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Antihypertensive drug utilization study in hypertensive patients with associated CKD in a tertiary care teaching hospital

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ABSTRACT:

BACKGROUND: - Hypertension can be both, a cause and a consequence of habitual order complaint (CKD). thus, blood pressure control is an integral element in treatment of hypertensive CKD cases as it can decelerate down complaint progression and reduce associated cardiovascular complaint threat.

OBJECTS: - To dissect application pattern of antihypertensive medicines in hypertensive CKD cases in a tertiary care sanatorium.

METHODS: - This was a cross sectional study carried out in Department of Nephrology, VIMSAR, Burla, over a period of 4 months. Applicable data from 120 unique conventions (OPD and IPD) of 120 different hypertensive CKD cases, all above 18 times of age, was collected. These cases were clinically diagnosed with CKD and hypertension as per the NKF- KDOQI and JNC 8 guidelines independently. The medicine application pattern was studied with respect to age, gender, type of antihypertensive used, chance use of multidrug remedy, medicines specified from Essential medicine List (EDL) and conventions with general name, as per WHO Drug application criteria.

RESULTS: - Of 120 cases, 68(56.7) were males and 52(43.3) were ladies. maturity of the cases was in the age group 60- 80 times (45).29.3 of these cases were diabetic. Calcium channel blockers were the most constantly specified medicines (53.75) followed by diuretics (17.5). 55 cases were on multidrug antihypertensive remedy.63.46 antihypertensive medicines were specified with general name.

CONCLUSION: - Analysis of the conventions indicated that use of antihypertensives in CKD cases, was in agreement with NKF- KDOQI and JNC 8 guidelines. utmost cases were on multidrug antihypertensive remedy and calcium channel blockers followed by diuretics were the most constantly specified antihypertensive group of medicines.

Keywords: Utilization, antihypertensive, CKD, prospective, multidrug therapy

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 7, 2024

INTRODUCTION

Further than one billion grown- ups are hypertensive worldwide and maturity (66) are from developing countries, like India. (1) It has been feting that hypertension is a major factor responsible for a decline in order function in cases with diabetic and on-diabetic order complaint. On the other hand, among cases with habitual order complaint (CKD), high blood pressure may develop beforehand during the course of the complaint and accelerates its progression. (2) Hence, hypertension (HTN) is both a cause and a consequence of habitual order complaint (CKD). CKD is defined as the presence of reduced order function (an estimated glomerular filtration rate(eGFR)< 60 mL/ min/1.73 m2 (3)) or order damage (constantly indicated by the presence of proteinuria) for ≥ 3 months duration. CKD affects 10 – 15 of the population worldwide. Its frequency increases with age (> 20 in age> 60 times;> 35 in age> 70 times). (3) When both HTN and CKD live together, risks of cardiovascular complaint (CVD) morbidity and mortality substantially increases. (4) Hence, blood pressure control is an integral element in the care of CKD cases, and is applicable at all stages of the complaint, irrespective of the underpinning cause. respectable BP control can break down renal damage and reduce CVD trouble in CKD cases. (5) Controlling BP in cases with CKD can be delicate and constantly requires combination of antihypertensive agents and life changes. (6) A number of mechanisms contribute to the development of hypertension in CKD and these impact its operation. Increase in sympathetic tone, brought about by sensational signals generated by decline in order function, contributes to the development of hypertension in CKD.(7) As eGFR declines there is an upregulation of the renin – angiotensin – aldosterone system(RAAS) which promotes tar and water retention.(8) This is compounded by an increased tar perceptivity of BP.(9) Endothelial dysfunction is characteristic of advanced CKD(eGFR< 30 mL/ min/1.73 m2) and has well established association with hypertension.(10) Increased arterial stiffness, also seen throughout the spectrum of CKD, is intertwined in the development of hypertension(11), and is an independent trouble factor for CVD events(12). Once hypertension has developed, several factors, including increased oxidative metabolism, with attendant relative renal hypoxia, may drive further progression of BP and CKD (13, 14). In health, BP demonstrates a nocturnal dip of 10 to 20. This is controlled by several factors including quotidian variations in autonomic function, tar excretion and the RAAS (15). Dysregulation of these systems in CKD leads to an on-dipping or indeed rising nocturnal BP, which is associated with increased CVD morbidity and mortality and trouble of CKD progression. BP reduction reduces proteinuria, which slows eGFR decline and reduces CVD (16). further violent BP reduction (a target systolic BP< 120 mmHg) may offer lower reno- protection in those with significant proteinuria (> 1 g/ day; PCR> 100 mg/ mmol, ACR> 70 mg/ mmol) than in those without proteinuria (17, 18). In addition to its antihypertensive goods, the impact of a drug on proteinuria is an important consideration when managing hypertension in CKD. In particular, RAAS blockade appears to offer a BP-independent reduction in proteinuria (19). thus, these specifics are considered first- line remedy for those with protein uric CKD (20). drug operation evaluation is a comprehensive review of case's conventions against fated morals to ensure its seemliness for better clinical issues. We considered JNC 8 and KDOQI

