

Prevalence of Symptomatic Deep Vein Thrombosis (DVT) in Patients with Temporary Double Lumen Dialysis Femoral Catheterization- Experience From Multan Institute of Kidney Diseases Multan (MIKD).

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Abstract

Objective: The study was conducted in Multan Institute of Kidney Diseases (MIKD) to explore the DVT prevalence after double lumen dialysis femoral catheterization for haemodialysis.

Methodology: Retrospective cross sectional study was conducted in xx, all double lumen dialysis femoral catheters passed over a period of five years (sep-2017 to sep-2022) were included in the study, identified from the electronic system of the hospital. All patients met the exclusion criteria except those with temporary femoral catheters. SPSS version 25 was used for data analysis and the prevalence of DVT was calculated.

Results: Total 6628 patients with a mean age of 48(range 14 -90 years) were catheterized, 4105(61.9%) males and 2523(38.1%) were females, right sided catheters were 1826(27.5%) and 4802(72.5%) patients underwent left sided insertions. Duplex ultrasound was done of all symptomatic 252(3.8%) patients and femoral DVT was confirmed in 174(2.6%) that is 69% of symptomatic patients. The incidence of DVT significantly (3.7-fold) increases at day six and onward. Prevalence of DVT is 2.6% in all catheterized and 69% of symptomatic patients.

Conclusion: Femoral vein remains an important emergency haemodialysis access route. Physicians inserting femoral venous catheters should be aware of the risk of lower extremity DVT from day three and consider performing duplex ultrasound examinations on day five and onwards if it is essential to be kept in situ for this duration, otherwise, attention should be paid gaining access elsewhere at the earliest possible opportunity.

Keywords: Deep vein thrombosis, Prevalence, Double lumen dialysis femoral catheters, Haemodialysis access

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Introduction

There has been a steady rise in the number of patients accepting renal replacement therapy around the world. When haemodialysis is a treatment of choice permanent vascular access is vital. Patients maintained on dialysis need vascular access in the form of arteriovenous graft, fistula or central venous catheterization. For urgent haemodialysis, access must have specific characteristics such as ease of insertion and immediate availability. Two types of such access are currently available: non-tunnelled dialysis catheters and cuffed, tunnelled dialysis catheters. If a long-term access is not available double lumen, non-cuffed, non-tunnelled haemodialysis catheters are the preferred method for urgent haemodialysis. When all the options of permanent vascular access or right jugular venous catheter are exhausted femoral double lumen haemodialysis catheters are used, as a bridge of creation of AV-fistula/graft or in emergency cases.¹

The published literature on femoral catheters as vascular access from Pakistan is scant, we hereby report our centre, Multan Institute of Kidney Diseases (MIKD) experience of DVT prevalence in haemodialysis patients with femoral catheters as vascular access.

Methods

A retrospective cross-sectional study was conducted in MIKD. Data was taken from September 2017 to September 2022 for a duration of five years. Ethical approval was taken from the institutional review board (All patients who

underwent femoral catheterization in MIKD (6628) irrespective of their age, gender, cause of renal failure, and duration of the femoral catheter in situ were taken in the study. All patients other than temporary femoral catheterized were in exclusion criteria. SPSS version 25 was used for data entry and frequencies were calculated by descriptive analysis.

Results

In study population (6628), where males were 4105(61.9%) and while females were 2523(38.1%) with a mean age of 48(range 14 -90 years). Right sided femoral catheterization was performed in 1826(27.5%) while left sided femoral catheter insertions were done in 4802(72%). All of the 6628 patients with double lumen dialysis femoral catheters were analysed. The patients who presented with symptoms of deep vein thrombosis (DVT) were 252(3.8%), out of these 174 (2.6%) patients with a mean age of 47.9+/-13.8 were confirmed with deep vein thrombosis (DVT) on duplex ultrasound of lower limb. DVT involved the left femoral vein in 103 (59.2%) and right femoral vein in 65(37.4%) patients, six (3.4%) patients were presented with bilateral DVT, 77(44.3%) were males and 97(55.7%) were females. In our study, there is no statistically significant association of DVT prevalence with age, sex and cause of renal failure ($\chi^2>0.05$) but the incidence of DVT increased significantly after day five of femoral catheterization.

