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Pharmacology

EVALUATION OF PRESCRIBING PATTERN AND SURVIVAL OF CHRONIC KIDNEY DISEASE PATIENTS ON HAEMODIALYSIS: A PERSPECTIVE FROM SUPERSPECIALITY TERTIARY CARE TEACHING HOSPITAL OF CENTRAL INDIA.

Dr. Chetna Ashok Shamkuwar* Associate Professor, Department Of Pharmacology, GMC, Chandrapur. *Corresponding Author

Dr. Nalini Kumari Principal Investigator, SIPRA LABS LTD, Hyderabad, Telangana.

Dr. Sushant H. Meshram Professor And Head, Dept. Of Respiratory Medicine, Super-speciality, GMCH, Nagpur.

ABSTRACT The incidence of CKD is increasing and there are very few studies of medication prescribing pattern in Haemodialysis patients in central India, hence the present study was planned to evaluate the medication prescribing pattern in CKD patients on haemodialysis.

METHODOLOGY: An observational study with prospective design was conducted in the department of Nephrology in a superspeciality tertiary care teaching hospital from May 2011 to May 2012 and a total hundred and twenty (120) patients were enrolled after written informed consent of each patient.

RESULTS: Out of 120 patients of CKD undergoing hemodialysis, 95 were males and 25 were females with a mean age of 41.37 ± 13.25. Most common co-morbid condition associated with CKD was hypertension (92) followed by anemia (50). A total of 1926 drugs were prescribed off which only 285 drugs were prescribed by generic name. a total of 15 patients died out of 75 patients which were prescribed between 8-15 drugs about 12 patients died (9%).

KEYWORDS : Ckd, Hemodialysis, Prescribing Patterns.

INTRODUCTION :

Chronic kidney disease (CKD) is emerging as an important chronic disease globally.[1] CKD is the issue of growing burden in India. The incidences & projected prevalence of End Stage Renal Disease (ESRD) in India has been reported to be 160–232 per million population (pmp) and 785–870 pmp.[2] It is characterized by multiple disorders affecting the morphology and function of kidneys.[1] The Kidney Disease Outcomes Quality Initiative (K/DOQI) of the National Kidney Foundation (NKF) defines CKD as either kidney damage or a decreased glomerular filtration rate of less than 60 mL/min/1.73 m^2 for three or more months.[3]

The CKD slowly progresses to End Stage Renal Disease (ESRD) requiring hemodialysis or renal transplantation.[4] Patients of ESRD usually have multiple co morbid conditions such as Diabetes Mellitus, Hypertension, Coronary Artery Disease[5,6]

The progression of CKD and the deterioration of kidney function can be slowed by optimal treatment of underlying co-morbidities and risk factors, which can be accomplished with lifestyle modifications and/or different pharmacological interventions.[7]

Earlier studies reported that the patients of CKD were treated with 6-12 medication and those patients on maintenance dialysis were receiving more than 25 drugs per day[8, 9] ESRD patients on hemodialysis have complex drug regimens with multiple doses per day. Frequent medication adjustments on dialysis versus non- dialysis days, medically unstable nature of the disease and restricted life styles, render these patients at high risk for developing drug related problems (DRPs) and non-adherence to treatment.[7]

The studies of prescribing pattern can provide useful information for the improvement of appropriate and effective use of drugs in a hospital. This will have an enormous impact on patient's quality of life and contribute substantially to the financial cost of patient care.[10] Since there are very few studies of medication prescribed pattern in Haemodialysis patients in central India, hence the present study was planned to evaluate the medication prescribing pattern in CKD patients on haemodialysis.

METHODOLOGY:

This was an observational study with prospective design conducted in the department of Nephrology in a superspeciality tertiary care teaching hospital from May 2011 to May 2012. The institutional ethics committee approval was obtained. A total hundred and twenty (120) patients were enrolled after written informed consent of each patient and they all were followed for a period of 1 year to study the outcome/survival. Patients meeting the inclusion criteria were explained about the study. Chronic Kidney Disease (CKD) patients diagnosed by consultant Nephrologist, of either gender and above 18 years of age undergoing hemodialysis were included and their prescriptions were analyzed. The following information were obtained from prescriptions viz. demographic details, diagnosis, co- morbid conditions, and medication details. Drugs were classified into different groups based on Anatomic Therapeutic Chemical (ATC) classification. In the ATC classification system, drugs are divided into different groups according to the organ system on which they act and/or therapeutic and chemical characteristics[11]

STATISTICAL ANALYSIS

Analysis was done by entering the data in SPSS 16. Results were expressed as Mean ± Standard Deviation (SD). Non-parametric values were expressed as the percentage. P value <0.05 was considered significant.

