectives of the study are to investigate the 1) most commonly used antihypertensive drug groups, 2) To determine the preferred drug which suits all age groups and controls symptomatic blood pressure and 3) the antihypertensive drug preferred in diabetes mellitus and hyperlipidemia 4) and to evaluate the regimen commonly followed Result and concultion In this prescription survey, calcium channel blockers were most commonly prescribed drug in monotherapy as well as combination therapy. Beta blockers were most commonly used in patients with hypertension associated cardiovascular disease. Angiotensin converting enzyme inhibitors, angiotensin receptor blockers were most commonly used in concomitant diseases like, diabetes, mellitus and hyperlipidemia

INTRODUCTION

Drug utilization is defined by the World Health Organization (WHO) as "the marketing, distribution, prescription, and use and adverse effects of drugs in society, with special emphasis on the resulting medical, social, and economic consequences". These types of studies are useful for implementation of rational use of drugs among population in both private and public healthcare[1].

Hypertension is a chronic staggering health problem for three reasons as follows: high prevalence, devastating complications, and asymptomatic until late in its course. Randomized clinical trials have demonstrated substantially improved Cardiovascular disease and microvasuclar outcomes with a target diastolic blood pressure, close to or < 80 mmHg41,42. For the prognostically more important systolic blood pressure, a single randomized clinical trial43 and prospective observational data from three other clinical trials44-46 support improved Cardiovascular disease and microvascular outcomes with a target systolic blood pressure <130 mmHg. Based on these data, most international guidelines now recommend a target blood pressure < 130/80 mmHg for people with diabetes35, 47-51.

Optimal antihypertensive therapy requires consideration of patient's age, diet, exercise, tobacco use, co morbid conditions, adequate dosing, patient compliance, and optimal blood pressure control. Other issues which deserve scrutiny are accuracy of initial diagnosis, self monitoring of blood pressure and dosage adjustability. According to seventh joint national committee on prevention, detection and treatment of high Blood pressure criterian, addresses "current deficiencies as mainly due to underuse, overuse and misuse of antihypertensive medications"[2]. But some newer drugs are widely used with little indication, reasons being high cost and massive marketing strategies. This Prescription survey is a part of drug utilization studies to investigate the pattern of antihypertensive drugs or regimen prescribed by the physicians in a tertiary care hospital, Tamilnadu.

AIM & OBJECTIVES

The aim of the study is to conduct the prescribing survey of antihypertensives in moderate to severe hypertension and in hypertensive complications by the physicians of a tertiary care hospital. Objectives of the study are to investigate the 1) most commonly used antihypertensive drug groups, 2) To determine the preferred drug which suits all age groups and controls symptomatic blood pressure and 3) the antihypertensive drug preferred in diabetes mellitus and hyperlipidemia 4) and to evaluate the regimen commonly followed for combination therapy.

MATERIALS & METHODS

This prospective utilization study was done as prescription survey to examine the use of antihypertensive drugs among the inpatients with moderate and high blood pressure. The study protocol was approved by the Institute's human ethical committee.

The inclusion criteria includes prescriptions of patients with moderate (systolic BP 160 -179 mm Hg, diastolic BP 100-109 mm Hg) and severe hypertension (systolic BP $\geqslant$ 180 mm Hg and diastolic BP $\geqslant$ 110mmHg) from 25 to 80 age groups of both sexes, with concomitant medications and comorbid conditions like hyperlipidemia, diabetes mellitus, cardiovascular diseases, neurological disorders and renal diseases. The prescriptions of patients with incomplete treatment, poor patient compliance, mild hypertension, childhood hypertension, and hypertension associated with obstetrics and gynaecology and finally emergency malignant hypertension are excluded. Outpatient prescriptions were also not included in our study of prescription survey. The prescriptions were collected from the inpatients admitted in the wards of medicine, cardiology, neurology, and nephrology wards. The prescriptions were collected during 9 week period of May and June, 2006. Total no. 100 prescriptions were collected; patient's name, age, sex, names of the all the drugs prescribed and concomitant diseases like diabetes mellitus and hyperlipidemia, with treatment were recorded using a prescription monitoring proforma.

