



## A CROSS SECTIONAL STUDY OF INTRADIALYTIC COMPLICATIONS IN PATIENTS UNDERGOING HEMODIALYSIS

### General Medicine

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### ABSTRACT

**Background** The Hemodialysis procedure is associated with several complications. The common complications are hypotension and intradialytic hypertension, dialyzer reactions, disequilibrium syndrome, muscle cramping other less common complications are hemolysis hemorrhage, hypoxia, air embolism and cardiac arrhythmias. Present study aimed to assess the incidence and evaluate the various intradialytic complications of Hemodialysis. **Material & Methods:** Cross sectional study done among the patients on dialysis attending at the general medicine department dialysis unit at AVMC & H. Patients who are pregnant and below age of 13yrs were excluded from the study. Patients with AKI and CKD were included who were on hemodialysis, recorded the intradialytic complications and blood parameters among the patients. The data were entered in excel and analysed using SPSS v21 operating on windows 10. **Results:** In the present study total of 160 patients fulfilling inclusion criteria are included in the study. The mean age of patients was  $53.45 \pm 10.66$  yrs. Among them, 76.9% were male patients and 23.1% were female patients with male preponderance. Hypotension was present in 42.5% 15.6% patients had the nausea 18.1% of patients had the vomiting, 15.6% had the fever, 15% had the chills, 18.8% had the muscle cramps, 15.6% had the chest pain. Hypokalemia was present in 19.4% of the patients and 18.1% with hyponatremia among the patient. On correlation of the blood parameters with number of session, there is a significant positive correlation of serum potassium with number of sessions. **Conclusion:** Hemodialysis is a beneficial procedure for removal of the wastes but also may have complications. The most common complication found was hypotension, followed with presence of vomiting, muscle cramps, nausea, fever, chills and chest pain.

### KEYWORDS

Dialysis, kidney disease, Hyponatremia, Hypokalemia, Hypotension.

### INTRODUCTION

Hemodialysis is a part of Renal replacement therapy it is given to the patients when kidney function fails both chronic kidney disease and acute kidney damage. When blood comes into contact with a semipermeable artificial membrane during extracorporeal circulation, solutes are removed from the body. It keeps the electrolytes and fluid in a state of normal equilibrium. The principles of ultrafiltration and diffusion underlie hemodialysis. Numerous risks are connected to the hemodialysis treatment. Dialyzer responses, disequilibrium syndrome, hypotension and intradialytic hypertension, as well as muscular cramps, are typical complications. Hemolysis haemorrhage, hypoxia, air embolism, and cardiac arrhythmias are further less frequent problems.

Although hemodialysis is a common procedure, it has some complications. They can be classified into two groups of acute (early) and chronic (long term) complications.<sup>1</sup> Hypotension is the most common and serious complication during hemodialysis, which occurs in 20-30% of dialysis sessions.<sup>2</sup> It has been reported in up to 60% of dialysis sessions in some previous studies.<sup>3,4</sup> This complication is usually associated with symptoms of dizziness, headache, weakness, nausea, vomiting, muscle cramps, and fatigue.<sup>5,6</sup> Many factors could contribute to hemodialysis hypotension during hemodialysis. The main factor in intradialytic hypotension is the reduction of circulating blood volume followed by huge ultrafiltration and sodium uptake, subsequently the imbalance between the ultrafiltration rate and the plasma refilling rate.

Over the years, changes in hemodialysis machine technology, dialysate water purification, and dialyzers have altered the clinical spectrum of intradialytic problems. Patients might experience allergic responses to dialyzer membranes, sterilising and reprocessing chemicals, along with equipment that could not precisely manage ultra-filtration rates, and chemically and microbially contaminated dialysate in the early days of hemodialysis.

Although cardiovascular issues like hypotension are still the most frequent intradialytic complications, they are now primarily caused by the time constraints associated with trying to manage excessive weight gains from dialysis and reach target dry weight on a three times weekly schedule, as well as an ageing elderly dialysis population with rising

co-morbidity. The objective of the study is to evaluate the various intradialytic complications of haemodialysis, also to study the association between kidney disease and complications in relation to age and sex distribution.

### MATERIAL & METHOD

This study was performed after ethical committee clearance, to evaluate the various intradialytic complications that occur during haemodialysis and their management.

A descriptive cross-sectional study performed in chronic kidney disease patients who underwent conventional haemodialysis during the period of October 2020 to October 2022 in the dialysis unit under the Department of General Medicine, Aarupadai veedu medical college & hospital, Puducherry. The dialysis unit has a capacity of 6 regular dialysis of ESRD patients and a machine dedicated for acute or emergency dialysis. Three shifts of dialysis sessions are provided per day.

All the patients with ESRD<sup>8</sup> undergoing twice weekly maintenance HD were enrolled into the study, a self-structured questionnaire for recording the HD prescription, vital signs and intradialytic complications was utilized for each patient in each session. Intradialytic hypotension was defined as a fall of  $>20$  mmHg in systolic bp from the baseline or less than 90 mmHg of systolic during the HD session with or without symptoms.

Intradialytic hypertension was defined as a rise in a mean arterial pressure  $>15$  mmHg within or immediately post dialysis. Symptoms such as headache, backache, and itching were only included as intradialytic complications if the onset was during the HD session.