Table 1: Hemodialysis patients with deep vein thrombosis in a total dialysis population of 6628 patients.

	Number	Percentage (%)
Total population	6628	100
Clinically suspected of DVT	252	252/6628=3.8
Confirmed DVT on duplex	174	174/6628=2.6 174/252=69

Table 2: Statistics of patients with deep vein thrombosis according to gender and type.

GENDER (i)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	77	44.3	44.3	44.3
	Female	97	55.7	55.7	100.0
	Total	174	100.0	100.0	

TYPE(ii)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	B/L	6	3.4	3.4	3.4
	Left	103	59.2	59.2	62.6
	Right	65	37.4	37.4	100.0
	Total	174	100.0	100.0	

Table 3: Statistics of population underwent femoral catheterization.

GENDER OF PATIENTS(i)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	M	4105	61.9	61.9	61.9
	FM	2523	38.1	38.1	100.0
	Total	6628	100.0	100.0	

PROCEDURE(ii)

			Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Double Lumen Dialysis Catheterization, Left Femoral,		4802	72.5	72.5	72.5
	Double Lumen Dialysis Catheterization, Right Femoral,		1826	27.5	27.5	100.0
	Total		6628	100.0	100.0	

Discussion

One of the thromboembolism manifestations is deep vein thrombosis (DVT). Although most DVT is occult and resolves spontaneously but once pulmonary embolism occurs it is associated with high mortality.² In the adult population the incidence of venous thrombosis, which includes pulmonary embolism and deep vein thrombosis is roughly 1/1000 per year.³ Pulmonary embolism, recurrence, post thrombotic syndrome, significant bleeding from anticoagulation and death are the main consequences of thrombosis. Moreover, poor quality of life is linked to thrombosis, especially when post thrombotic syndrome manifests.^{4,5} Studies that use autopsy based pulmonary embolism diagnosis have estimated the mortality rate as high as 30% highlighting the fact that many episodes of pulmonary embolism are not diagnosed clinically before death. In clinical practice, DVT is frequently asymptomatic, and the lethal pulmonary embolism is typically the first clinical sign in many patients.⁶ So deep vein thrombosis prevention and early detection is utmost important to avoid its complications.

