

A Descriptive Study on Prescription Pattern of Intradialytic complications in patients Undergoing Hemodialysis

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Abstract

Hemodialysis is a life-saving treatment for individuals with end-stage renal disease, but it is not without its challenges. This study examines the prescription pattern related to Intradialytic complications. It mainly aims to discern trends and improve management strategies for complications arising during Dialysis offering insights into optimizing prescription pattern within its clinical content.

OBJECTIVES: The goal of the study was to describe the Intradialytic complications associated with hemodialysis. Study also aimed to assess the prescribing pattern of drugs used for the treatment of intradialytic complications.

METHODOLOGY: A Descriptive study was carried out among 90 samples in the Nephroplus dialysis unit of ESIC PGIMS Model Hospital Bengaluru. The data was collected by using self-designed data collection form. The collected data were entered in Microsoft excel and appropriate descriptive and inferential statistical analysis was performed.

RESULTS: Out of the 90 subjects selected for the study (75.55%) presented with cardiovascular complications, (44.44%) Neurological, (36.66%) Gastrointestinal and (55.55%) Hematological complications. A positive association was seen between Age and all the Intradialytic complications. Among the cardiovascular complications Nicardipine was given for (51.47%), For Neurological complication Tab Paracetamol has been given for (37.50%), For Gastrointestinal complications Inj Pantoprazole (69.70%) and for miscellaneous complications Inj Avil (44.00%)

CONCLUSION: This study illuminate's prescription patterns impacting intradialytic complications and provide valuable insights for refining medication strategies during dialysis, emphasizing the importance of tailored prescriptions to enhance patient outcomes and minimize complications within this critical medical context.

Keywords: Intradialytic complications, Hemodialysis.

Introduction

The Greek words Dia, which means "through," and lysis, which means "loosening or splitting," are combined to form the phrase dialysis. In this kind of renal replacement treatment, the kidneys' natural ability to filter blood is augmented by artificial machinery that eliminates excess water, solutes, and poisons ^[1]. Dialysis is necessary to preserve homeostasis, or a stable internal environment, in patients with acute kidney injury (AKI), a rapid loss of kidney function, and chronic kidney disease (CKD), a long,

constant loss of kidney function. It is a measure to help individuals who cannot have a kidney transplant, to delay the need for a transplant, or to treat acute renal damage. [2]

In the twenty-first century, one of the main causes of mortality and suffering is CKD. According to estimates, 843.6 million individuals worldwide were affected by CKD in 2017. This increase in prevalence is partly attributable to an increase in risk factors such as obesity and diabetes mellitus. Haemodialysis is used by around 89% of dialysis patients worldwide [3] Renal Replacement Therapy (RRT) incidence is influenced by the prevalence of illnesses that cause End-Stage Renal Disease (ESRD), early identification of chronic kidney disease (CKD), and therapies to stop the progression of ESRD. It is easier to start planned RRT when patients with a history of acute renal injury episodes, excessive proteinuria, and a falling estimated Glomerular Filtration Rate (eGFR) are identified systematically. This helps to halt the upward trend in the incidence of emergency RRT.

Although there are several advantages of long-term HD for ESRD control, there are also drawbacks. HD issues might arise during dialysis (intradialytic), in between treatments (interdialytic), or during long-term dialysis. [4] Intradialytic issues, including Intradialytic Hypotension, Intradialytic Hypertension, Fever, Chest Pain, Chills, Nausea, Vomiting, and Muscle cramping, are common in haemodialysis patients. Therefore, it is crucial to monitor closely, manage these intradialytic problems appropriately, and treat them quickly because some of them are potentially fatal. [5] Hypotension is the most common acute complication reported worldwide (25–55%). The Kidney Disease Outcomes Quality Initiative (KDOQI) of the National Kidney Foundation defines hypotension as a decrease in mean arterial pressure (MAP) of at least 10 mm Hg or a reduction in systolic blood pressure (SBP) of more than 20 mm Hg. Arrhythmias (50%) are another concern, as are nausea/vomiting associated with the dialysis response (15%), cramping in the muscles (20%), headache, back pain (5%), chest discomfort (5%), fever (6%), and chills (6%). [6,7] pre-to post-hemodialysis elevation in blood pressure is known as intradialytic hypertension. Dialysate sodium reduction and substitution are two of the therapeutic methods for this independent risk factor in hypertension haemodialysis patients. Mainly carvedilol and other inadequately dialyzed antihypertensives [8,9]

Other typical intradialytic complications include cramping, nausea, vomiting, and hypotension. Haemodialysis patients may develop gastrointestinal symptoms such as nausea and vomiting. However, these symptoms are frequently brought on by blood pressure changes, anxiety, and overeating during the treatment. By decreasing the blood flow rate, the dialysis machine may be reset and intradialytic hypotension can be controlled. Cramping mostly affects the lower limbs, while it can sometimes sporadically affect the hands, arms, and abdomen [10].

