OCCLUDED TUNNELLED VENOUS CATHETER IN HAEMODIALYSIS PATIENTS: RISK FACTORS AND EFFICACY OF ALTEPLASE

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I. INTRODUCTION

Thrombosis of tunneled CVC in hemodialysis (HD) patients is common and it can lead to elimination of vascular sites. This study aimed to evaluate the incidence of thrombotic obstruction of CVC in HD patients and the efficacy of occlusion treatment with alteplase use, and identify factors associated with thrombotic occlusion.

II. METHODOLOGY

Prospective cohort study performed in two centers which evaluated the diagnosis and treatment of thrombotic occlusion of CVC in HD patients for 24 consecutive months. The catheter occlusion was defined as the difficulty to infuse or withdraw fluid from their paths. Alteplase dose was infused to fill the lumen of occluded catheter and remained for 50 minutes. Since there was no obstruction of the catheter, the procedure was repeated. Alteplase cryopreservation was performed (50mg dissolved in 50ml of sterile water and subsequently divided into individual portions and stored at -20 ° C).

Statistical analysis: For categorical variables, the Chi-square Test was used and for continuous variables, t Test or Mann - Whitney test. Multivariate analysis was performed using logistic regression model. Difference was considered when $p < 0.05$.

III. RESULTS

Three hundred thirty nine CVC in 247 patients were evaluated and followed totaling 67,244 CVC/ day.

Table 1. Patient characteristics with tunnelled central venous catheter

Characteristics	patients
	n=247
Male gender %	133 (54%)
Age (years)[b]	58 (47- 66)
Etiology of ESRD(%)	
Diabetes	108 (44%)
Hypertension	49 (20%)
Glomerulonephritis	19(8%)
Comorbidity (%)	
Diabetes	123 (50%)
CVD	91 (37%)
Catheter site (%)	
Internal jugular vein	202 (82%)
Subclavian	6 (2%)
Femoral vein	39 (16%)
Time of dialysis (days)	119 (41.5-585.5)

CVD = cardiovascular disease; ESRD: end stage renal disease

Eight hundred fifteen occlusion episodes were diagnosed (12 episodes per 1000 CVCP - day), with primary success with alteplase in 596 episodes (77 %) and secondary in 81 cases (10 %). In 99 episodes (13%) success was not obtained after the second dose of alteplase.

Table 2: Prevalence of occluded central venous catheter in hemodialysis patients

CVC	n= 339
Occlusions/1000 CVC- day	12
Mean of occlusion per CVC	2.4
Time of catheterization (days)	186 (95- 279,5)
Occlusion free catheter survival (days)	143.3

Adverse effects were not observed. Distribution of clinical and dialytic characteristics of patients with CVC according to the presence or without episodes of obstruction are show in table 3.

Table 3. Characteristics of patients using tunnelled central venous catheter according to presence or absent of occlusion

Characteristics	occlusion	no occlusion	p
	n=184	n=155	
Male gender (m)%	106 (57.6)	78 (50.3)	0.21
Age (years)	59 (48-67)	57.5(46-66)	0.72
Etiology of ESDR (%)			
Diabetes	72 (39.1)	81 (52.3)	0.02
Hypertension	43 (23.4)	24 (15.5)	0.09
Others	69 (37.5)	50 (32.3)	0.13
Comorbidity (%)			
DM	81 (44)	90 (58.1)	0.02
CVD	68 (37)	63 (41.1)	0.31
Cetheter site (%)			
Internal Jugular Vein	167 (90.8)	118 (76)	0.007
Femoral vein	17 (9.2)	37(23)	0.0008
Time of dialysis (days)	98 (36-361)	193.5 (47-810)	0.008
Time using catheter (days)[b]	156 (74-225)	220 (116-334)	<0.0001
***Lock* therapy**	77 (41.8)	88 (56.8)	0.006
ESI	53 (28.8)	69 (44.5)	0.003
BSI	58 (31.5)	43 (27.7)	0.52

The obstruction group showed less need for removal of the CVC and the etiologies of withdrawal also were differed between the groups.

Table 4. Tunnelled central venous catheter outcome according to presence or absent of occlusion

	occlusion	no occlusion	p
	n= 184	n= 155	
Removal	140(76)	90 (58)	<0. 001
Etiology of CVC removal (%)			
AVF use	66 (47.1)	22 (24.4)	0. 009
Infectious	49 (35)	40 (44.4)	0.83
Mechanical complications	5 (3.6)	16 (17.8)	0. 0006
Others*	20 (14.3)	12 (13.3)	0.76

Table 5. Tunnelled Table CVC outcome according to presence or absent of occlusion excluding AVF use as cause of removal

	occlusion	no occlusion	p
	n= 118	n= 133	
Removal	74(62.7)	65 (51.1)	0. 08
Etiology of CVC removal (%)			
Infectious	49 (66.7)	40 (61.5)	0.23
Mechanical complications	5 (6.7)	16 (24.6)	0. 0007
Death	5 (6.7)	3 (4.6)	0.73
Others*	15 (20.2)	6 (9.3)	0.16

Table 6. Multivariable analysis regression analysis for occlusion

	OR	IC	P
Age (per 1 year)	0,988	0.973-1.004	0.157
Time on dialysis before CVC implantation	1,001	1.00-1.01	0.06
Time of catheterization	1,02	1.01- 1.04	0.004
Diabetes	1,560	1.351 -1.894	0.015
ESI	1,567	1.347 -1.926	0.023
Lock therapy	1,756	0.467 -1.224	0.2553

IV. CONCLUSION

Thrombotic occlusion was in CVC of HD patients. We observed 12 episodes/1000 CVC -day, with a high success rate after alteplase use (87 %). In the multivariate analysis, the time with CVC, the presence of diabetes and ESI were identified as variable associated with thrombotic obstruction.

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