### RESULTS

In the present study total of 160 patients fulfilling inclusion criteria are included in the study. The mean age of patients was  $53.45 \pm 10.66$  yrs. Among them, 42.5% were with hypotension. 15.6% patients had nausea. 18.1% patients had vomiting. 15% patients had headache 15.6% had fever. 19.4% patients had hypokalaemia and 18.1% had hyponatremia (Table 1).

**Table.1, 160 Patients, Fulfilling The Criteria In The Study.**

| S. NO | COMPLICATION | FREQUENCY | PERCENTAGE |
|-------|--------------|-----------|------------|
| 1.    | HYPOTENSION  | 68        | 42.5       |
| 1.    | NAUSEA       | 25        | 15.6       |
| 2.    | VOMITING     | 29        | 18.1       |
| 3.    | HEADACHE     | 24        | 15.0       |
| 5.    | FEVER        | 25        | 15.6       |
| 6.    | HYPOKALAEMIA | 129       | 80.6       |
| 7.    | HYPONATREMIA | 29        | 18.1       |

## DISCUSSION

The Hemodialysis procedure is associated with several complications. The common complications are hypotension and intradialytic hypertension, dialyzer reactions, disequilibrium syndrome<sup>1</sup>, muscle cramping other less common complications are hemolysis hemorrhage, hypoxia, air embolism and cardiac arrhythmias. Complication are usually associated with symptoms of dizziness, headache, weakness, nausea, vomiting, muscle cramps, and fatigue.<sup>5,6</sup> Many factors could contribute to hemodialysis hypotension during hemodialysis<sup>7</sup>. The main factor in intradialytic hypotension is the reduction of circulating blood volume followed by huge ultrafiltration and sodium uptake, subsequently the imbalance between the ultrafiltration rate and the plasma refilling rate.

In the present study total of 160 patients fulfilling inclusion criteria are included in the study. The mean age of patients was 53.45±10.66yrs. Among them, 76.9% were male patients and 23.1% were female patients with male preponderance. Hypotension was present in 42.5% 15.6% patients had the nausea 18.1% of patients had the vomiting, 15.6% had the fever, 15% had the chills, 18.8% had the muscle cramps, 15.6% had the chest pain.

Raja SM et al., Males were 19 (65.5%) and females were 10 (34.5%). More than half of the patients had diabetes. Hypotension was the most common complication occurring in 10% of the sessions followed by nausea and vomiting (5.24%), hypertension (5.06%), muscle cramps (4.71%), and headache (4.54%). Other complications such as back pain, chest pain, fever, chills and itching occurred in less than 3% of the sessions.

Vomiting reported in (61.8%) of patients; during 1st hour, vomiting occurred in (40.9%) of patients. They concluded that During 2nd and at 3rd hour of HD-session, patients had vomiting almost the same number during this time of HD session. Epigastric pain reported in (26.2%), and vomiting with epigastric pain reported in (11.6%) of patients. Epigastric pain and vomiting with raised pancreatic enzymes reported in (1.8%) of patients. Low random blood sugar (RBS) reported in (56.4%) patients; during 1st hour (29.2%), only (3.3%) of patients had low RBS with features of hypoglycemia.

The most frequently seen complications were hypotension (37.5%), cramps (12.5%), itching (15%), vomiting (22.5%), and dialysis response (5%). Although intradialytic consequences are potentially fatal, they are treatable and occur seldom.

The most prevalent consequence was hypotension (28.7%), followed by hypertension (17%) and nausea/vomiting (13%). The arteriovenous fistula was the most often utilised access (75.5 percent, n=71). Most patients (51.1 percent, n=48) had been on hemodialysis for more than five years. Blood pressure fluctuations are crucial during hemodialysis, and discovered hypotension to be the most prevalent intradialytic consequence in our findings, followed by hypertension. Other symptoms included fever, muscular cramping, and nausea/vomiting.

In the Chronic renal failure group documented by Prabhakar et al., found the common complications were hypotension (26.1%), nausea and vomiting (14.2%), fever and chills (14.4%), chest pain and back pain (13.0%), hypertension(10.4%) and headache (10.4%). Agarwal RK et al., found were transfusion responses (23 episodes, 1.5 percent), rigours unrelated to transfusions (13 episodes, 0.8 percent), nausea/vomiting (20 episodes, 1.4 percent), muscular cramps (12 episodes, 0.8 percent), and hypoglycemia (6 episodes, 0.4 percent). Intradialytic problems are uncommon, and many are not life-threatening.

In the present study hypokalemia was present in 19.4% of the patients and 18.1% with hyponatremia among the patient. On correlation of the blood parameters with number of session, there is a significant positive

correlation of serum potassium with number of sessions.

Most common group of complications<sup>10,11</sup> found in the study was patient-related complications (63%) and among that hypotension (26.8%) is the commonest followed by headache<sup>13,14</sup> (25.1%) and hypertension (24.7%), frequency of vascular access-related complications (4.4%) and technical complications (3.1%) was very low. The present study found presence of manageable complications documented intradialytic among patient undergoing dialysis<sup>15</sup>.

## CONCLUSION

Hemodialysis is a beneficial procedure for removal of the wastes but also documented for the complications. The most common complication<sup>9,12</sup> found was hypotension, followed with presence of vomiting, muscle cramps, nausea, fever, chills, and chest pain. All the complications are low risk which can be managed efficiently by the physician and the dialysis unit<sup>15</sup>.

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