The common neurological manifestations associated with hemodialysis are headache, neuropathy, stroke, myopathy, sleep disorder etc. [11] They are mainly occurring due to the stress during the hemodialysis procedure [12] Neurological complications during hemodialysis are underdiagnosed and timely management of these disorders can improve the quality of life of hemodialysis patients [13]

Studying intradialytic complications is vital for patient safety and care quality during dialysis [14]. By identifying and addressing these issues, healthcare providers can enhance the patient experience, reduce healthcare costs, and make data-driven treatment decisions. Furthermore, this research contributes to the broader field of nephrology, advancing medical knowledge in renal care [15].

2. RESULTS

1. Materials And Methods

This retrospective study was conducted in the Nephroplus dialysis unit, ESIC MC-PGIMSR and Model Hospital, Rajajinagar, Bengaluru for 6 months in the patients who had taken hemodialysis. Patients of age above 18 years were included in the study. Self-designed data collection form containing demographic details, social details, medical and medication histories, diagnostic details, and treatment details of patients was used for study.

1.1. Study procedure

The study commenced after the approval of the Institutional Ethics Committee. The investigator had chosen the study subjects based on the inclusion and exclusion criteria from the Nephroplus dialysis unit of ESIC MC PGIMSR and model hospital, Rajajinagar. Relevant data from the files was obtained and recorded on the data collection form or entered into an electronic data collection form and then in a Microsoft Excel sheet. The data so obtained was segregated in a Microsoft Excel sheet, assessed, and appropriate statistical analysis was performed.

1.2. Statistical analysis

All recorded data were entered and analyzed using MS Excel for determining for the statistically significant. Descriptive statistics were computed for quantitative variables and frequencies and percentages were calculated for categorical values. Column charts, pie-charts, bar graphs were made to find the nature of data distribution.

2. Results

This study included 90 patients attending the Nephroplus dialysis unit of ESIC MC -PGIMSR, Rajajinagar, Bengaluru. The study was conducted over a period of three months from June to August 2023

Out of 90 patients in the study 69 were male (76.67%) and 21 were female (23.33%). The mean age of the study population was found to be 51.9 years. Majority of the patients belonged to the age group 56-65years (32.22%) followed by the 46-55years age group (27.78%). The youngest patient included in the study was 24 years old, while the oldest patient was 75 years old.