The prescriptions were primarily categorised according to sex, age, Blood pressure (moderate & severe). The sub classifications of prescriptions were also done as follow as:

1) Class of antihypertensive drugs used in the treatment, 2) Mode of Therapy of Antihypertensives (monotherapy or combination therapy co administered with other drugs like antidiabetic drugs, lipid lowering drugs, drugs used to treat cardiovascular diseases, drugs used for accompanying neurological disorders and renal diseases), 3) the combination therapy again sub classified into two, three and four drug regimens. These prescriptions under various categories and subcategories were analysed statistically and recorded. The results were shown as percentage.

RESULTS

A total of 100 prescriptions were collected. Out of 100 patients, 55 patients were male and 45 patients were female. Patients were over the age of 60 years are 42, out of these 24 were men and 18 were women. Minimum age of the hypertensive patient admitted in hospital among both sexes is 40 and maximum age was 76 years. In 100 patients, 84 had moderate hypertension and 16 had severe hypertension (Table 1).

In 100 prescriptions, 42 patients received single antihypertensive drugs and 58 received combination therapy. In these total 100 prescriptions, 61 patients received calcium channel blockers, 42 patients received beta adrenergic blockers. Angiotensin converting enzyme inhibitors and Angiotensin receptor blockers were given to 24 and 13 patients respectively. 28 patients were treated with diuretics, 5 patients with alpha blockers and clonidine was given to 2 patients (Table 2).

In monotherapy category, calcium channel blockers were given to 24 patients and beta blockers were given to 9 patients. Angiotensin converting enzyme inhibitors were given to 8 patients as monotherapy and only one patient was receiving diuretic as

monotherapy. Among 58 patients receiving combination therapy, two drug regimens were received by 46 patients. Out of these 46 patients, combination with calcium channel blocker and beta blocker were given to 14 patients (Fig 3). Combination with calcium channel blocker and diuretic were given to 10 patients. 6 patients received Angiotensin converting enzyme inhibitor and diuretic and 5 patients received beta blocker and Angiotensin converting enzyme inhibitor. 1 patient received combination of calcium channel blocker and Angiotensin receptor blocker combination.

Three drug combination therapies was given to 8 patients, in those 8 patients beta blocker, Angiotensin receptor blocker and diuretic triple drug therapy were given to 4 patients. 2 patients received calcium channel blocker, beta blocker and alpha blocker combination. Four drug combinations were given to 4 patients. Calcium channel blocker, beta blocker, Angiotensin receptor blocker and diuretic were prescribed in 2 patients.

Out of 100 prescriptions, 31 patients were associated with diabetes mellitus and treated. The most commonly used antihypertensive drugs in these patients were Angiotensin converting enzyme inhibitors and Angiotensin receptor blockers. 13 patients were associated with hyperlipidemia and all of them were treated with HMG CoA reductase inhibitors (Table 3). In 61 patients of calcium channel blockers, 40 patients were receiving Amlodipine and 21 patients were receiving Nifedipine (Table 4). Among 42 patients of beta blockers, 32 patients were receiving Atenolol, 6 and 4 patients receiving Metoprolol and Carvedilol (Table 5).

In Angiotensin converting enzyme inhibitors, 22 patients were receiving Enalapril and 2 patients were receiving Ramipril (Fig 5). Among diuretics, 18 patients were treated with Furosemide, 9 patients received thiazides and 1 patient received spirinolactone (Fig 6). Losartan was the only drug given in Angiotensin receptor blocker group.