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 7, 2024

guidelines as standard remedy for treating hypertensive cases with CKD. (21) Rational use of drugs is important in CKD cases to help the progressions of complaint as well as the development of CVD. Hence, we performed the study to observe the applicable operation of antihypertensive drugs according to JNC 8 guidelines.

POINTS AND OBJECTS

- To assay application pattern of antihypertensive medicines in habitual order complaint (CKD) cases in VIMSAR, Burla, a tertiary care tutoring sanatorium.

MATERIAL AND STYLES

- Across-sectional study was conducted with authorization of IEC (19- I- S- O-165/164)
- Study point- OPD (Dept. of Nephrology) and Dept. of Pharmacology, VIMSAR, Burla
- Study period- 4 months (JUNE- SEPT) 2019
- Sample size – 120 conventions
- Testing fashion – Accessible slice
- All the data was entered into excel wastes and descriptive statistics were used to assay the data.
- We considered JNC 8 and KDOQI guidelines as standard remedy for treating hypertensive cases with CKD.

Addition criteria

- Conventions of cases ≥ 18 times of age, of either gender diagnosed as CKD with HTN.

Rejection Criteria

- Children, pregnant and lactating women
- Surgical conditions similar as advanced conditions, excrescences, and trauma
- Cases not specified any antihypertensive specifics

A predesigned data collection form was employed to gather all necessary data from the case's medical history. Cases diagnosed with habitual order complaint (CKD) and suffering from Hypertension, with or without Diabetes Mellitus, were aimlessly named from the inpatient department (OPD) of Nephrology during the study period. All data were entered into Excel spreadsheets for ease of analysis. Descriptive statistics were employed to dissect the data. Cases were distributed grounded on age, gender, stages of hypertension-morbidities(diabetic or non-diabetic), and the class and combination of specified antihypertensive specifics. The total number of antihypertensive specifics specified to each case(both diabetic and non-diabetic) was determined. The specifics were classified according to their pharmacological classes, and the predominant classes specified were linked. general and brand names of the antihypertensive specifics were recorded and compared. The proportion of antihypertensive specifics specified from the Essential Medicines List(EML) was calculated. Eventually, the tradition pattern was compared to the guidelines defined by the JNC 8 and KDOQI norms.

RESULTS AND DISCUSSION:

An aggregate of 120 unique cases of hypertensive habitual order complaint(CKD) were proved. The maturity of cases were from the age group above 60 times(36.7)(Fig 1), and the prevalence was advanced in males(56.7) compared to ladies(43.3)(Fig 2). These findings are

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 7, 2024

harmonious with former studies, similar as Elhami et al., which reported 70(58.33) males and 50(41.66) ladies with CKD.

Glomerular Filtration Rate(GFR) generally decreases with advancing age, declining by 1- 2 ml/ min per time after the sixth decade of life. However, the rate of decline may increase to 4- 8 ml/ min per time, potentially leading to End- Stage Renal complaint(ESRD), If systolic blood pressure is unbridled. Progressive renal failure can complicate unbridled hypertension(HTN) due to volume expansion and increased systemic vascular resistance. thus, it's pivotal to maintain blood pressure within the limits specified by guidelines to decelerate the progression of renal complaint and reduce the threat of cardiovascular complaint(CVD).