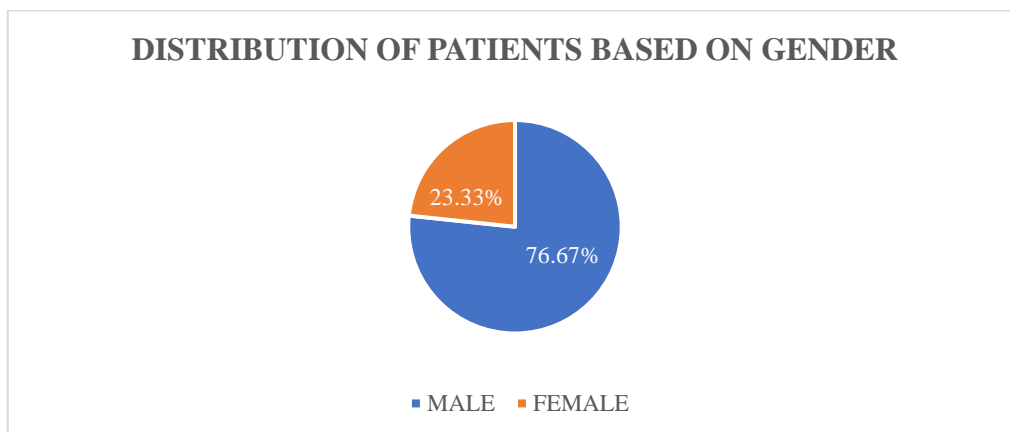


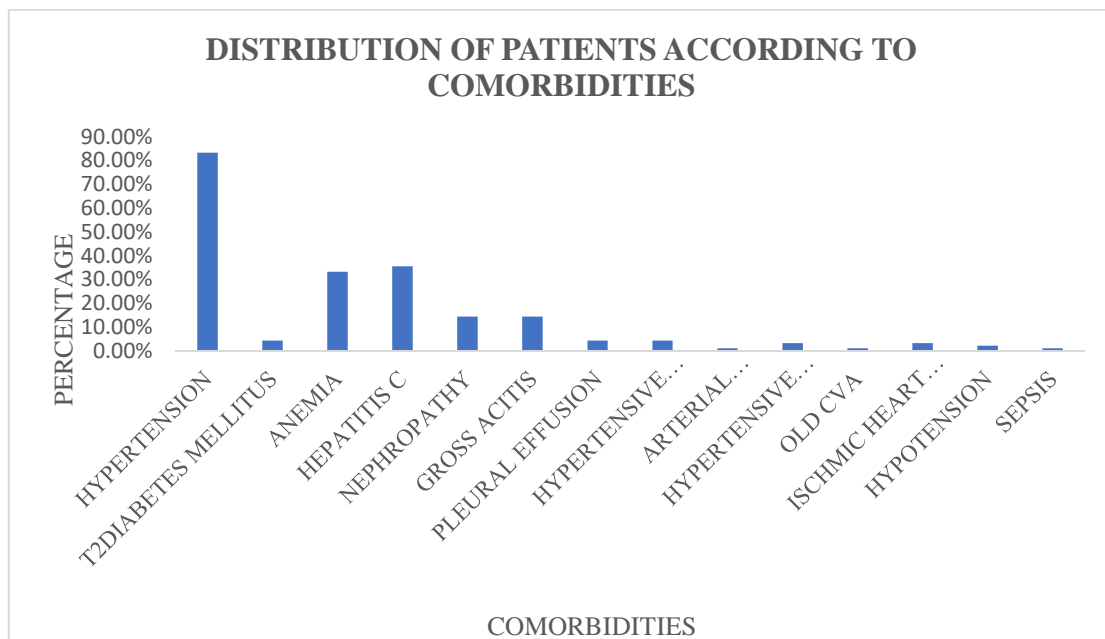
Table 1. Distribution of patients based on Gender

Sl No	Age Category	Number(N)	Percentage (%)
1	18-25	2	2.22%
2	26-35	7	7.77%

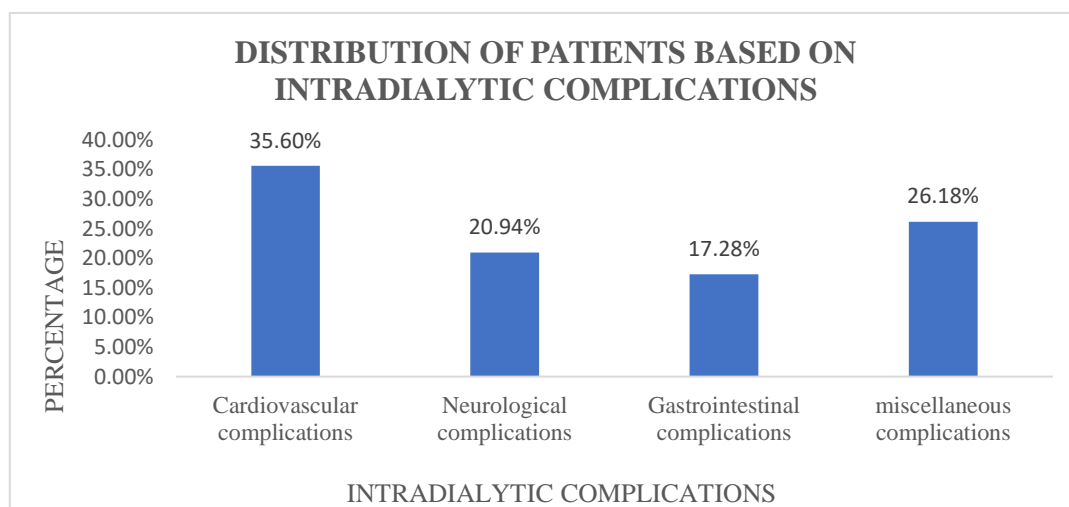
3	36-45	18	20.00%
4	46-55	25	27.78%
5	56-65	29	32.22%
6	>65	9	10.00%

