



Abstract Type : Oral presentation

Abstract Submission No.: A-0143

Abstract Topic : Interventional Nephrology

Central Venous Catheter as a permanent vascular access should be avoided even in the Very Elderly Dialysis Population: A Retrospective Study Using NHIS Data

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Objectives : The number of elderly dialysis patients is increasing, but establishing permanent vascular access remains challenging. Consequently, data on optimal vascular access for elderly, particularly very elderly individuals such as octogenarians (≥ 80 years) or nonagenarians (≥ 90 years), are limited. This study analyzes the mortality rates by permanent vascular access across different age groups to identify the best strategies for these populations.

Methods : This is a retrospective cohort study using data from the Korean National Health Insurance Service (NHIS). A total of 79,286 patients who initiated maintenance hemodialysis with vascular access placement between January 1, 2012, and December 31, 2021, were included. Survival rates were compared between patients using a central venous catheter (CAT) and those utilizing an arteriovenous fistula (AVF) and graft (AVG). Patients were stratified by age groups.

Results : The arteriovenous access (AVF and AVF) group significantly showed the better survival rates compared to CAT group across all age groups (Fig. 1). The adjusted hazard ratios (HR) for CAT compared to AVF were 4.413 (4.033-4.828), 3.620 (3.461-3.787), 3.300 (3.138-3.471), and 3.181 (2.651-3.817) in the age groups of 65-69, 70-79, 80-89, and ≥ 90 years, respectively (all $p < 0.001$). Similarly, the hazard ratios for CAT were higher compared to AVG, with values of 2.789 (2.511-3.098), 2.633 (2.500-2.773), 2.610 (2.469-2.760), and 2.554 (2.100-3.107) in the respective age groups (all $p < 0.001$) (Table 1).

Conclusions : The use of CAT as a permanent vascular access was associated with poorer patient survival compared to AVF or AVG across all age groups, including octogenarian and even nonagenarian populations. Therefore, CAT should only be considered as a permanent vascular access option in extremely limited cases where patient survival expectancy is severely restricted due to multiple comorbidities. Age should not be regarded as a limiting factor for establishing arteriovenous HD access and does not justify a catheter-dependent state.

Figure1_제출용.png

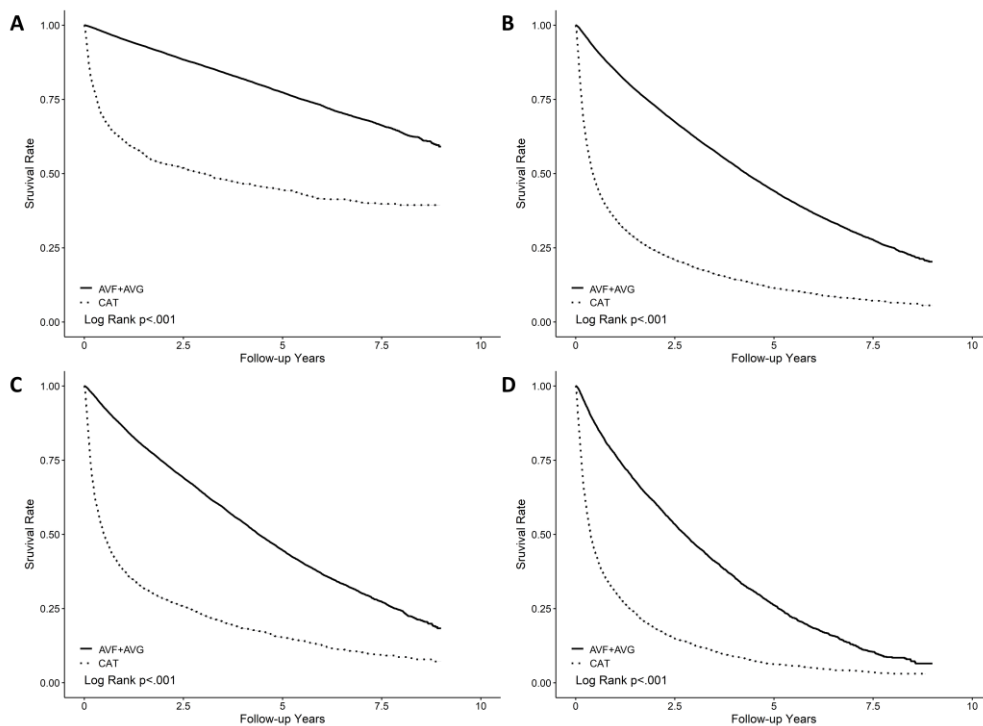


Figure 1. Kaplan-Meier survival curves stratified by Vascular Access and Age Groups. (A) <65 years, (B) ≥65 years, (C) 70-79 years, (D) 80-89 years
AVF+AVG, Arteriovenous access group; CAT, Catheter group

Figure1_제출용.png

Table 1. Hazard ratio of mortality for CAT compared to AVF and AVG, by Age Groups

Age groups, years	Univariate analysis		Multivariate analysis	
	Unadjusted HR(95% CI)	P value	Adjusted HR(95% CI)	P value
CAT vs AVF				
AVF	Reference	-	Reference	-
<65 years	4.312 (4.045-4.596)	<0.001	4.402 (4.123-4.700)	<0.001
65-69 years	4.612 (4.221-5.038)	<0.001	4.413 (4.033-4.828)	<0.001
70-79 years	3.784 (3.621-3.954)	<0.001	3.620 (3.461-3.787)	<0.001
80-89 years	3.356 (3.197-3.524)	<0.001	3.300 (3.138-3.471)	<0.001
≥90 years	3.033 (2.538-3.623)	<0.001	3.181 (2.651-3.817)	<0.001
CAT vs AVG				
AVG	Reference	-	Reference	-
<65 years	2.347 (2.174-2.535)	<0.001	2.601 (2.401-2.818)	<0.001
65-69 years	2.825 (2.546-3.134)	<0.001	2.789 (2.511-3.098)	<0.001
70-79 years	2.664 (2.531-2.805)	<0.001	2.633 (2.500-2.773)	<0.001
80-89 years	2.619(2.479-2.767)	<0.001	2.610 (2.469-2.760)	<0.001
≥90 years	2.416 (1.996-2.925)	<0.001	2.554 (2.100-3.107)	<0.001

Adjusted for age, gender, history of peripheral vascular disease, history of coronary artery disease, history of cerebral vascular disease, presence of diabetes, presence of hypertension. AVF, Arteriovenous fistula group; AVG, Arteriovenous graft group; CAT, Central venous catheter group.