Fig.2: DISTRIBUTION ACCORDING TO AGE (PERCENTAGE PATIENTS%)

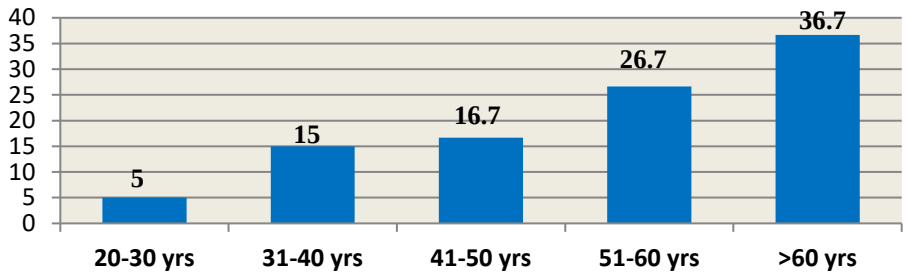
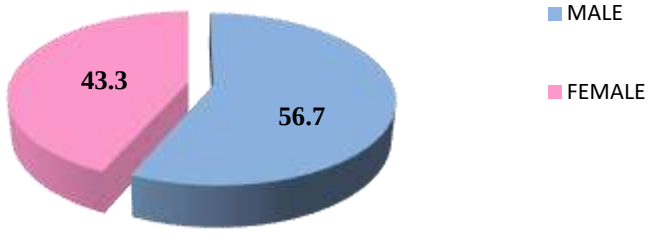


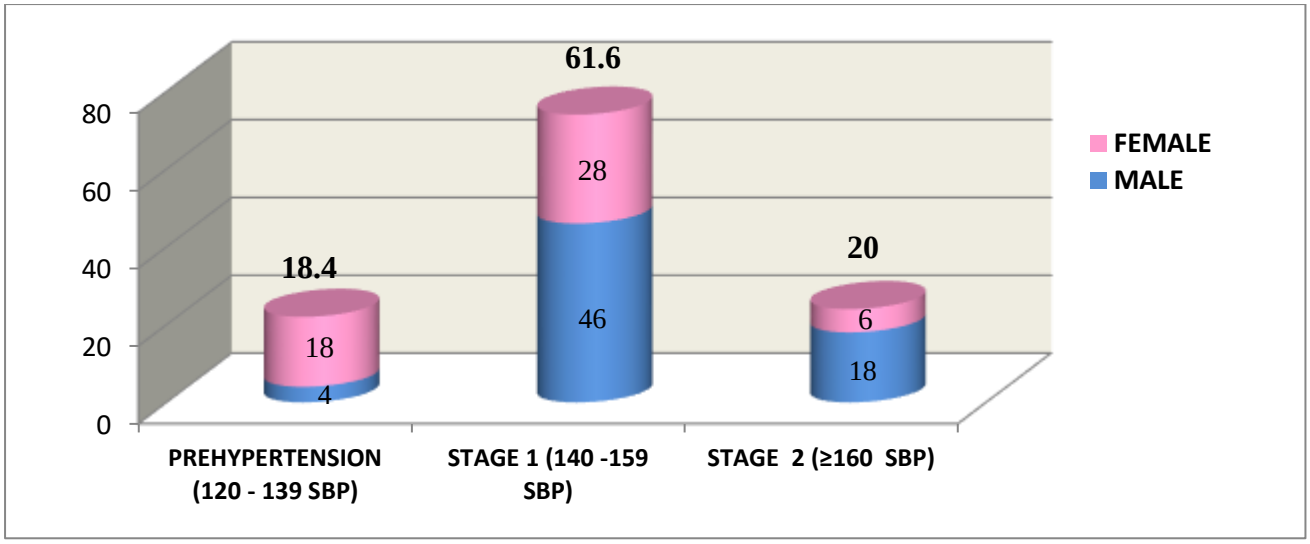
Fig. 1 : DISTRIBUTION ACCORDING TO GENDER (PERCENTAGE PATIENTS%)