Table 2. Distribution of patients based on Age category

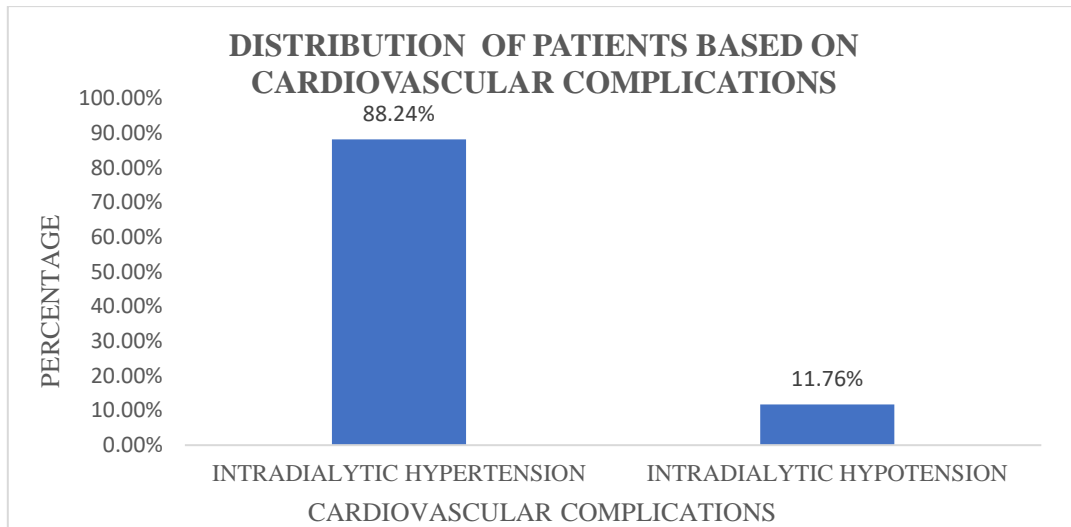
Out of the 90 subject’s majority of the patient presented with hypertension mainly (83.33%) followed by anaemia in 32 patients (17.32%) and type 2 diabetes mellitus in 30 patients (16.13%). The below table shows the Distribution of patients based on comorbidity



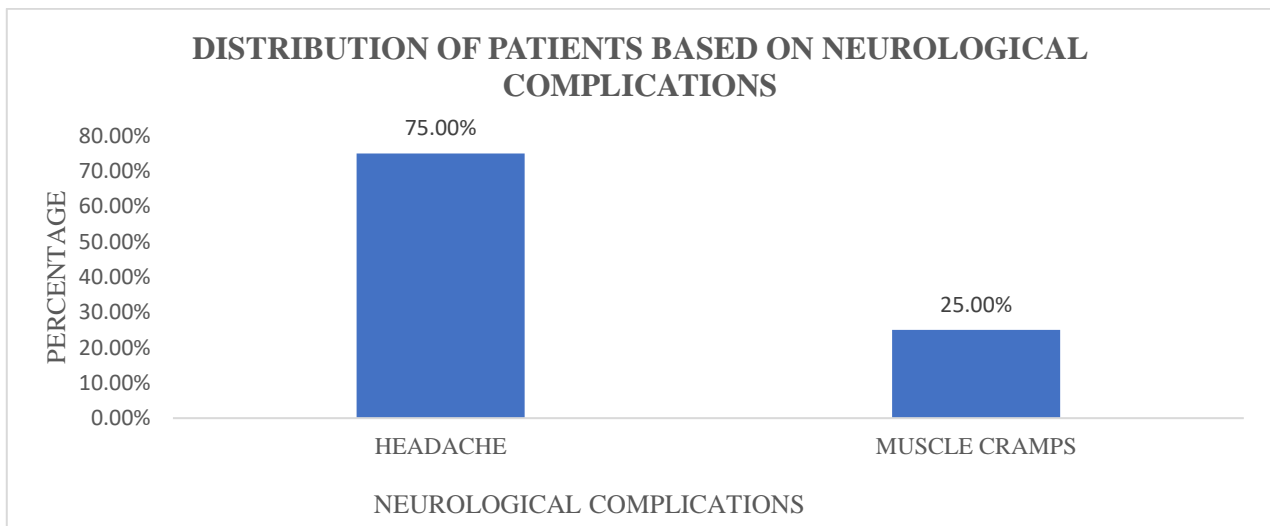
Majority of the patients experience dialysis related complications. In this study only intradialytic complications were only included which are divided into Cardiovascular (75.55%), neurological (44.44%) Gastrointestinal (36.66%) and other Miscellaneous Complications (55.55%)



