VASCULAR ACCESS AND SURVIVAL RATES IN OLDER ADULTS: PECULIARITIES OF THE CAUSE-EFFECT RELATION

Authors: A. Zulkarnaev, A. Vatazin, N. Fominikh.

Hospital: Moscow Regional Research and Clinical Institute. Surgical department of transplantation and dialysis. Moscow

BACKGROUND

The use of a central venous catheter (CVC) as a permanent vascular access point is associated with reduced survival rates compared to arteriovenous fistula (AVF). At the same time, the question of polarity of the cause-effect relation is not straightforward.

OBJECTIVES

To evaluate the impact of vascular access at start of hemodialysis, and comorbidities on survival of patients.

METHODS

We have analysed the results of 812 older adults with chronic kidney disease stage 5 (CKD 5). 455 patients started and continued haemodialysis (HD) using AVF (AVF group), 203 – commenced HD via CVC and then changed to AVF (CVC-AVF group), 154 – received HD via CVC only (CVC group). Comorbidity was evaluated with the cumulative illness rating score.

RESULTS

The type of vascular access at the start of the GD is largely depended on the cause of chronic kidney disease. Traditionally, two-thirds of patients with polycystic kidney disease and systemic disease begin dialysis via CVC. In total, 56% of patients had a functioning permanent vascular access at start of hemodialysis (figure 1). After one year on hemodialysis 79% of patients had a functioning vascular access (figure 2).

In the analysis of conversions we have identified three groups of patients. Patients of group “AVF" began and continued hemodialysis via AVF or AVG - 56%. The remaining 44% of patients started hemodialysis via CVC. Subsequently, 25% of patients performed successful conversion of AVF/AVG (CVC-AVF group), 19% - continued hemodialysis via CVC (CVC group) (figure 3).

It should be noted that patients who started HD with functioning AVF/AVG, and then lost permanent vascular access was censored. This was done for two reasons: these patients was only 4% and the follow-up of vascular access was extremely heterogeneous: one part of them part converted to the CVC, another part - part to peritoneal dialysis.

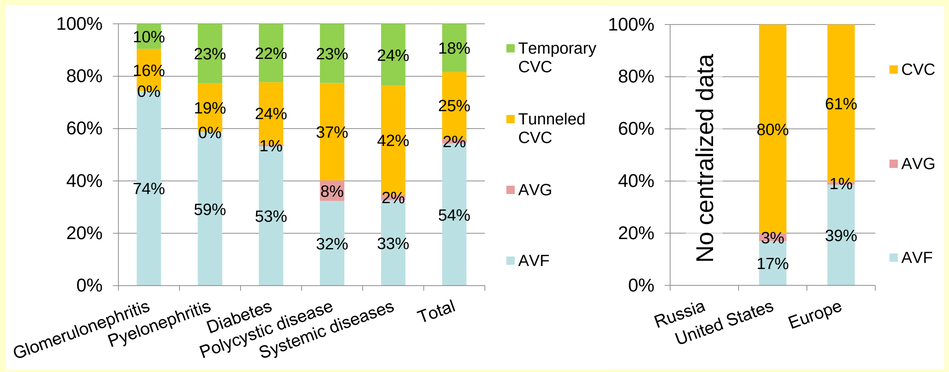

Figure 1. The proportion of vascular access at initiation of hemodialysis.

Bikbov B. T., Tomilina N.. Nephrology and dialysis. Appendix to vol. 17, No. 3. 2015
USRDS Annual Data Report Volume 2. 2015
Noordzij M. Nephrol Dial Transplant. 2014. PMID: 25061126

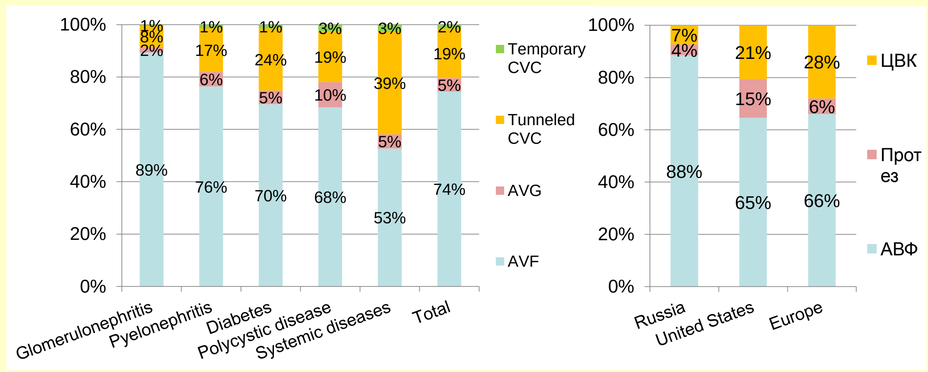

Figure 2. The proportion of vascular access after a 1 year on hemodialysis.

