VASCULAR ACCESS IN ELDERLY PATIENTS ON HEMODIALYSIS: BALANCING BETWEEN LOCAL AND SYSTEMIC COMPLICATIONS. WHERE IS THE COMPROMISE?

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BACKGROUND

The number of elderly patients on hemodialysis is growing every year and currently accounts for approximately 20-25%. These patients are at risk of local complications of vascular assess (VA), but additionally in elderly patients, there is an extremely high risk of cardiovascular complications. Elderly patients require a special approach to the creation, monitoring and maintenance of vascular access.

OBJECTIVES

To evaluate the results of creation of vascular access and risk factors of systemic complications.

METHODS

We analyzed the treatment results of 604 elderly patients who initiated hemodialysis (65-89 years) - cohort study.

RESULTS

The results of AVF/AVG creation, were not bad: in 87% of patients it was possible to create the permanent vascular access – fig.1. In 13% of patients attempting to create an AVF/AVG were unsuccessful and a tunneled central venous catheter (CVC) was used. In the presence of risk factors we use only tunneled CVC, even if we assume that it will be short-lived – fig.2. Desintegrating type of forearm vessels structure systolic blood pressure < 100 mmHg, systemic vasculitis, chemotherapy history, heart rhythm disorders, were risk factors for VA creation failure, but diabetes mellitus.

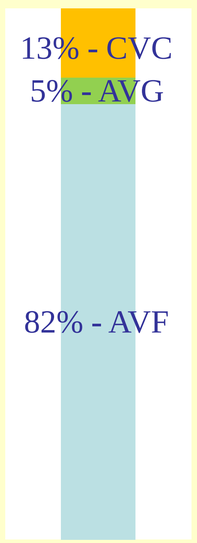

Figure 1. Proportion of VA types

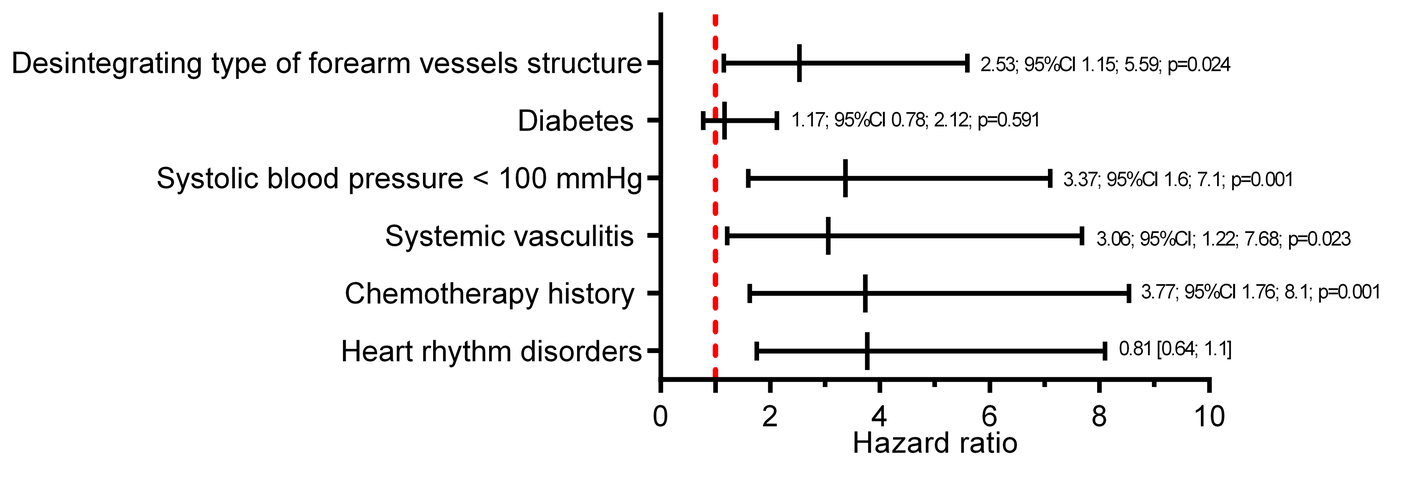

Figure 2. Risk factors for VA creation failure (Cox proportional hazards multivariate analysis). Adjusted for gender, age, cumulative illness rating score, hemoglobin, albumin.