RESULT :

A total 120 patients of CKD undergoing haemodialysis were studied during the study period, of which 95 were male and 25 were female with mean age of 41.37 ± 13.25. All the patients were undergoing haemodialysis for more than one year. The baseline demographic details are shown in Table 1. The most common co-morbid condition associated with CKD were hypertension (92) and anemia (50).

A total number of drugs prescribed were 1926. Approximately 50 % of drugs were prescribed from WHO essential drug list while only 285 drugs were prescribed by generic name. Out of 75 patients who were prescribed between 8 to 15 medicines, 12 patients (9%) died and out of 45 patients who were prescribed between 16-23 medicines, 3 patients (0.13%) died. (table 2)

Table 3 and Table 4 shows the categories of drugs used in hemodialysis as per the Anatomic chemical classification and the most commonly prescribed drugs were for gastrointestinal tract and metabolism 32.79 % followed by drugs for treatment of disorders of blood and blood forming organs 24.68%. Also, frequently prescribed drugs were multivitamins, Iron, folic acid, calcium carbonate and calcitriol.

Fig 1 shows the number of medications used in the patients of CKD.

DISCUSSION

Medical care for CKD patients is complex, due to widespread co-morbidities and major risk factors for CKD.[7] Hemodialysis restores the intracellular and extracellular fluid levels which is the function of

normal kidney.[12] Although dialysis is a lifesaving procedure, but at best it replaces only about 10% of normal renal function. The male predominance of CKD in our study is probably due to hypertension and diabetes. Hypertension was the most common co- morbid condition observed in present study, similar co-morbid condition were reported by others.[13,14]

The average number of drugs per prescription is 16.05. Similarly, Manley et al reported a mean of 12.3 different medications from which 10.0 were home medications. [15, 13] The interpretation could be that, all dialysis patients have many co-morbid condition and continue to have health problems, including salt and water retention, phosphate retention, secondary hyperparathyroidism, hypertension, chronic anemia, hyperlipidemia, and heart disease. To overcome all these medical problems varieties of medications are required.[16,17]

In present study, 285 (14.79%) drugs were prescribed by generic name, showing that prescribing by brand name is the norm, which needs to be discouraged. Encouraging prescription of drugs by generic names is always recommended by various national and international bodies to promote rational use of medicines.

In this study (47.35%) drugs were prescribed from WHO essential list. So availability of all these drugs in public health facilities is less likely. Majority of the patients cannot afford to purchase these drugs from private pharmacies. Hence, whether the patients are actually consuming all the prescribed drugs is a matter of great concern. Around more than half of the patients, diuretics was most common prescribed anti hypertensive followed by calcium channel blockers (CCB) in our study. The primary action of diuretic is to increase the sodium excretion and decrease the blood pressure and also by facilitating the response of other antihypertensive agents in CKD.[18]

Whereas earlier studies reported the use of beta blocker as an anti hypertensive in haemodialysis patients.[19]

In our study most of the patients received iron. Iron is required for formation of red blood cells. Hemodialysis patients lack iron due to loss of small amounts of residual blood discarded in the dialyzer and tubing after each dialysis session.[14]

40(%)of patients were prescribed pantoprazole, a proton pump inhibitor (PPI) and 34(%) received H2 blockers to reduce peptic ulcers and gastro-esophageal reflux disease which is more common in CKD patients. USRDS reported the use of PPI in 30% of hemodialysis patients.[3] The number of drugs prescribed for haemodialysis patients are remarkably higher than that prescribed for ambulatory patients. A positive relation had been reported between the number of medications and the potential for drug related problems.[15] When a large number of medications are used, the potential for drug-related problems such as drug duplication, significant drug interaction, and use of contraindicated drugs is high, [11] and these problems probably increase the risk of adverse drug effects.[5]

CONCLUSION:

The number of medications prescribed is higher in patients of CKD and is associated with more morbidity and mortality. This study may help to identify most commonly prescribed medicines in CKD patients undergoing Haemodialysis and thereby help to prevent medication-related problems in these patients.

LIMITATION OF STUDY:

Survival analysis was not done in our study. As it was only restricted to one superspeciality hospital, these findings cannot be extrapolated to general population.

