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FREQUENCY OF CATHETER INDUCED THROMBOSIS IN PATIENTS WITH END STAGE RENAL DISEASE (ESRD) ON HEMODIALYSIS

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Abstract;

Objective; To determine the frequency of catheter induced thrombosis in patients with end stage renal disease (ESRD) on hemodialysis. **Material and Methods;** All the cases (86) undergoing hemodialysis were recruited from Department of Medicine, Nishtar Hospital Multan, Pakistan. Double lumen hemodialysis catheter was inserted by a senior consultant. Color Doppler sonography was done at the 6th day of placement of catheter and presence of thrombus was noted in the study proforma. History was taken for hypertension, smoking, family history and previous history of thrombosis. **Results;** Of these 86 study cases, 51 (59.3 %) were male patients and 35 (40.7%) were female patients. Mean age of our study cases was 45.62 ± 8.44 years. Of these 86 patients 28 (32.6%) were diabetic, 35 (40.7%) were hypertensive, 34 (39.5%) were smokers and 07 (8.1%) had previous history of thrombosis. Mean duration of catheter placement was 81.62 ± 41.67 days and mean duration on hemodialysis was 22.36 ± 10.43 months. Majority of our study cases i.e. 65 (75.6%) had to undergo hemodialysis three times in one week. Catheter related thrombosis was noted in 29 (33.7%) of our study cases.

Conclusion; Frequency of catheter-related thrombosis was high in patients with end-stage renal disease (ESRD) in our study. Thrombosis in ESRD patients was significantly associated with male gender, age, duration of catheter placement and duration of hemodialysis.

Keywords; End-stage renal disease, catheter, thrombosis.

Introduction;

Central venous catheters (CVCs) refer to vascular access devices indicated for the administration of intravenous medication treatments, fluids, or total parenteral nutrition, repeated blood sampling, and for hemodialysis (HD)[1-4]. Use of CVCs for HD has increased in recent years, comprising approximately 25% of prevalent HD patients in the United States; this is despite the recommendation by the National Kidney Foundation that tunneled, cuffed

catheters for HD access be limited to <10% of prevalent dialysis patients due to the greater risk of morbidity and mortality[4].

However, several complications resulting from the use of CVCs, including sepsis, extravasation of infusions, and venous thrombosis, can increase associated morbidity and mortality. These complications can also interrupt and delay treatment for the underlying disease and thereby affect outcome. The most common CVC complications are occlusion and catheter-related thrombosis (CRT) [5]. Patients with CVCs are prone to CRT because of the direct effects of the catheter on the adjacent veins and blood flow, underlying disease and its treatment, nature of substances being infused, and location and time of placement of the catheter. A CRT occurs most often in the upper extremity where most long-term catheters are located. Symptoms include pain, tenderness to palpation, swelling, edema, warmth, erythema, and development of collateral vessels in the surrounding area. Risk factors for CRT include previous catheter infections, malposition of the catheter tip, and prothrombotic states. CRT can lead to catheter infection, pulmonary embolism, and post-thrombotic syndrome[6-10]. CRT is diagnosed primarily using Doppler ultrasound or venography and treated with anticoagulation for 6 weeks to a year, depending on the extent of the thrombus, response to initial therapy, and whether thrombophilic factors persist. Prevention of CRT includes proper positioning of the CVC and prevention of infections; anticoagulation prophylaxis is not recommended at present.[11] Kujur et al [12] from India reported 33% frequency of catheter related thrombosis in a prospective study conducted in such patients.

Material and Methods;

All the cases (86) undergoing hemodialysis were recruited from Department of Medicine, Nishtar Hospital Multan, Pakistan. Known patients of CAD and Coagulopathy on lab report, diagnosed cases of malignancy and tuberculous meningitis, bed ridden patients such as post surgical patients and with CVA were excluded from our study. Detailed history and physical examination was done for these study cases. All the relevant baseline investigations were arranged. For this purpose, Venous blood (3 ml) sample was drawn and sent to the central laboratory of Nishtar Hospital Multan for the blood glucose level estimation (FBS) and CBC. Double lumen hemodialysis catheter was inserted by a senior consultant. Color Doppler sonography was done at the 6th day of placement of catheter and presence of thrombus was noted in the study proforma. History was taken for hypertension, smoking, family history and previous history of thrombosis.

