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RESEARCH ARTICLE

A RETROSPECTIVE STUDY OF THE DRUG PRESCRIBING PATTERNS IN GERIATRIC HYPERTENSIVE PATIENTS IN A TERTIARY CARE TEACHING HOSPITAL, UDAIPUR, INDIA

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ABSTRACT

Background: The incidence of hypertension increases with progression of age, making it the most dominant and common morbid condition in the elderly (> 65 years).

Objective: The main objective of the present study was to analyze the drug prescribing pattern for anti-hypertensives in geriatric patients.

Methodology: A retrospective observational study was conducted in our institution, from 1st July 2012 to 31st December 2013. Elderly patients who have been diagnosed with hypertension as per JNC-7 guidelines and patients prescribed with antihypertensive drugs were included. The case files of Indoor and Outdoor patients were retrieved from Medical Record Department and data was collected according to the proforma.

Results: In our study, the total numbers of patients with hypertension were 300. The incidence of disease was more common in males. In our study 78% of the patients were Pre-Hypertensive systolic (120-139 mmHg) and Diastolic (80-89 mmHg) followed by Stage-I and Stage-II Hypertension. The most common drugs involved in the study were calcium channel blockers 43% followed by angiotensin II receptor blockers 18%. The most commonly prescribed drugs in the study population were amlodipine 43%, losartan 10% and telmisartan 8%. The most common FDC therapy involved in the study was telmisartan + hydrochlorothiazide 17%. The most common two drug combination therapy involved in the study was amlodipine + atenolol 5%, followed by metoprolol + amlodipine 2%.

Conclusion: Study indicates that calcium channel blockers and angiotensin II receptor blockers were commonly prescribed. Use of anti-hypertensive drug combination was significant.

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INTRODUCTION

Hypertension is defined as elevated systolic blood pressure ≥ 140 mm Hg or diastolic blood pressure ≥ 90 mm Hg (Chobanian *et al.*, 2003). It is associated with increased risk of stroke, myocardial infarction, atrial fibrillation, heart failure, peripheral vascular disease, and renal disease (Brown and Haydock, 2000). The World Health Report 2002 of the World Health Organization (WHO) states that high blood pressure is the primary or secondary cause of 50% of all cardiovascular diseases worldwide (Guilbert, 2002). Hypertension is highly prevalent in India. The prevalence of hypertension in India in 2000 was 60.4 million males and 57.8 million females and projected to increase to 107.3 million and 106.2 million

respectively in 2025. Hypertension is vary from 4-15% in urban and 2-8% in rural population (Lawes *et al.*, 2008). It is reported to be the fourth contributor to premature death in developed countries and the seventh in developing countries (Pradeepa and Mohan, 2008). Due to the increase in life span, the population of elderly patients (>65yrs) has remarkably increased (Christensen *et al.*, 2009). The incidence of hypertension increases with progression of age, making it the most dominant and common morbid condition in the elderly (> 65 years).

Hypertension in the elderly is one of the main risk factors for cardiovascular and cerebrovascular diseases (Elliott, 2004). At the same time as elderly patients commonly have multiple pathologies leading to polypharmacy, and altered pharmacokinetics and pharmacodynamics, are prone to adverse drug reactions from inappropriate medication (Cunningham *et al.*, 1997; Mannesse *et al.*, 1997). Therefore treatment of

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hypertension in elderly age group is emerging as a significant health problem. The main objective of the present study was to analyze the drug prescribing patterns in geriatric hypertensive patients.

MATERIALS AND METHODS

A retrospective observational study was carried out at Geetanjali Medical College & Hospital, Udaipur, a tertiary care teaching hospital from 1st July 2012 to 31st December 2013. The case files of patients were retrieved from Medical Record Department after obtaining approval from University Ethics Committee (letter no. GU/UEC/EC/2014/620). Elderly patients of age > 65 years who have been diagnosed with hypertension as per JNC-7 guidelines and patients prescribed with antihypertensive drugs were included in the study (Psaty *et al.*, 1997). Patients with < 65 years, head injury, hypertension with coma, and death cases were excluded. Details necessary for evaluation regarding chief complaints of the patients, previous allergies, comorbidities, and others were collected from the patient's clinical records. Certain demographic characteristics were studied and the factors studied were: (a) patient characteristics (gender, age (> 65 years), and comorbidities), (b) drug characteristics (list of antihypertensive and number of drugs prescribed) and Blood Pressure. The Sociodemographic status such as educational qualification, occupation, type of diet, and social habits of the patients were collected. All data were collected from data collection form, and to review the current prescribing patterns of Anti-hypertensive drugs in hypertension patients with co-morbidities and without co-morbidities, use of Anti-Hypertensive Drug Monotherapy and combination therapy in patient with hypertension.