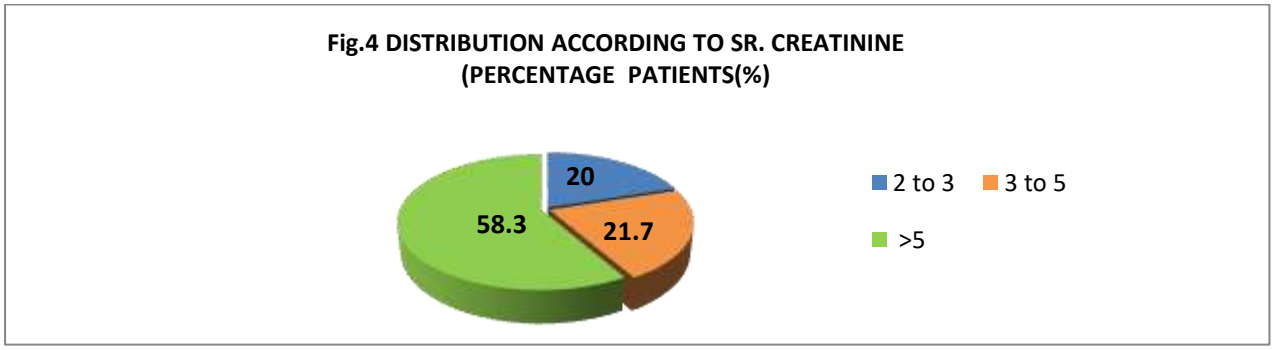


This study showed that out of 68 manly cases 4(5.8) were prehypertensive (SBP 120- 139 mm of Hg), 46(67.6) had stage- 1 HTN (SBP 140- 159 mm of Hg), 18(26.4) had stage- 2 HTN (SBP ≥ 160) analogous to study by Ashika RM et al. The target blood pressure in CKD cases should be maintained below140/90 mm Hg according to JNC 8 guideline.

Fig3. DISTRIBUTION ACCORDING TO HYPERTENSION STAGE PERCENTAGE PATIENTS (%)

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 7, 2024





Although serum creatinine is not the ideal indicator of kidney function, it serves as a useful marker for diagnosing renal insufficiency. The study revealed (Fig 4) that 24 (20%) of the total cases had serum creatinine levels between 2-3 mg/dL, 26 (21.7%) had levels between 3-5 mg/dL, and 70 (58.3%) had levels greater than 5 mg/dL, indicating reduced renal function in the majority of the cases. Additionally, approximately one-third of the cases, 38 (31.7%), were diabetic, while the remaining two-thirds, 82 (68.3%), were non-diabetic.

Out of 184 antihypertensive medicines specified for hypertensive cases with CKD, utmost generally specified medicines Table 5 were calcium channel blockers (CCBs)-51.6, followed by diuretics (25.3), beta- blockers (12.1), ARBs (4.4), ACEIs (3.3), α1 antagonists (2.2), centrally acting antihypertensive medicines (1.1). analogous pattern was observed in study by Neetu Joseph et al, 2017. According to JNC 8 guidelines, CCBs and diuretics should be used rather of ACE impediments and ARBs in cases over the age of 75 times with disabled order function due to threat of hyperkalaemia, increased creatinine and farther renal impairment.

Table 1: Utilization Patterns of Antihypertensive Medications in Hypertensive CKD Patients

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 7, 2024

ANTIHYPERTENSIVE GROUP	DRUG	FREQUENCY	PERCENTAGE (%)
CALCIUM CHANNEL BLOCKERS	Cilnidipine	39	21.4
	Amlodipine	29	15.9
	Nifedipine	22	12.1
	Benidipine	4	2.2
DIURETICS	Furosemide	18	9.9
	Torsemide	14	7.7
	Chlorthalidone	4	2.2
	Hydrochlorothiazide	4	2.2
	Metolazone	6	3.3
β BLOCKERS	Metoprolol	8	4.4
	Labetalol	6	3.3
	Carvedilol	6	3.3
	Celoprolol	2	1.1
ARBs	Telmisartan	8	4.4
ACE INHIBITORS	Ramipril	6	3.3
α_1 BLOCKERS	Prazocin	4	2.2
CENTRALLY ACTING SYMPATHOLYTICS	Moxonidine	2	1.1

Calcium channel blockers beget vascular smooth muscle relaxation, especially in arterial beds and produce negative ionotropic and chronotropic goods (Bhanu Priya B. Basavanna P L, 2015). In our study most generally specified CCBs are Cilnidipine (21.4) and Amlodipine (15.9.). Cilnidipine has a longer duration of action of 24 hours, also prevents kickback tachycardia as it widely acts on both L and N type of calcium channels. Hence, Cilnidipine is preferred over Amlodipine (L type of calcium channel blocker), which also has side goods like pedal edema.