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TABLES

Table-1 Demographic characteristics of Haemodialysis patients. (n=120)

Patient characteristics	Number of patients (%)
Gender	
Male	95 (79.16)
Female	25 (20.83)
Age in years	
20-30 years	29 (24.16)
31-40 years	31 (25.83)
41-50 years	27 (22.50)
51-60 years	26 (21.66)
61-70 years	05 (04.16)
>71 years	02 (01.66)
Stage of CKD	
Stage V	104 (86.66)
Stage IV	14 (11.66)
Stage III	02 (01.66)
Co-morbidities	
Hypertension	92 (76.66)
Anemia	50 (41.66)
Diabetes	20 (16.66)
Coronary artery disease	07 (05.83)
Obstructive uropathy	06 (05)
Others	10 (8.33)

Table 2. Analysis of prescription of CKD patients on Hemodialysis and survival rates

Details of prescription	Number
Prescription analysed	120
Total number of drugs prescribed	1926
Average number of drugs per prescription	16.05
Number of drugs prescribed by generic name	285
Number of drugs from WHO essential drug list out of total number of drugs prescribed	912
Outcome of patients prescribed on 8-15 medicines	12 died (9%)
Outcome of patients prescribed on 16-23 medicines	3 died (0.13%)

Table 3 : Distribution of drugs prescribed for chronic kidney dise ase according to Anatomic Therapeutic Chemical classi fication

Drugs Class (based on ATC classification)	Total no. of drugs Prescribed (%)
A- Drugs for gastrointestinal tract and metabolism	758(39.35)
B- Drugs for treatment of disorders of blood and Blood forming organs	429(22.27)
C- Drugs for cardiovascular system	301(15.26)
D-Dermatological drugs	05(0.25)
G- Drugs for genitourinary system and sex Hormones	53 (2.75)
H- Hormones for systemic use except sex Hormones	75(3.89)
J- Anti infectious drugs for systemic use	111(5.76)
L- Antineoplastic and immunomodulating agents	05(0.25)
— Drugs for musculoskeletal system	22(1.26)
– Drugs acting on nervous system	31(1.60)
P- Drugs against parasites and insecticides	00
R- Drugs for respiratory system	109(5.65)
S- Drugs for eye and ear	00
V- Various others	27(1.40)
Total	1926

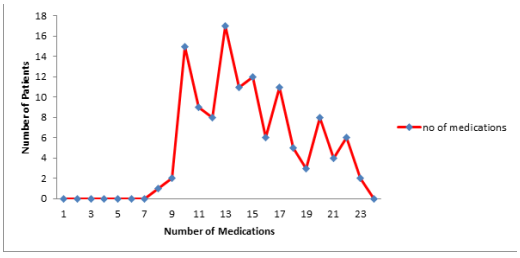
Table 4: Categories of drugs used in haemodialysis patients as per Anatomic Therapeutic Chemical classification.

Drug class	ATS CODE	No. of Prescribed drugs (%)
Cardiovascular drugs	C08CA	**301**
Calcium channel blockers	C03CA	84 (4.83 %)
Diuretics	C02CA	105(6.04%)
Alpha blockers	C09AA	19(1.09)
ACE inhibitors	C09AA	04 (0.23)
Angiotensin receptor blockers	C07AB	09(0.51)
Beta blockers		50(2.87)
Isosorbide dinitrate		18(1.03)
Glyceryl trinitrate	C02AB	05(1.03)
Centrally acting		05 (1.23)
Miscellaneous		
Drugs for GIT	A02BC	**758**
Proton pump inhibitors	A02BA	40(2.30)
H2 blockers	A04AA	34(1.95)

Serotonin (5HT3) Antagonist	N05AD	37(2.12)
Domperidone		07(0.40)
Miscellaneous		
Anti diabetic drugs	A10A	
Insulin	A10B	18(1.03)
Oral Hypoglycemic agents	A11HA	03(0.17)
Vitamin D3		100(5.19)
Phosphate binders	A12AA04	
Calcium Carbonate	A12AA12	57(2.96)
Calcium acetate	A12AA03	8(0.42)
Calcium gluconate	V03AE02	16(0.83)
Sevelamer hydrochloride		7(0.36)
Hematopoietic agents	B03A	**429**
Iron	A11AA	93(5.35)
Multivitamins	B03XA01	50 (2.55)
Erythropoietin	B03B	62(3.56)
Folic Acid	B01AC	31(1.78)
Platelete aggregation Inhibitors	B01A	07(0.40)
Anti thrombotic agents		83(4,77)
Drugs for respiratory system	R03AC	**109**
Selective beta 2 adrenoreceptor agonist		49(2.54)
Antihistaminics	RO6AB	60(3.12)

FIGURES:

Figure 1 : Distribution of number of medications used in CKD patients



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