The primary and secondary patency in patients with diabetes was patency of AVF/AVG was 66%, 56% and 41% at 12, 24 and 36 months; the secondary patency (from creation till final thrombosis) – 93%, 86% and 78%, respectively. The secondary patency in patients with diabetes mellitus was lower – fig.3.

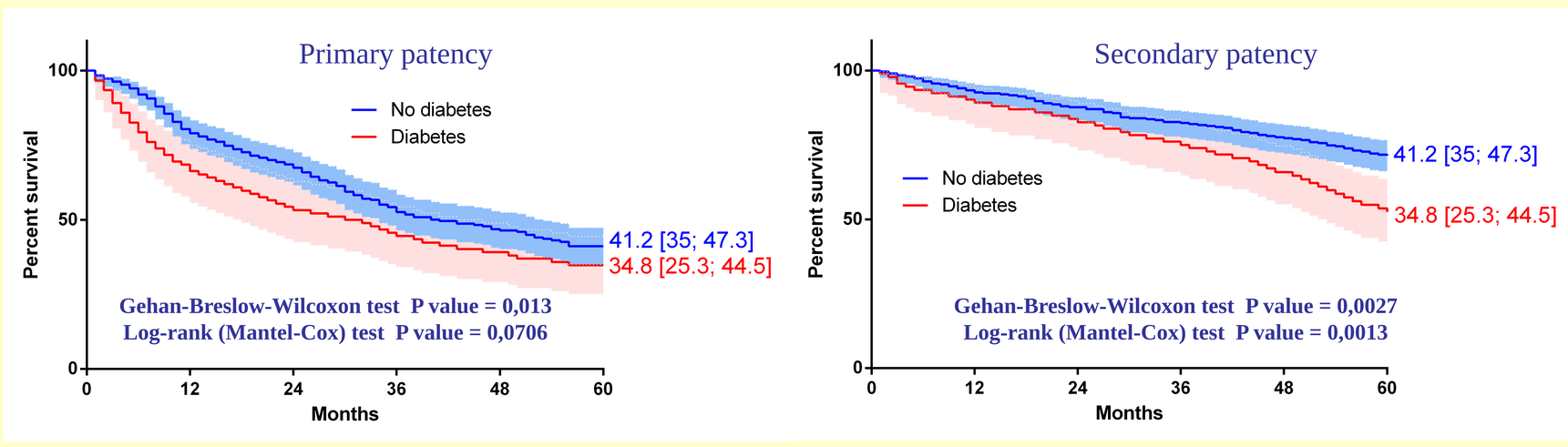

Figure 3. Survival rates of vascular access.

The important aspect in elderly patients is the cardiovascular complications. We found that the increase of NT-proBNP may be considered as a reliable biomarker of the high risk of cardiovascular death (AUROC 0.844; 95%CI 0.736; 0.951; p<0.0001). The threshold value is in the range from 10326 pg/ml (sensitivity 0.765; specificity 0.738) to 12390 pg/ml (sensitivity 0.706; specificity 0.833). The NT-proBNP increase more than 11000 pg/ml was associated with a high risk of cardiovascular death (HR of 2.63; 95%CI 1.2; 5.76; p<0.001; adjusted for age, sex, kT/V, type of dialysis membrane, cumulative index rating scale, hemoglobin, albumin) and may be an indication for applying of tunneled CVC or conversion to peritoneal dialysis. Systolic and diastolic cardiac dysfunction, pulmonary hypertension were also associated with cardiovascular mortality, but the concentration of cytokines, albumin, hemoglobin, C-reactive protein.

Deterioration of cardiac hemodynamics may occur even when AVF/AVG blood flow is less than 1000 ml/min. This shows that elderly patients require mandatory monitoring even in the absence of excessive AVF/AVG blood flow, for timely reducing the risk of cardiovascular complications. In most cases, applying of tunneled CVC or conversion to peritoneal dialysis leads to reducing of a hemodynamic disorders and allows to slightly reduce the risk of death.

CONCLUSIONS

Elderly hemodialysis patients require the special approach to the creation of the permanent vascular access. It is necessary to evaluate the risk factors for local and systemic complications, and also to conduct mandatory periodic monitoring (biomarkers and indicators of cardiac hemodynamic), especially in patients with previous cardiovascular pathology. Such individualized approach can provide good treatment results in elderly patients.

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