RESULTS

We studied the case records of 300 patients who visited the Geetanjali hospital (Geetanjali Medicity) from 1st July 2012 to 31st December 2013 and were diagnosed as hypertension based on clinical findings. Of these 300 prescriptions, 67% of the patients were in the age group of 65-70 years, followed by 21% in 71-75 years, 9% in 76-80 years and 3% who were >81 years. Among them, 63% were male and 37% female. The male to female ratio was 1.81:1. The peak incidence of disease was in the age group 65-70 years, is shown in Table 1. The numbers of drugs prescribed were in the range of 4-6 per prescription. The Sociodemographic status such as Educational qualification, Occupation, and Social habits of the patients was summarized in Table 2. Hypertensive patients were classified on the basis of Joint National Committee (JNC-7) was summarized in Table 3.

Most commonly prescribed drug classes involved in the study was Calcium Channel Blockers 43% followed by Angiotensin II receptor antagonists 18%, and other prescribing patterns of Anti-Hypertensive Drug Monotherapy were summarized in Table 4. Among these, most common anti-hypertensive fixed dose combination therapy involved in the study was Telmisartan + Hydrochlorothiazide 17% followed by Olmesartan + Hydrochlorothiazide 2%, Losartan + Hydrochlorothiazide 2% and Ramipril + Hydrochlorothiazide 2%. We observed that different two drug antihypertensive combinations were prescribed to hypertensive patients (Table 5 & 6). The most common two drug combination therapy involved in the study was Amlodipine + Atenolol 5% followed by Metoprolol + Amlodipine 2%.

Table 1. Age and sex distribution of Geriatric Hypertensive patients

Age group (Years)	Men		Women		Total	
	Number of patients	Percentage	Number of patients	Percentage	Number of patients	Percentage
65 – 70	126	42 %	75	25 %	201	67 %
71 – 75	45	15 %	18	6 %	63	21 %
76 – 80	12	4 %	15	5 %	27	9 %
81 – Above	06	2 %	03	1 %	09	3 %
Total	189	63 %	81	37 %	300	100 %

Table 2. Sociodemographic status of the patients

Sociodemographics	Number and percentage
Educational qualification	
Literate	192 (64 %)
Illiterate	108 (36 %)
Occupation	
Employed	165 (55 %)
Unemployed	135 (45 %)
Type of Diet	
Vegetarian	120 (40 %)
Non – vegetarian (mixed)	180 (60 %)
Social habits	
Alcoholic	48 (16 %)
Smoker	87 (29 %)
Both	27 (9 %)

Table 3. Classification of hypertensive patients on the basis of JNC-7

Systolic blood pressure	Number and percentage (%)	Diastolic blood pressure	Number and percentage (%)
Pre- Hypertension (120-139 mmHg)	234 (78 %)	Pre-Hypertension (80-89 mmHg)	216 (72 %)
Stage-I Hypertension (140-159 mmHg)	42 (14 %)	Stage-I Hypertension (90-99 mmHg)	63 (21 %)
Stage-II Hypertension (≥160 mmHg)	24 (8 %)	Stage-II Hypertension (≥100 mmHg)	21 (7 %)

Table 4. Prescription pattern of anti-Hypertensive drug monotherapy

Anti-Hypertensive drug monotherapy drugs	Number and percentage (%)
Calcium channel blockers	129 (43 %)
Amlodipine	
Angiotensin – II receptor blockers	30 (10 %)
Losartan	24 (8 %)
Telmesartan	
β – blockers	15 (5 %)
Atenolol	15 (5 %)
Metoprolol	
Diuretics	03 (1 %)
Hydrochlorothiazide	06 (2 %)
Furosemide	

Table 5. Use of anti-hypertensive drugs in hypertension patients with co-morbidities

Co-morbidities drugs	Drugs	Number and percentage
Diabetic mellitus	losartan	12 (4 %)
	Telmesartan	15 (5 %)
	Amlodipine	18 (6 %)
	Telmisartan + Hydrochlorothiazide	03 (1 %)
DM + Hemiplegia	Metoprolol + Amlodipine	03 (1 %)
	Amlodipine	03 (1 %)
	Amlodipine + Atenolol	03 (1 %)
CVA Hemiplegia	Telmisartan + Hydrochlorothiazide	06 (2 %)
	Furosemide	03 (1 %)
	Telmisartan + Hydrochlorothiazide	03 (1 %)
	Losartan	12 (4 %)
	Amlodipine + Atenolol	06 (2 %)
	Metoprolol + Nifedipine	03 (1 %)
	Amlodipine + Enalapril + Hydrochlorothiazide	06 (2 %)
Amlodipine	30 (10 %)	