Bikbov B. T., Tomilina N.. Nephrology and dialysis. Appendix to vol. 17, No. 3. 2015
USRDS Annual Data Report Volume 2. 2015
Noordzij M. Nephrol Dial Transplant. 2014. PMID: 25061126

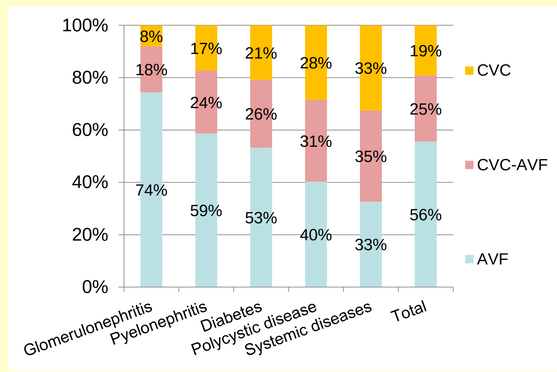

Figure 3. Vascular access for the entire period, taking into account the conversion.

Relative risk of death in CVC-AVF vs. AVF = 1.85 [1.17; 2.92], p=0.008, but becomes statistically insignificant when adjusted for co-morbidities (1.1 [0.71; 1.38], p=0.54. Therefore, the use of CVC at the start of HD is not a risk factor - – figure 4. But we should not forget about the risk of central venous stenosis, which was higher in the CVC-AVF group - 1.79 [1.15; 2.72], p=0.009.

Survival rate in the AVF group differed from that in CVC (log rank p<0,0001), but not from CVC-AVF (p=0,119) – figure 5. Post adjustment for risks in the multifactorial analysis (figure 6), the estimated survival rate in the group of CVC-AVF has become closer to the value in the AVF group. The survival rate in both groups significantly differed from the CVC group. Therefore, patients in the CVC group initially had a higher CIRS and a higher risk of death – figure 7. This compromises CVC and may lead to re-evaluation of its effect on mortality.

Conversion from AVF to CVC in some patients may be justifiable (for example in a case of progressive systolic and diastolic heart dysfunction, pulmonary hypertension (even in the absence of blood hyperflow through AVF), raised NT-proBNP > 11000 pg/ml, etc.) but not in the case of diabetes. The survival rate of patients with diabetes in any case of using CVC (even with the subsequent conversion in functioning of AVF) was much lower than when using AVF – figure 8. Amongst diabetes patients in the CVC group we observed a 1.6 and 2.1 times increase in the frequency of systemic and local infections compared to other vascular access types ($\chi 2$ p=0,001; p<0,001 y). Moreover, diabetes increases mortality in patients even with adjustment for comorbidities. In other diseases, conversion may be justified and in most cases, leads to improvement in cardiac and pulmonary haemodynamics in the short term. The effect on long term survival rates remains uncertain, there is a need for more research with larger sample sizes.

Patients with systemic diseases we did not observe differences between the types of vascular access, we believe, due to the high mortality in all types of access - figure 9.

It is noteworthy, that no reliable predictors of progressive cardiac insufficiency had been identified to date of AVF creation. Most elderly patients have a history of cardiovascular anamnesis. In several cases when serious pulmonary hypertension, systolic or diastolic dysfunction is revealed we have abandoned AVF and implanted a tunnel CVC or peritoneal dialysis. This issue requires further study, as elderly patients differ from the general population of patients on haemodialysis.

Risks of developing infections and central venous stenosis were higher when using non-tunnel CVC, compared to tunnel CVC: 2.45 [1.41; 3.62], p=0.003 и 1.7 [1.15; 2.51], p=0.009 respectively, even when adjusted for the time of catheter being in. The use of non-tunnel CVC is associated with increased number of hospitalizations (p=0.01) and a longer hospital stay (p=0.004), which may compensate for the high cost of tunnel catheters.

The median of CVC and AVF in different HD centres varies greatly (“the HD centre effect”). This emphasises the importance of using the right vascular access type. This emphasises the importance of the correct usage of any vascular access type.