Results;

Our study included a total of 86 study cases who met inclusion and exclusion criteria of our study. Of these 86 study cases, 51 (59.3 %) were male patients and 35 (40.7%) were female patients. Mean age of our study cases was 45.62 ± 8.44 years (with minimum age was 32 years while maximum age was 58 years). Mean age of the male patients was 42.75 ± 8.76 years while that of female patients was 49.80 ± 5.63 years (p= 0.000). our study results have concluded that majority of our study cases i.e. 56 (65.1%) were aged more than 40 years. Of these 86 patients 28 (32.6%) were diabetic, 35 (40.7%) were hypertensive, 34 (39.5%) were smokers and 07 (8.1%) had previous history of thrombosis. Mean duration of catheter placement was 81.62 ± 41.67 days (with minimum duration of placement was 18 days while maximum duration was 210 days) and majority of our study cases i.e. 58 (67.4%) had catheter placement for less than 90 days. Mean duration on hemodialysis was 22.36 ± 10.43 months (with minimum duration on hemodialysis was 3 months while maximum was 36 months) and most of our patients (58.3%) were on hemodialysis for more than 18 months. Majority of our study cases i.e. 65 (75.6%) had to undergo hemodialysis three times in one week. Catheter related thrombosis was noted in 29 (33.7%) of our study cases.

Discussion;

Catheter-related thrombosis (CRT) is a relatively common complication in patients with long-term indwelling CVCs and may pose clinicians with difficult decisions on what anticoagulant treatment to choose and whether the CVC must be removed [13].

Our study included a total of 86 patients with end stage renal disease (ESRD) on hemodialysis meeting inclusion and exclusion criteria of this study. Different studies have reported end stage renal disease to be more prevalent in male patients, similarly Of these 86 study cases, 51 (59.3 %) were male patients and 35 (40.7%) were female patients. A Chinese study conducted by Wang et al [14] reported 57 % male gender predominance which is close to our study results. Menon et al [15] also reported male patients predominating over female patients

(58 % versus 42 %) which is same as that of our study results. A study conducted by Iftikhar et al [16] from Lahore has reported 58 % male patients with ESRD and 42 % female patients, these findings are same as that of our study results. Siddiqui et al from Rawalpindi [17] reported 67 % male patients with ESRD which is in compliance with that of our study results. Another study conducted by gazzaza et al from Saudi Arabia [18] also reported male patients predominance in 61 % ESRD patients and female patients were only 39 %, which is similar to that of our study results. Machingura et al [19] from Zimbabwe has reported male gender predominance in 70 % patients with ESRD on hemodialysis, these findings are close to that of our study results.

Mean age of our study cases was 45.62 ± 8.44 years (with minimum age was 32 years while maximum age was 58 years). Mean age of the male patients was 42.75 ± 8.76 years while that of female patients was 49.80 ± 5.63 years (p= 0.000). Our study results have concluded that majority of our study cases i.e. 56 (65.1%) were aged more than 40 years and similar findings have been reported by Wang et al [104] from China. Machingura et al [19] reported 46.7 ± 13.5 years mean age of these patients of ESRD on hemodialysis, these findings are close to that of our study results. A study conducted in Lahore by Anees et al [120] has reported 46.10 ± 16.29 years mean age of patients with ESRD on hemodilaysis, these findings are similar to that of our study results. Another study by Siddiqui et al [17] has reported 44.5 ± 14.3 years mean age of ESRD patients on hemodialysis which are in consistence with our study findings.

Of these 86 patients 28 (32.6%) were diabetic, 35 (40.7%) were hypertensive, 34 (39.5%) were smokers and 07 (8.1%) had previous history of thrombosis. A study by Wang et al [14] from China reported 27 % diabetes which is close to our study results, however they reported hypertension only in 11% patients which is quite low than our findings. Anees et al [120] reported similar findings.

Mean duration on hemodialysis was 22.36 ± 10.43 months (with minimum duration on hemodialysis was 3 months while maximum was 36 months) and most of our patients (58.3%) were on hemodialysis for more than 18 months. Majority of our study cases i.e. 65 (75.6%) had to undergo hemodialysis three times in one week. Anees et al [120] reported mean duration on hemodialysis to be 24.87 ± 22.1 months which is similar to that of our findings. Wang et al [14] from China reported 26.5 months mean duration of hemodialysis which is consistent to our study results.

Mean duration of catheter placement was 81.62 ± 41.67 days (with minimum duration of placement was 18 days while maximum duration was 210 days) and majority of our study cases i.e. 58 (67.4 %) had catheter placement for less than 90 days. Similar findings have been reported by Wang et al [14].

Catheter related thrombosis was noted in 29 (33.7%) of our study cases. Kujur et al [12] from India reported 33% frequency of catheter related thrombosis in a prospective study conducted in such patients. These results are similar to our study results.

Conclusion;

Frequency of catheter-related thrombosis was high in patients with end-stage renal disease (ESRD) in our study. Thrombosis in ESRD patients was significantly associated with male gender, age, duration of catheter placement and duration of hemodialysis. Anticipation, early diagnosis and early management of thrombosis can play a key role to decrease disease morbidity and mortality. This will also improve quality of life of these patients and will also save their increased medical costs.

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