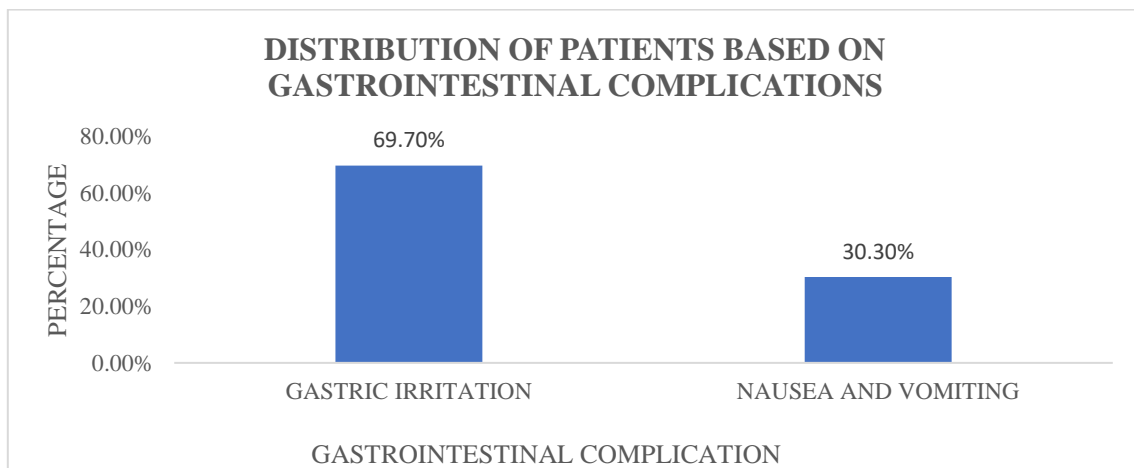
Out of the common Intradialytic complications the most common was cardiovascular complications (35.60%). The common cardiovascular complications seen were Intradialytic Hypertension (88.24%) followed by Intradialytic Hypotension (11.76%)



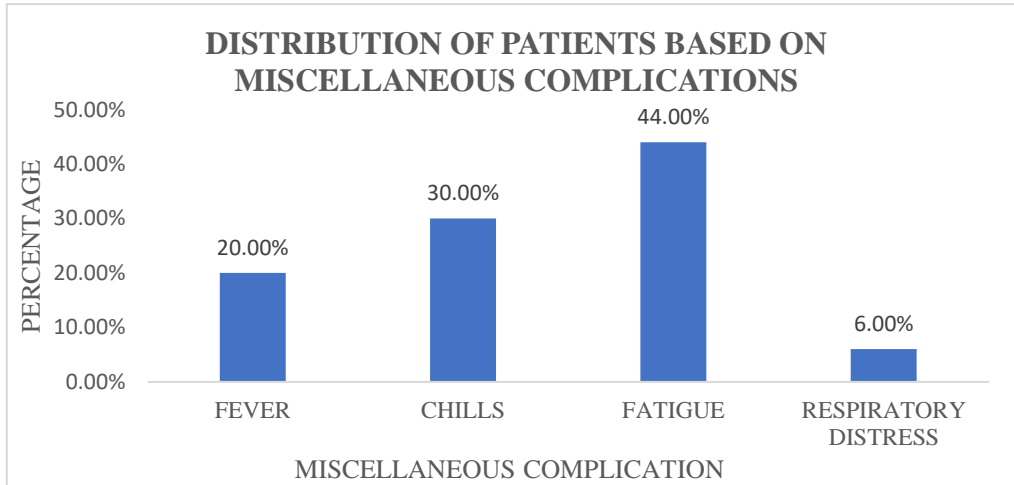
Neurological complications were seen in 20.94%. Among the neurological complications the most common were Headache (75%) and Muscle cramps. (25%)



Gastrointestinal complications were seen in (20.94%). Among the Gastrointestinal complications gastric irritation seen in (69.70%) and Nausea & vomiting seen in (30.30%)



Miscellaneous complications were seen in (26.28%). Among the miscellaneous complications most common are Fatigue (44.00%), chills (30.00%), fever (20.00%), Respiratory Distress (6.00%)



