



Pre and post hemodialysis coagulation profile in chronic kidney disease patients.

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Abstract: Chronic renal failure (CRF) is a growing problem worldwide leading to increasing incidence of life threatening complications or death. Over 1.1 million patients are to have renal failure worldwide with an annual increase at a rate of 70%. CKD in India is an important public health problem. The main contributing factors for high prevalence of CKD in India are hypertension and diabetes mellitus. Kidneys are those vital organs of the body responsible for diverse body function. Chronic Kidney Disease (CKD) is a condition characterized by permanent and significant loss of the glomerular filtration rate (GFR). The main stay of treatment in this condition is renal replacement therapy which includes both kidney transplantation and dialysis (Hemodialysis and peritoneal dialysis). In hemodialysis, anticoagulant is necessary to prevent blood clots within the extracorporeal circuit. Prothrombin time (PT) and activated partial thromboplastin time (APTT) are screening tests for extrinsic, intrinsic and common pathway clotting factors. The aim of the study was investigating the coagulation profile pre and post hemodialysis in CKD patients compared to normal control.

Index Terms – Chronic Kidney Disease, Hemodialysis, Coagulation profile (PT, PT-INR, aPTT)

I. INTRODUCTION

Chronic renal failure (CRF) is a growing problem worldwide leading to increasing incidence of life threatening complications or death. Over 1.1 million patients are to have renal failure worldwide with an annual increase at a rate of 70%. Chronic Kidney Disease (CKD) in India is an important public health problem. The main contributing factors for high prevalence of CKD in India are hypertension and diabetes mellitus.

Kidneys are those vital organs of the body responsible for diverse body function. Among them are excretion of nitrogenous waste product i.e. Urea and Uric acid; protein and vitamin D metabolism; hormone production i.e. erythropoietin, rennin and prostaglandin and maintaining homeostasis.

Chronic Kidney Disease (CKD) is a condition characterized by permanent and significant loss of the glomerular filtration rate (GFR). With reduction of the GFR, renal function deteriorates progressively and Uraemia develops. Uraemia is characterized by very high blood Urea and creatinine levels and accumulation of metabolic waste product. The haemostatic defect in uremia often is complex and multifactorial, including thrombocytopenia, platelet aggregation defects or dysfunction and coagulation abnormalities.

The main stay of treatment in this condition is renal replacement therapy which includes both kidney transplantation and dialysis. Kidney transplantation remains the gold standard, but dialysis (both hemo and peritoneal) is the most common and most practiced modality of treatment because of high cost of renal transplantation. Out of the two type of dialysis, hemodialysis is most commonly practiced. There is a large population of patients maintained on dialysis all over the world. Hemodialysis (HD) was introduced in India in 1962, transplantation was introduced in 1971, and peritoneal dialysis (PD) was introduced in 1991.

Early diagnosis of CKD made by screening those with diabetes, hypertension, autoimmune disease, or family history of CKD must become a priority. Hemodialysis is a renal replacement therapy for long-term control in End Stage Renal Disease (ESRD) patients. Hemodialysis is a blood separation of filtering or cleaning process through a semi-permeable membrane conducted in patients with renal function impairment both chronic and acute.

The goals of hemodialysis to treat uremic symptoms (through removal of toxic metabolites) correct acid base and electrolyte disturbances, maintain volume status and over the long term improve quality of life, lower morbidity and mortality rates and maintain nutritional stability.

In hemodialysis, anticoagulant is necessary to prevent blood clots within the extracorporeal circuit. Dialysis can lead to increase in bleeding tendency in the patients. Unlike CKD in which the bleeding tendency is due to platelet functional defects, the patients on dialysis particularly hemodialysis tend to have bleeding or thrombotic tendency due to disturbance in the function of platelet as well as coagulation and fibrinolytic system. This is observed by measuring coagulation parameters i.e. Prothrombin time (PT) and activated partial thromboplastin time (APTT) are screening tests for extrinsic, intrinsic and common pathway clotting factors. Both PT and APTT tend to increase post dialysis. According

to a previous study activated partial thromboplastin time and prothrombin time are deranged in 16% and 5% of patients of respectively with mean PT of 15.8+2.09 sec and mean APTT derangement 35.4+2.4 sec.

This study is aimed at investigating the coagulation profile pre and post hemodialysis in CKD patients compared to normal control.

METHODS AND MATERIALS

This is an analytical-observational study with cross-sectional design. The samples were collected in HD room of varies general hospital in Gujarat from December to February 2022-2023. Coagulation study examination was conducted in clinical pathology laboratory of General hospital in Palanpur. The sample of PT, PT-INR and aPTT were 60 blood plasma with anticoagulant citrate randomly collected from patients with chronic CKD. The inclusion criterion was patients with chronic CKD undergoing hemodialysis with minimum does of heparin and with an age group of 21-80 years. The exclusion criterion was patients with malignancy and liver disease.

STATISTICALLY ANALYSIS

Based on t-test, chi- square test.

RESULTS

In present study total 60 patient are included. In which 24 patients were female and 36 patients were male. (Table 1)

Table 1: Gender wise distribution

Gender	Total male/female	Percentage
Male	36	60%
Female	24	40%
Total	60	100%

In present study shows that the age distribution highest case in age group 41-60 years. Nearly 73.33% of the patients were from this age group. (Table 2)

Table 2: Age wise distribution

Age(year)	21-40	41-60	61-80	Total
Cases	7	44	9	60
Percentage (%)	11.66%	73.33%	15%	100%

In present study show that coagulation profile PT, PT-INR, aPTT are increase after the hemodialysis.

Table 3: Coagulation profile (PT, PT-INR, aPTT)

Coagulation profile	Pre-hemodialysis	Post-hemodialysis
PT(sec)	14.09 ± 0.98	18.62 ± 0.98
PT-INR	1.07 ± 0.07	1.42 ± 0.07
aPTT(sec)	34.72 ± 1.81	39.32 ± 1.81

DISCUSSION

In present study total 60 patient are included. In which 24 patients were female and 36 patients were male. Previous study done by Anwar Habib el al shows that Haemodialysis is a more common among male (75%) than female (25%). In present study shows that the age distribution highest case in age group 41-60 years. Nearly 73.33% of the patients were from this age group. Previous study done by Yetti Hernaningsih et al shows that Haemodialysis is more common among age group 41-60 years. Nearly 70% were from this age group.

In present study show that coagulation profile PT, PT-INR, aPTT are increase after the hemodialysis. Previous study done by Purnima Mitra et al show that coagulation profile PT (sec) and PT-INR are showing slight variation in pre-haemodialysis and post-haemodialysis patients and aPTT is increase after the hemodialysis.

CONCLUSION

Gender wise distribution indicates the male are more common than female on haemodialysis. Age wise distribution shows the highest cases in age group 41-60 years. Coagulation profile shows that PT, PT-INR and aPTT are increases after haemodialysis.

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