Table 6. Use of anti-hypertensive drugs in hypertension patients without co-morbidities

Monotherapy drugs	Number and Percentage (%)	Combination therapy drugs	Number and Percentage (%)
Calcium channel blockers		Metoprolol + Amlodipine	03 (1 %)
Amlodipine	57 (19 %)		
Angiotensin – II receptor blockers		Olmesartan + Hydrochlorothiazide	06 (2 %)
Losartan	15 (5 %)	Losartan + Hydrochlorothiazide	06 (2 %)
Telmesartan	18 (6 %)		
β – blockers		Ramipril + Hydrochlorothiazide	06 (2 %)
Atenolol	15 (5 %)	Atenolol + Amlodipine	06 (2 %)
Diuretics		Telmisartan + Hydrochlorothiazide	39 (13 %)
Hydrochlorothiazide	03 (1 %)		

Prescribing patterns of antihypertensive were classified into two types like with co-morbidities 42%, and without co-morbidities 58%. Among these comorbidities Cerebrovascular Accident Hemiplegia 21%, Diabetes Mellitus 16%, Diabetes Mellitus + Hemiplegia 5% and the detailed drugs prescribed with co-morbid conditions were summarized in Table 5. Among these without co-morbidities were divided into two types of drugs prescribed with single drug 36% and combination drug therapy 22%, these result were summarized in Table 6.

DISCUSSION

Our study was a retrospective prescription-based survey on geriatric hypertensive patients in a tertiary care teaching hospital in Udaipur, Rajasthan, India. This type of feedback from such prescription audits help to promote rational drug use (Tiwari *et al.*, 2004). Study was showed the peak incidence of hypertension in the age group 65-70 years. In this, the incidence of disease was more prevalent in men (63%) than

their women counterparts (37%), probably smoking (29%), followed by alcoholic activity (16%) and intake of non-vegetarian meal (60%). The women's were more likely to develop high blood pressure after menopause because of altered hormonal activity. In the present study 64% of the patients were literate and 55% patients were employed. Literate employed groups were probably more health conscious than the unemployed illiterates. As Age-related vascular and neuro-humoral changes are important factors leading to the development of hypertension in the elderly (Grassi *et al.*, 2000). During the study period 78% of the patients were Pre-hypertensive systolic (120-139 mmHg) and Diastolic (80-89 mmHg) followed by Stage-I Hypertension and Stage-II Hypertension.

Inappropriate prescribing can be defined as prescribing medications outside the bounds of accepted medical standards (Spinewine *et al.*, 2007). Maximum of diagnosed cases were from cardiovascular system (31.3%), followed by Diabetes Mellitus (20.7%). Cardiovascular complications due to

hypertension were the most common reasons for hospital admission. In a previous study among the elderly at Bangalore, COPD & complications were shown to be the predominant reasons for admission (Veena et al., 2012). The majority of the drug classes involved in the study was calcium channels blocker 43% followed by angiotensin – II receptor blockers 18% and the most commonly prescribed drugs in the study population were amlodipine 43%, Losartan 10% and Telmisartan 8%.

The most common anti-hypertensive fixed dose combination therapy involved in the study was Telmisartan + Hydrochlorothiazide 17% and most common two drug combination therapy involved in the study was Amlodipine + Atenolol 5% followed by Metoprolol + Amlodipine 2%. Prescribing patterns of anti-hypertensive were classified into two types like with co-morbidities 42%, and without co-morbidities 58%. Among these comorbidities Cerebrovascular Accident Hemiplegia 21%, Diabetes Mellitus 16% and Diabetes Mellitus + Hemiplegia 5%.

Conclusion

This study has shown that most commonly prescribed drug classes involved were calcium channel blockers followed by angiotensin – II receptor blockers and use of anti-hypertensive drug combination was significant and this practice positively impacted on the overall blood pressure control. In order to promote the rational prescribing drugs and hospital formularies in special committees are useful in reducing the abuse of drugs especially in poly-pharmacy and in the treatment of the hypertension.

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Conflict of interest

The author declares no conflict of interest.

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