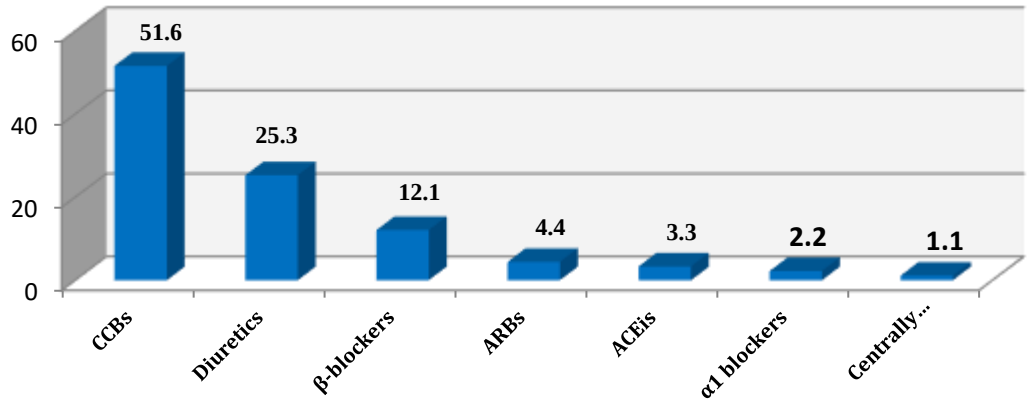
Thiazide and circle diuretics increase the delivery of sodium to the distal tubule, thereby adding urinary potassium excretion also. So, potassium- sparing diuretics are generally used as an adjunct to other diuretics for forestalment and treatment of diuretic convinced hypokalaemia and in cases with oedematous countries. In present study, utmost generally used diuretics are Furosemide (9.9) and Torsemide (7.7). analogous to chancing in study by Ashika RM etal.

Beta blocker is preferred in haemodialysis cases due to RAAS overactivity, increased position of sympathetic exertion in haemodialysis cases. They play a cardioprotective part in these cases. In our study, utmost generally used β blocker is Metoprolol (4.4), Neetu Joseph et al.

In α1 blocker, Prazosin (2.2) was the only medicine specified to veritably many cases. α β blocker, Carvedilol was specified to3.3 cases.

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 7, 2024

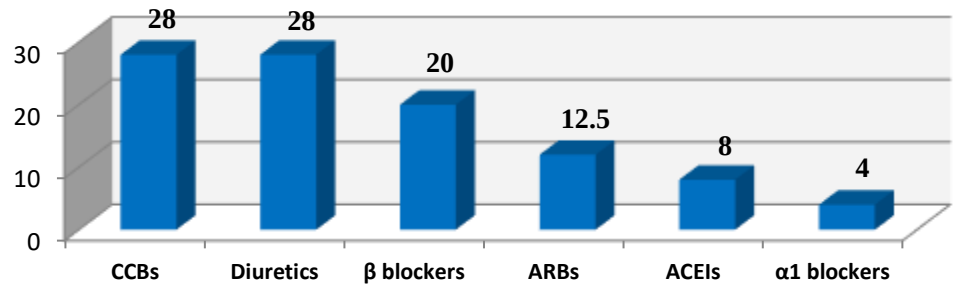
Fig 5. Utilization pattern of antihypertensives in CKD patients Percentage(%)



ACEIs reduce glomerular capillary pressure and hence help glomerular injury by dwindling arterial BP and by dilating renal sensational arterioles. Ramipril (3.3) was the only ACEI specified.

ARBs act by expressing invincible enmity due to slow dissociation kinetics of the composites from the AT1 receptor. The only ARB specified was Telmisartan (4.4).