Out of 90 patients included in the study 68 patients presented with intradialytic cardiovascular complications. Mainly patients falling in the category of age group 56-65 years presented with more intradialytic cardiovascular complications (93.1%) followed by > 65 years (88.88%)

Sl No	Age Category	Number(N)	Percentage (%)
1	18-25	1	50%
2	26-35	2	28.57%
3	36-45	8	44.44%
4	46-55	22	88%
5	56-65	27	93.1%
6	>65	8	88.88%

Out of 90 patients included in the study 40 patients presented with intradialytic Neurological complications. Mainly patients falling in the category of age group > 65 presented with more intradialytic Neurological complications (66.66%) followed by 56-65 age group (65.51)

Sl No	Age Category	Number(N)	Percentage
1	18-25	1	50%
2	26-35	2	28.57%
3	36-45	2	11.57%
4	46-55	10	40%
5	56-65	19	65.51%
6	>65	6	66.66%

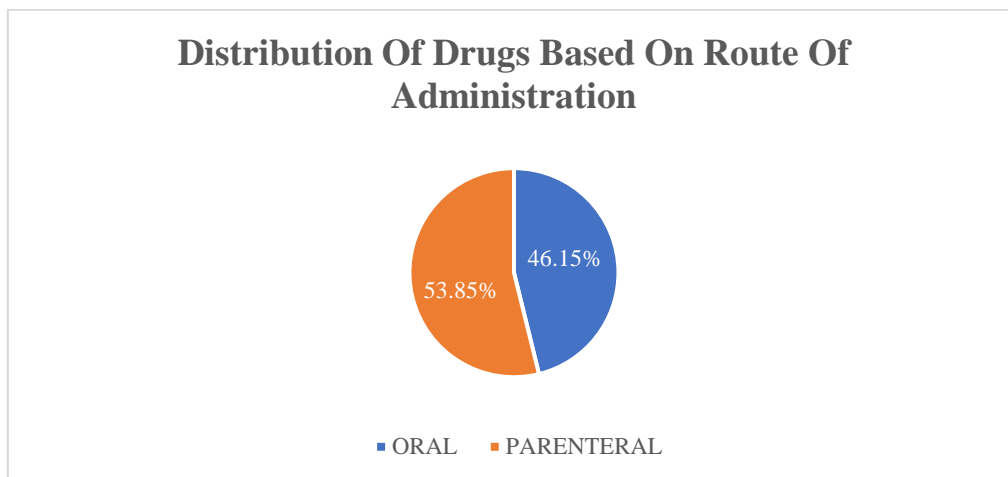
Out of 90 patients included in the study 33 patients presented with intradialytic Gastrointestinal complications. Mainly patients falling in the category of 56-65 (58.6%) age group presented with more intradialytic Gastrointestinal complications followed by >65age group (55.5%)

SI No	Age Category	Number(N)	Percentage (%)
1	18-25	0	0%
2	26-35	1	14.28%
3	36-45	2	11.11%
4	46-55	7	28%
5	56-65	17	58.6%
6	>65	5	55.5%

Out of 90 patients included in the study 55 patients presented with intradialytic Miscellaneous complications. Mainly patients falling in the category of >65yrs (77.8%) age group presented with more intradialytic Miscellaneous complications followed by 56-65 age group (72.4%)

SI No	Age Category	Number(N)	Percentage (%)
1	18-25	1	50%
2	26-35	1	14.28%
3	36-45	5	27.77%
4	46-55	15	60%
5	56-65	21	72.4%
6	>65	7	77.8%

Out of 13 drugs prescribed for intradialytic complications, majority of them were 7 (53.85%) by the parenteral route followed by oral route 6 (46.15%).



DRUGS PRESCRIBED FOR INTRADIALYTIC CARDIOVASCULAR COMPLICATIONS

Out of 90 patients 68 presented with cardiovascular complications. The most commonly used drug was Nicardipine (51.47%) for intradialytic hypertension followed by amlodipine (36.76%). For treating Intradialytic hypotension IV Normal saline is most commonly prescribed followed by INJ Dextrose

SI No	Drugs Prescribed	Number (N)	Percentage (%)
1	Nicardipine 10mg	35	51.47%
2	Amlodipine 10mg	25	36.76%
3	IVF NS	5	7.35%
4	Dextrose 25mg	3	4.41%