FIG.1
PRESCRIBED ANTI HYBERTENSIVE DRUGS AND CO-ADMINISTRATIVE OF OTHER DRUGS WITH ASSOCIATED DISEASES

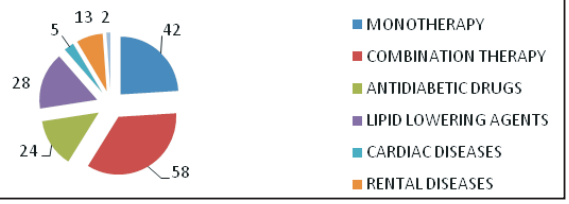


FIG.2
TWO DRUGS COMBINATION THERAPY

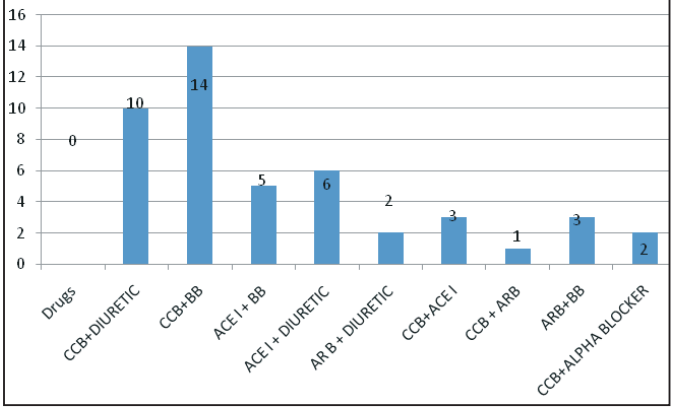


FIG.3
THREE DRUGS COMBINATION THERAPY

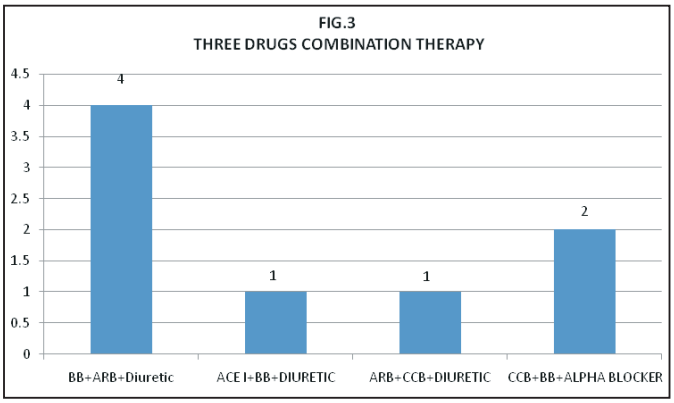


FIG.4
FOUR DRUGS COMBINATION THERAPY

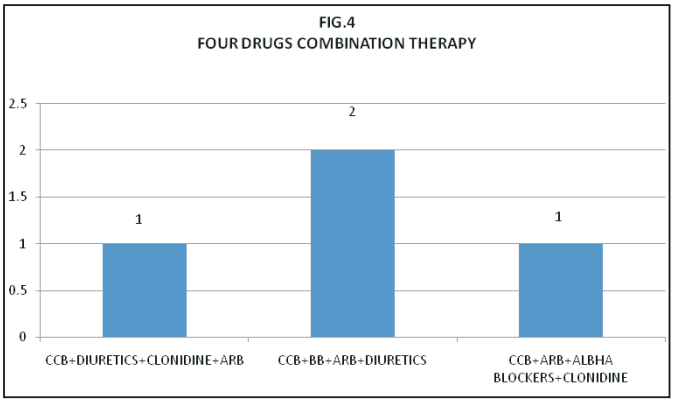


FIG.5
ANGIOTENSIN CONVERTING ENZYME INHIBITORS
(24 OUT OF 100 PRESCRIPTIONS)