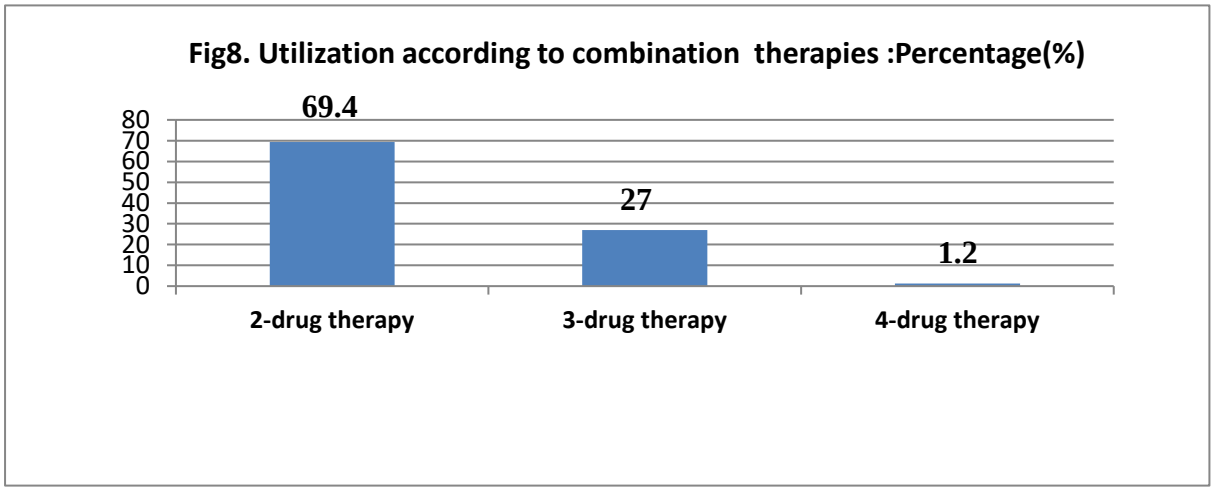
Fig.6: Utilization pattern of antihypertensives in Diabetic CKD patients Percentage(%)