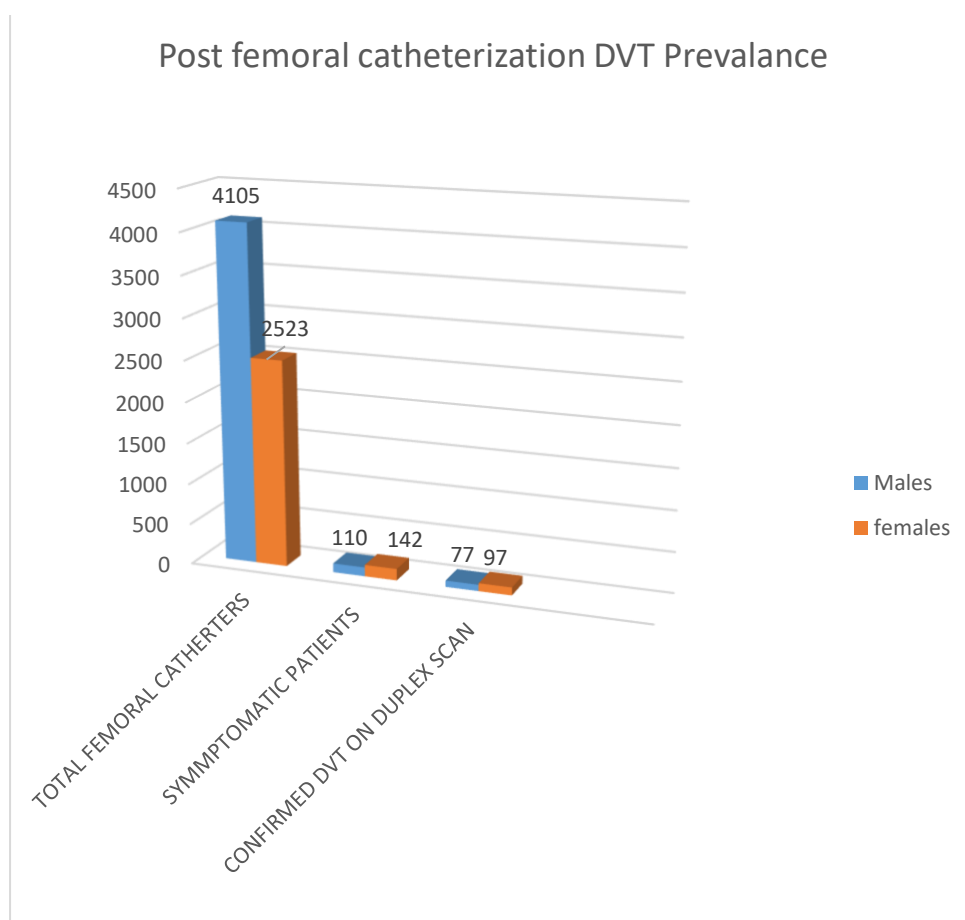


Figure 1: Post femoral catheter DVT prevalence among acute hemodialysis patients.

Several studies found evidence of thrombosis after femoral venous catheterization. In a prospective cross-sectional study was carried out at tertiary care hospital of Karachi. There were 16 (15.3%) cases of deep vein thrombosis total and none of these patients exhibited any symptoms⁷ In our study Doppler examination based deep vein thrombosis (DVT) found 69% of symptomatic patients and in 2.6% of all femoral catheterized patients.

All studies detected a high rate of lower limb thrombosis however in this study, we included only symptomatic patients with clinical suspicion of DVT. If routine ultrasonography is done, many additional patients may be diagnosed with asymptomatic DVT. The length of catheter may cause trauma to the vein which raises the risk of thrombosis. A randomized trial with appropriate blinding is required before a universal policy of prophylactic anticoagulation can be adopted. Joynt GM et al found an 11.2% rate of iliofemoral DVTs, twelve (9.6%) were line related and two (1.6%) occurred in un-cannulated leg as in our study six patients found with bilateral DVT.⁸

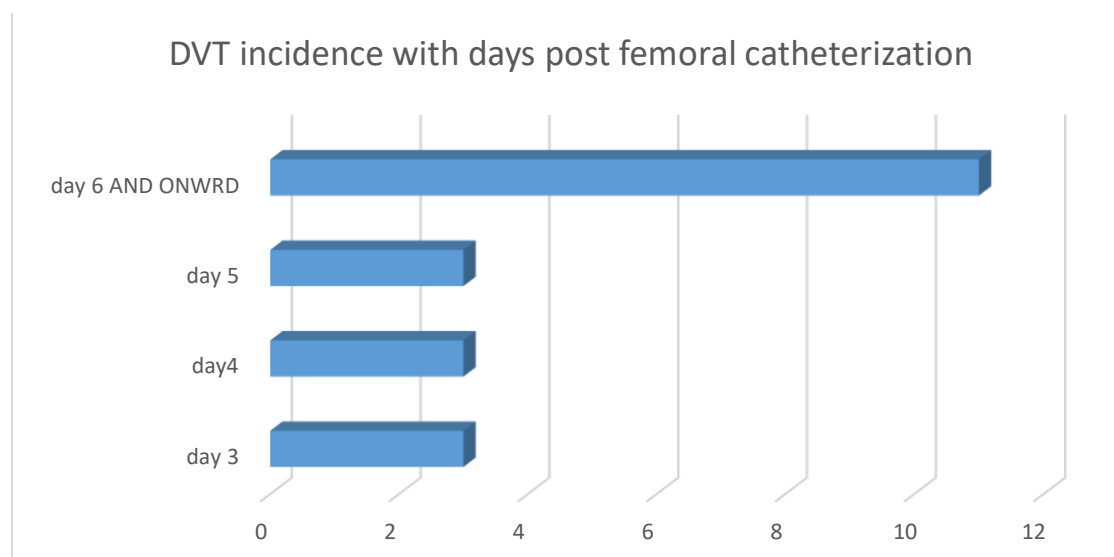


Figure 2: Number of days till occurrence of DVT

The incidence of diagnosed venous thrombosis varies by ethnic groups as well, rates are lower, in Asians, Pacific Islanders and Hispanics in the United States than in whites.^{9,10} According to several research, African Americans experience a rate of DVT 25% higher than others.^{10,11} In one study Africans Americans showed a higher risk of secondary venous thromboembolism (VTE) than idiopathic VTE, which might be due to difference in prophylactic anticoagulation treatments, or it might be due to the difference in the efficacy of prophylaxis in this population.¹¹ The epidemiology of thrombosis in African Americans is not well understood.