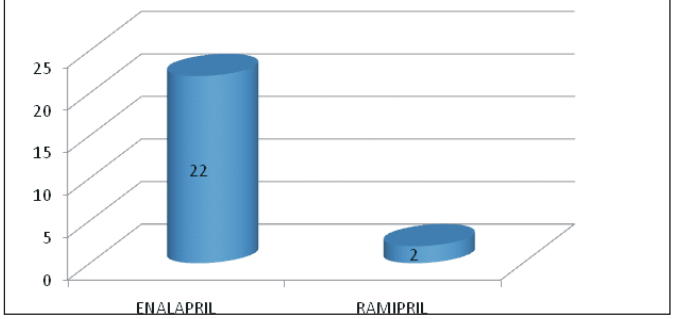
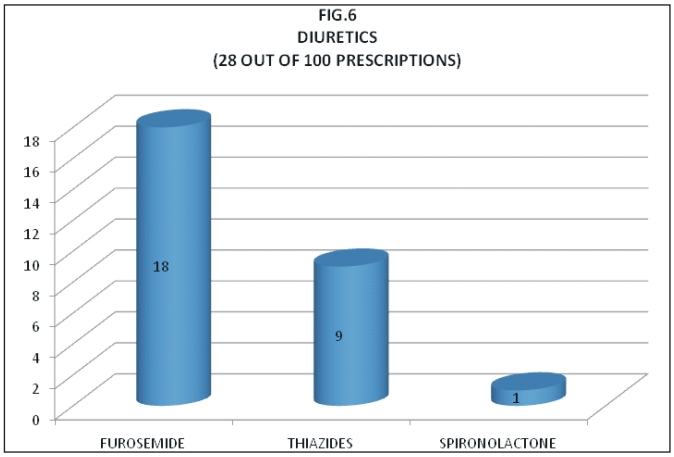


FIG.6
DIURETICS
(28 OUT OF 100 PRESCRIPTIONS)



Number of Prescriptions	100
Male	55
Female	45
Age: Percentage of patients over 60 years Male Female	 42 24 18
Blood Pressure Reading Moderate Hypertension (systolic 160-179 mmHg) (diastolic 100 – 109 mm Hg)	84 patients
Severe Hypertension (systolic ≥ 180 mmHg) (diastolic ≥ 110 mmHg)	16 patients

TABLE 1 : DEMOGRAPHIC PROFILE OF THE PATIENTS IN THE PRESCRIPTION SURVEY

S.No	Anti Hypertensive Drugs either given alone or in Combinations	Percentage of Prescriptions
1.	Patients treated with Beta – Adrenoceptor Blocking agents	42
2	Patients treated with Calcium channel blocking agents	61
3	Patients treated with ACE inhibitors	24
4	Patients treated with Diuretics	28
5	Patients treated with Alpha – adrenoceptor Blocking agents	5
6	Patients treated with Angiotensin Receptor Antagonist	13
7	Patients treated with Clonidine	2

Table 2 : NUMBER OF PRESCRIPTIONS WITH ANTI-HYPERTENSIVE DRUGS

S.No	Type of Therapy	Percentage
1.	Number of patients treated with Monotherapy	42
2	Number of patients treated with Combination Therapy	58
3	Number of patients treated with Antidiabetic Drugs	31
4	Number of patients treated with Lipid Lowering Agents	13
5	Number of patients treated with Cardiac Diseases	30
6	Number of patients treated with Renal Diseases	17
7	Number of patients treated with Neurological Disorders	7

TABLE - 3 : PRESCRIBED ANTI HYPERTENSIVE DRUGS WITHCO-ADMINISTRATION OF OTHER DRUGS

S.No	Monotherapy - 42 out of 100 prescriptions	Percentage (%)
1.	Calcium Channel Blockers (CCB)	24
2	Beta Blockers	9
3	Angiotensin Converting Enzyme Inhibitors	8
4	Diuretics	1

TABLE - 4 : NO. OF PATIENTS TREATED WITH SINGLE ANTI HYPERTENSIVE DRUG

S.No	CALCIUM CHANNEL BLOCKERS – 61 out of 100 prescriptions	Percentage (%)
1.	Amlodipine	40
2	Nifedipine	21

TABLE - 5 : NO. OF PATIENTS TREATED WITH CALCIUM CHANNEL BLOCKERS EITHER ALONE OR IN COMBINATIONS

S.No	Beta Blockers - 42 out of 100 prescriptions	Percentage (%)
1.	Atenolol	32
2	Metoprolol	6
3	Carvedilol	4

TABLE - 6 : NO. OF PATIENTS TREATED WITH BETA BLOCKERS EITHER ALONE OR IN COMBINATIONS

DISCUSSION

A prescription survey is considered to be one of the most effective methods to evaluate the prescribing attitude of doctors. It is also important to consider the guidelines of international regulatory associations on the management of hypertension that will improve prescribing practice of the physicians and ultimately, the clinical standards. This practice will eventually, help to promote rational use of drugs.