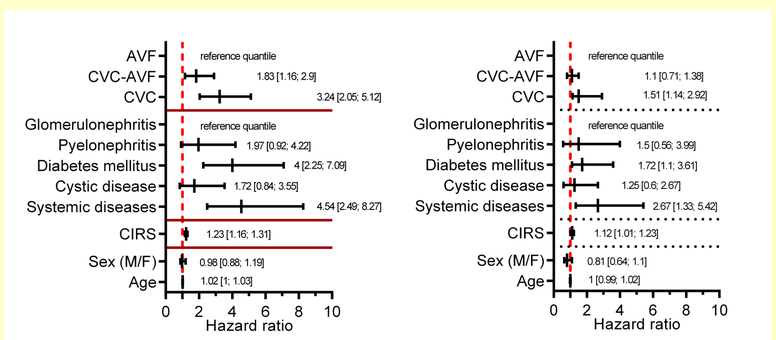

Figure 4. Risk factors for all-cause mortality

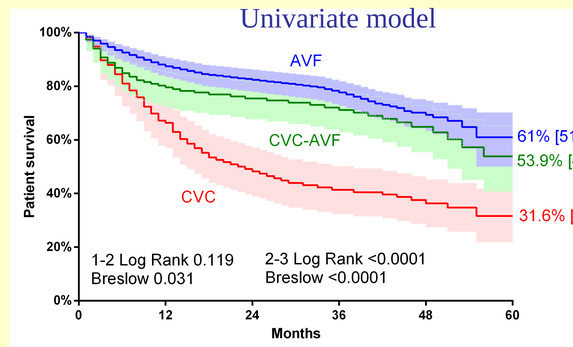

Figure 5. Unadjusted survival rates

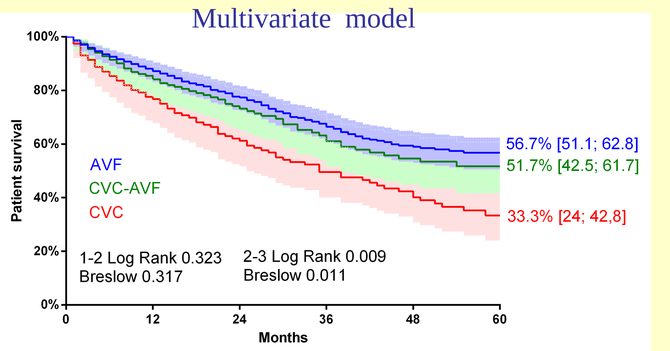

Figure 6. Adjusted survival rates

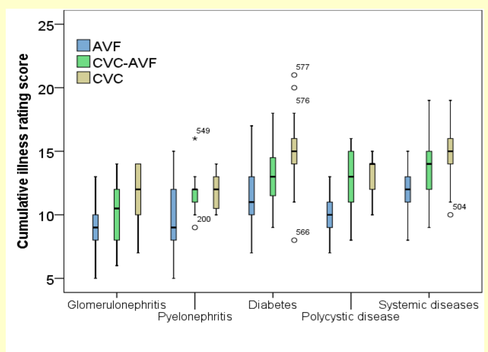

Figure 7. Adjusted survival rates patients with systemic diseases

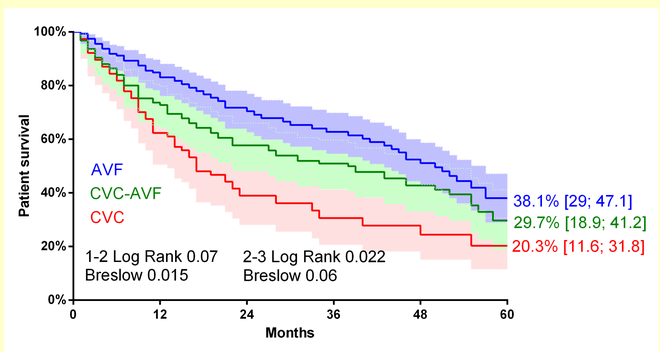

Figure 8. Adjusted survival rates patients with diabetes

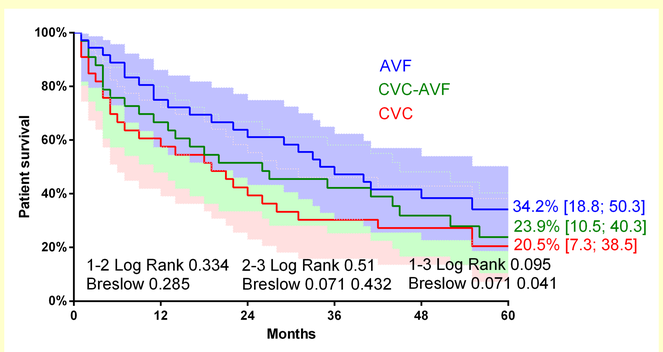

Figure 9. Adjusted survival rates patients with systemic diseases

CONCLUSIONS

Differences in survival rates with different types of vascular access are largely determined by the number of co-morbidities and the presenting condition. In case of successful subsequent conversion to functioning AVF CVC may be used as vascular access for initiation oh hemodialysis without increasing the risk of death.

54 ERA
625--MP
Dialysis - Vascular access II
Aleksei Zulkarnaev
DOI: 10.3252/pso.eu.54ERA.2017
ePosters supported by F. Hoffmann- La Roche Ltd.
54th ERA-EDTA CONGRESS Madrid, Spain June 3rd-6th 2017
PosterSessionOnline.com