DRUGS PRESCRIBED FOR INTRADIALYTIC NEUROLOGICAL COMPLICATIONS

Out of 90 patients 40 presented with cardiovascular complications. The most commonly used drug was Tab Paracetamol (37.50%) Tab Combiflam (20.00%), Tab Tramadol (17.50%) for headache followed by Tab Levocarnitine (25.00%) for muscle cramps,

SI No	Drugs Prescribed	Number(N)	Percentage (%)
1	Tab Tramadol	7	17.50%
2	Tab Combiflam	8	20.00%
3	Tab PCT	15	37.50%
4	Tab Levocarnitine	10	25.00%

DRUGS PRESCRIBED FOR INTRADIALYTIC GASTROINTESTINAL COMPLICATIONS

Out of 90 patients 33 presented with Gastrointestinal complications. The most commonly used drug was INJ Pantoprazole (69.70%) for gastric irritation followed by INJ Emetet (39.30%) for nausea and vomiting.

SI No	Drugs Prescribed	Number(N)	Percentage (%)
1	INJ Pantoprazole	23	69.70%
2	INJ Emetet	10	39.30%

DRUGS PRESCRIBED FOR INTRADIALYTIC MISCELLANEOUS COMPLICATIONS

Out of 90 patients 33 presented with Intradialytic Miscellaneous Complications. The most commonly prescribed drug was INJ Avil (44.00%), INJ Hydrocortisone (16.00%) for chills followed by INJ Paracetamol (40.00%) for fever

SI No	Drugs Prescribed	Number(N)	Percentage (%)
1	INJ Avil	11	44.00%
2	INJ Hydrocortisone	4	16.00%
3	INJ Paracetamol	10	40.00%

Age and Intradialytic Cardiovascular Complication

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	26.305 ^a	5	.000	.000
Likelihood Ratio	25.047	5	.000	.000
Fisher's Exact Test	24.156			.000
Linear-by-Linear Association	18.786 ^b	1	.000	.000
N of Valid Cases	90			

Table 24: Age and Intradialytic Cardiovascular complication

The standardized statistic is 4.334.

The p-value (Asymp. Sig. and Exact Sig.) less than 0.05, indicating a statistically significant relationship ($p < 0.05$) between age and intradialytic cardiovascular complication.

Age and Intradialytic Neurological Complication

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	16.055 ^a	5	.007	.004
Likelihood Ratio	17.476	5	.004	.006
Fisher's Exact Test	16.676			.003
Linear-by-Linear Association	10.130 ^b	1	.001	.002
N of Valid Cases	90			

Table 25: Age and Intradialytic Neurological complication

The standardized statistic is 3.183.

The p-value (Asymp. Sig. and Exact Sig.) less than 0.05, indicating a statistically significant relationship ($p < 0.05$) between age and intradialytic Neurological complication.

Age and Intradialytic Gastrointestinal Complication

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	16.107 ^a	5	.007	.004
Likelihood Ratio	17.499	5	.004	.005
Fisher's Exact Test	15.321			.005
Linear-by-Linear Association	13.208 ^b	1	.000	.000
N of Valid Cases	90			

Table 26: Age and Intradialytic Gastrointestinal complication

The standardized statistic is 3.634.

The p-value (Asymp. Sig. and Exact Sig.) less than 0.05, indicating a statistically significant relationship ($p < 0.05$) between age and intradialytic Gastrointestinal complication.

Age and Intradialytic Miscellaneous Complication

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	14.480 ^a	5	.013	.008
Likelihood Ratio	15.161	5	.010	.015
Fisher's Exact Test	14.278			.008
Linear-by-Linear Association	11.355 ^b	1	.001	.001
N of Valid Cases	90			

Table 27: Age and Intradialytic Miscellaneous complication

The standardized statistic is 3.370.

The p-value (Asymp. Sig. and Exact Sig.) less than 0.05, indicating a statistically significant relationship ($p < 0.05$) between age and intradialytic Miscellaneous complication