In the present prescription based survey, the prominent findings were, out of 100 prescriptions, elderly males above 60 years were most commonly affected with hypertension. In our survey, combination therapy was most widely prescribed regimen by the physicians. Earlier studies have revealed that an ideal combination must have antihypertensive drugs possessing complementary modes of action that provide a synergistic effect with minimal adverse effects. Most hypertensive diabetic patients with normal renal function require a combination of two to three antihypertensive agents to lower blood pressure to < 130/80 mmHg; patients with concomitant chronic kidney disease may require three or more agents. Combination therapy is required for optimal blood pressure control and prevention of cardiovascular, renal and neurological complications.

In this survey, most commonly prescribed monotherapy were calcium channel blockers followed by beta blockers. Very rarely diuretic was used as a monotherapy. In elderly patients, the preferred antihypertensive by the physicians were calcium channel blockers.

In two drug combinations, calcium channel blockers with beta blockers were widely prescribed by the physicians, next in line is the combination of calcium channel blockers and diuretics. Less frequently used two drug combination therapy was calcium channel blocker with Angiotensin receptor blocker.

In three drug combination therapy, the most common classes of drugs were beta blockers, Angiotensin receptor blockers and diuretics. Less frequent combination is Angiotensin converting enzyme inhibitors, diuretics and beta blockers. The second combination least used is Angiotensin receptor blockers with calcium channel blockers and diuretics.(Table 4) In four drug regimen, Calcium channel blockers, beta blockers, Angiotensin receptor blockers, and diuretics were widely used.

In individual drug utilization category, Amlodipine was most prescribed calcium channel blocker compared to Nifedipine. Atenolol was most preferred beta blocker followed by Metoprolol and then is Carvedilol. The predominant Angiotensin converting enzyme

inhibitor used was Enalapril and Ramipril was less frequently used. Among diuretics, Furosemide was popularly prescribed in comparison with thiazide and spirinolactone.

In diabetic patients, most widely used drug classes were Angiotensin converting enzyme inhibitors and Angiotensin receptor blockers. In patients with cardiovascular disease, beta blockers were most commonly used. Cardio selective beta blockers were largely used in these patients. Calcium channel blockers were most preferred in elderly patients. All these drugs were well tolerated and patient response was also found to be satisfactory. The major studies have demonstrated decrease in morbidity and mortality in patients treated with either diuretics or ß-blocker [4-14]

Inspite of pharmacotherapy lifestyle modification like exercise, diet, salt restriction, relaxation techniques remains the cornerstone in the management of hypertension[15]. All the patients were advised about non pharmacological measures like regular walking, Weight reduction, diet & salt restriction, low carbohydrates, fruits and vegetables consumption. 58% of patients followed life style modification to some extent.

CONCLUSION

In this prescription survey, calcium channel blockers were most commonly prescribed drug in monotherapy as well as combination therapy. Beta blockers were most commonly used in patients with hypertension associated cardiovascular disease. Angiotensin converting enzyme inhibitors, angiotensin receptor blockers were most commonly used in concomitant diseases like, diabetes, mellitus and hyperlipidemia. The most widely prescribed two drug combination therapy was calcium channel blockers and beta blockers. In elderly patients, the preferred antihypertensive by the physicians was calcium channel blockers. Most of the physicians followed the guidelines of international societies but the use of diuretics as a first line therapy both in monotherapy and combination therapy was found to be less. This kind of survey allows the identification of areas of aberrant or sub optimal prescribing for further evaluation.

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