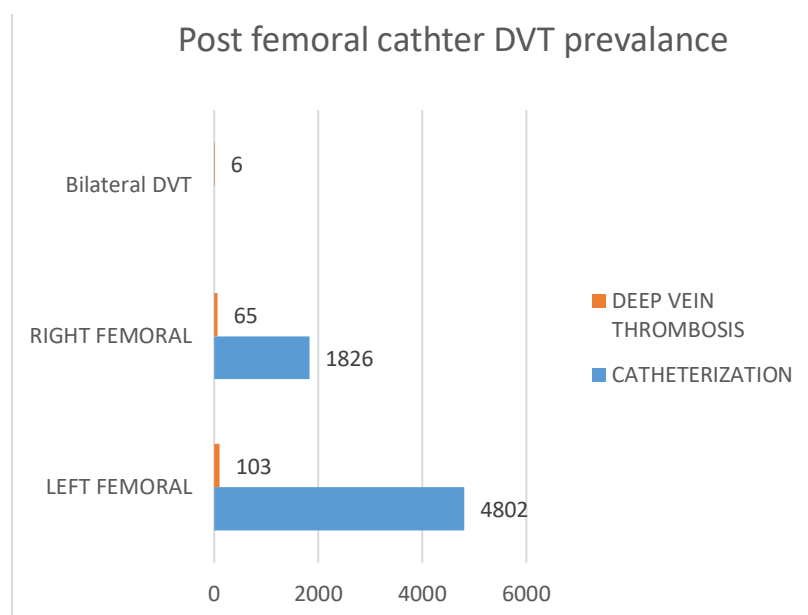


Figure 3: Side of occurrence of femoral DVT among acute hemodialysis patients.

According to two reports hospital induced DVT or postoperative DVT were comparable in Western and Asian countries.^{12,13} Although, the reported rate of DVT in Chinese population is only 0.17 per 1000 people annually.¹⁴ The findings of the former two reports might be explained by an increased frequency of subclinical episodes detected due to screening. There may be a correlation between the occurrence of thrombosis in non-Caucasian ethnic groups due to a lower prevalence of factor V Leiden or the prothrombin 20210a mutation.¹⁵⁻¹⁷ Even so, factor V Leiden is not very common with African Americans¹⁸, it has a comparable high risk of thrombosis.¹⁹ The observations that the prevalence of thrombosis in African American families are comparable to that in white

families, given that blacks may be more susceptible to thrombosis than whites, it is possible that unknown gene variants are major contributors to thrombosis in blacks.²⁰ It was demonstrated that blacks have higher levels of several haemostatic markers of thrombosis risk, including factor viii, von Willebrand factor and D-dimer, compared to whites.²¹ Reports on the prevalence of DVT in Pakistan are scarce.²² The opinion was refused by most recently released research on Asian patients, which asserted that hospital associated DVT and post-surgical DVT rates are similar in Asians and Western countries.²³

Limitations: Our study is limited by the retrospective design; we did not compare the outcome of femoral catheters with other alternate vascular access site. Moreover, many patients lost follow-up after double lumen femoral catheterization so the DVT rate may be underestimated.

CONCLUSION

To conclude, based on data from this study, if we consider only clinically suspected cases, DVT is confirmed in more than two third (69%) of suspected cases and 2.6% of all femoral catheterized patients. The femoral vein is an important emergency haemodialysis access route, clinicians inserting femoral venous catheters should be aware of the risk of lower extremity DVT from day three- and 3.7-fold increased risk after day five. Prospective trials are required to explore the exact prevalence of DVT post temporary femoral double lumen catheterization, and the use of prophylactic anticoagulation to minimize it. Furthermore, performing duplex ultrasound examination should be considered at day 5 and onward if it is extremely necessary to be kept in situ for this duration, otherwise attention should be paid to gaining access elsewhere at earliest possible opportunity.

Conflict of interest: Authors declare there is no conflict of interest regarding the publication of this article.

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