3. Discussion

A Descriptive study was performed in the NEPHROPLUS DIALYSIS UNIT OF ESIC MC PGIMSR & MODEL HOSPITAL, Rajajinagar enrolling 90 study subjects conducted for a period of 6 months. Out of the 90 subjects included in the study most of them belonged to the age group of 56-65 years and the average age of the study subjects was 51.9 years which is divergent to the mean age of the participants in the study conducted by A M Khan *et al* which was 55.8 years. In the Current study out of the 90 patients 69 were males and 21 were females. This result is in line with the study conducted by Muhammed Ali *et al.*, in that majority of the patient population were males and the result is in contrary with the study conducted by **Firaz Fadhil Alyassin *et al.***, in that out of the 80 hemodialysis patients 26 were only men and 54 were women. In the current study Hypertension was found to be the most common comorbid condition in about (83.33%) followed Anemia and Diabetes mellitus. These results were in line with the study conducted by **Judith g Marin *et al.***, in that hypertension was the most common comorbidity followed by anemia and contrary to the study done by **Muhammed Ali *et al.***, in that diabetes was the most common comorbidity. Out of 90 subjects, 68 patients presented with cardiovascular complications followed by neurological complications in 40 subjects, gastrointestinal complications in 33 subjects and some other Miscellaneous complications have occurred during the hemodialysis sessions and have been managed properly and timely by providing appropriate treatment for the complication that have occurred. These results were similar to the study conducted by **VishnuPriya *et al.***, hypertension was the most common complication in (81.11%) whereas in the study conducted by **Habas *et al.***, vomiting was the most common complication (61.8%) followed by low RBS (56.4%). and chills in (4.5%) In the study the Intradialytic complications was commonly seen in the age group of 56-65 years followed by >65 years and all the intradialytic complication was managed timely with drugs that are mainly given orally and parenterally Inside the dialysis unit. Among the intradialytic cardiovascular complications' Hypertension was seen as the most common complications and also most of the patients showed increase in blood pressure towards the end of the hemodialysis session. For intradialytic hypertension amlodipine was mostly given followed by nicardipine during the process of hemodialysis. Intradialytic Hypotension was seen in 8 patients and the major reason for intradialytic hypotension was loss of fluid and minerals and is given IV normal saline in most of the patients and in some other patients it is managed by Inj Dextrose. Intradialytic hypotension happened on pharmacological methods are also used in case of Intradialytic hypotension that involve changing the position of the patient to Trendelenburg position. The results were in line with the study conducted by **Mehmood Y *et al.***, In case of intradialytic Neurological complications, the common complication was headache and Muscle cramps and have been managed with Tab PCT followed by Tab Combiflam and Tab Tramadol and in case of Muscle cramps Tab Levocarnitine has been given in the hemodialysis subjects during the course of dialysis and also stretching exercise was given for the relief from muscle cramps The Gastrointestinal complication during hemodialysis include gastric irritation and Nausea and Vomiting, Gastric irritation is managed by INJ Pantoprazole, Nausea and vomiting is managed by INJ Emeset The miscellaneous complications during Hemodialysis include chills, fever, fatigue and breathing difficulty. Chills is managed mainly by INJ Avil and INJ Hydrocort (Antihistamines) that is given during the course of hemodialysis, Fever is managed by INJ Paracetamol

and in case of breathing difficulty oxygen mask will be provided to the patient and also elevating the head of the bed.

4. Conclusion

Hemodialysis plays a crucial role in the management of advanced kidney disease, offering a lifeline to countless individuals whose kidneys can no longer effectively filter waste and excess fluids from their bloodstream. This life-sustaining medical procedure not only helps maintain a patient's overall health but also enhances their quality of life by preventing the accumulation of harmful toxins. Hemodialysis allows individuals to continue leading productive lives, bridging the gap until a kidney transplant becomes available or offering a long-term solution for those ineligible for transplantation. Moreover, it serves as a testament to medical innovation and the tireless efforts of healthcare professionals, offering hope and extended survival to those grappling with the challenges of end-stage renal disease. In this study it is found that Dialysis process is associated with different Intradialytic complications commonly Cardiovascular, Neurological, Gastrointestinal and some other Miscellaneous complications. The Cardiovascular Complications most commonly seen is Intradialytic Hypertension and Intradialytic Hypotension, Neurological complications include fever and muscle cramps, Gastrointestinal complications include gastric irritation and nausea, vomiting and Miscellaneous complications include fever, chills, fatigue and Breathing difficulty. All these complications mainly occurred in patients above the age of 50 years mainly 56-65 years and more than 65 years. Proper and timely management of Intradialytic Complications will help to reduce the risk of long-term complications in patients undergoing haemodialysis. I closely observed the haemodialysis session of all the patients during the study period and found that all the intradialytic complications happening in the Nephroplus dialysis unit have been managed with efficiently by the technical staff and medical staff of Nephroplus dialysis unit with proper medicines and thereby it improves the quality of the dialysis process.

5. Acknowledgement

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