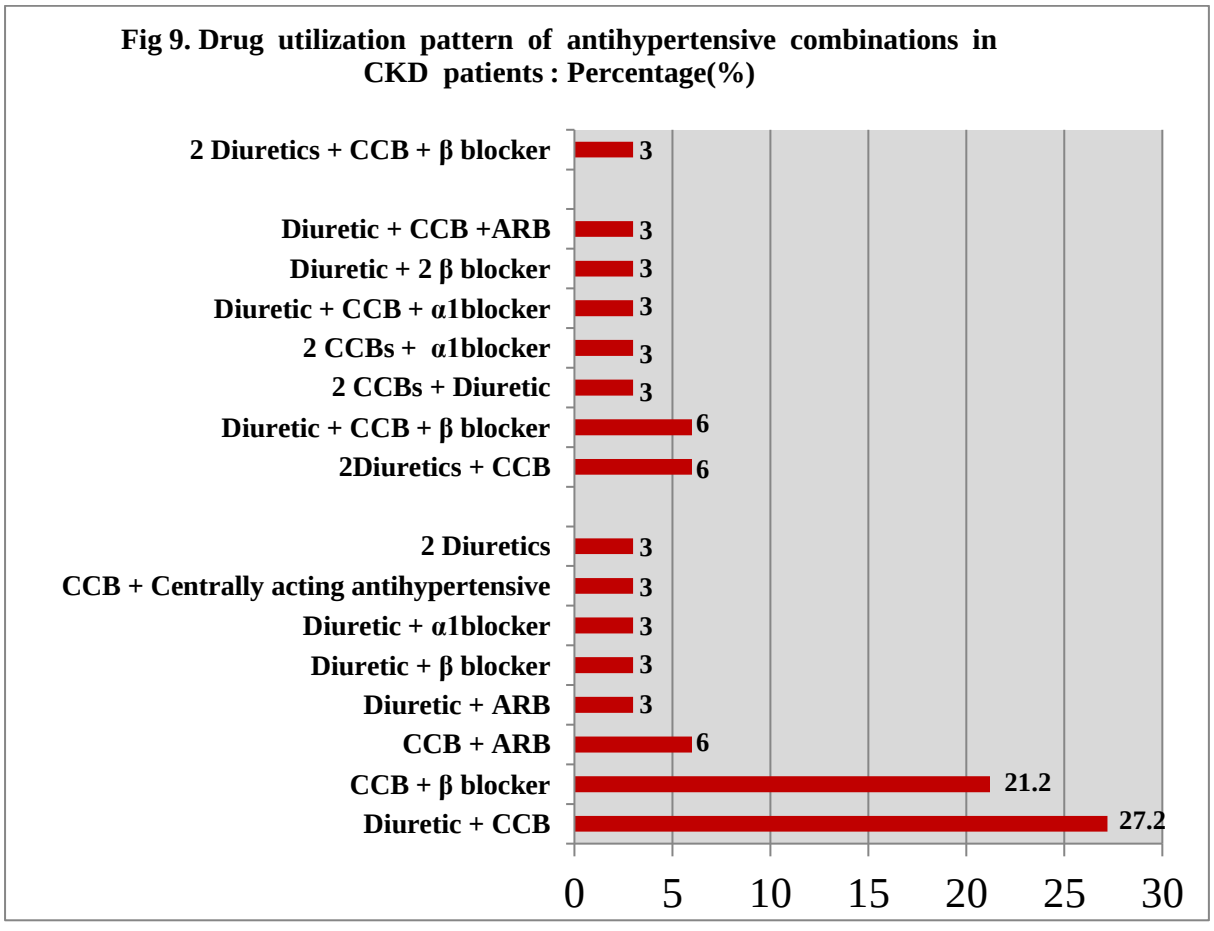


Moxinidine is the only centrally acting sympatholytic specified with chance of 1.1 maturity (55) cases were specified multidrug antihypertensive remedy and 45 cases were specified single medicine antihypertensive remedy. JNC 8 guideline suggests, use of combination of antihypertensive medicines to achieve target BP in CKD cases (i.e., ≤140/90 mmHg). (22) In the present study, utmost generally used antihypertensive combinations are two- medicine combinations and utmost prescribed combination was (Furosemide Nifedipine) i.e. Diuretic

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 7, 2024

CCB (27.2) followed by combination CCB β blocker (21.2)





The combination of drugs offers added benefits due to their different mechanisms of action in reducing blood pressure. In our study, it was observed that the average number of antihypertensive drugs prescribed per case was 1.8.

In our drug utilization study, WHO prescribing indicators observed were as follows:

INDICATOR	RESULT
Average number of antihypertensive drugs per encounter	1.8

ISSN: 0975-3583, 0976-2833 VOL15, ISSUE 7, 2024

Percentage of antihypertensive drugs prescribed by generic name	86.5
Percentage of encounters with an antihypertensive drug injection	23.3
Percentage of antihypertensive drugs prescribed from EDL	73.6
Percentage of antihypertensive drugs used as FDC	3.3

CONCLUSION:

Our study revealed that the majority of cases required multiple drug therapies to slow the progression of the disease. All medications were prescribed at appropriate doses according to JNC 8 guidelines. Calcium Channel Blockers (CCBs) and Diuretics were the most commonly prescribed antihypertensive drugs in both diabetic and non-diabetic hypertensive patients with CKD. These medications help reduce blood pressure and decrease the frequency of cardiovascular conditions that can develop during the progression of CKD with hypertension.

According to JNC 8 and KDOQI guidelines, the recommended drugs for hypertensive CKD patients are ACE inhibitors or ARBs with diuretics. However, in our study, CCBs and diuretics were the most frequently prescribed. This deviation may be due to the age profile of the majority of patients (≥ 70 years) and the risk of ACE inhibitor and ARB-induced hyperkalemia in these patients. Polypharmacy was observed in nearly all prescriptions, which is unavoidable given the disease burden and potential complications.

Active participation from clinicians and pharmacists, along with close monitoring of drug therapy, provision of drug information services, patient counseling, and detection and management of adverse drug reactions (ADRs), will significantly improve treatment outcomes. Generic drugs were prescribed in most cases, which means that out-of-pocket expenses for patients were minimized. Most medications were selected from the Essential Medicines List (EML) and were available through the hospital's government supply.

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