

Adam Mazurkiewicz, Maciej Sybilski, Krzysztof Bojakowski, Krzysztof Braun, Marek Durlik, Piotr Andziak

## **Improved Outcomes of Hemodialysis Access Construction and Maintenance in the Era of Guidelines.**

### **Purpose:**

The aim of this study was to assess influence of integrated multidisciplinary management according to guidelines on outcomes of vascular accesses for hemodialysis constructed on the upper extremities.

### **Method:**

Retrospective review and outcome comparison, according to SVS/AAVS reporting standards, of 101 accesses before (1993-1999) and 213 after (since 2000) introduction of integrated multidisciplinary management according to guidelines in our institution.

### **Results:**

Average age, representation of males and proportion of patients with symptomatic or asymptomatic arterial stenosis/occlusion and degenerative aneurysms in the second period were significantly higher than in the first one.

In both study periods our policy was to construct arteriovenous fistulas (AVF) starting as distally as possible and then to implant arteriovenous grafts (AVG). Since 2000 we constructed significantly more proximal accesses. The explanation is that patients in the second period were older and, with higher proportion of atherosclerotic lesions, their vascular system was not optimal for distal access surgery.

Meeting “fistula first” policy requirements, established in our institution early before 2000, the majority of primary hemodialysis vascular accesses in both study periods were AVF ( $p>0,05$ ). In the second period we noticed significant increasing in the number of primary proximal AVF and decreasing in primary AVG. In the group of secondary accesses the difference was not statistically significant.

The number of distal accesses constructed before start of continuous renal replacement therapy by hemodialysis increased significantly from 4,25% to 47,5%. This proportion for proximal accesses was not statistically significant (5,71% to 30,23%).

Amount of primary radiocephalic fistulae (RCAVF) constructed in diabetics decreased significantly from 35,9% in the first period to 16,95% in the second one as the result of preoperative imaging studies (ultrasound mapping, angiography, CT, MRI) performed significantly more frequently since 2000.

The number of proximal accesses lost due to thrombosis during the first month after placement decreased significantly from 7,89% in the first period to 0,76% in the second one.

Access monitoring in the second period resulted in increasing in the number of secondary operations performed for dysfunction (20% vs 90,48%) and in decreasing in the number of thrombotic episodes (80% vs 9,52%) in the group of brachiocephalic fistulae (BCAVF). The rate of thrombotic episodes per patient-year in the first and second study period for BCAVF was 0,0364 and 0,0051 respectively. This rate for episodes of dysfunction as an indication for secondary intervention in the group of BCACF was 0,0091 and 0,0484 respectively. Episodes of thrombosis, malfunction and reinterventions per access/year for access type are described in Table 1.

Generally, in the second analyzed period primary, primary assisted and secondary patency rates were significantly higher than in the first one. Primary functional pat-

ency rates in the first period at 12 and 24 months were 66,14% and 63,85%, in the second period 82,83% and 80,9% respectively ( $p=0,00380$  in the log-rank test). Primary assisted functional patency rates in the first period at 12 and 24 months were 68,22% and 66,06%, in the second period 82,85% and 80,97% respectively ( $p=0,00957$  in the log-rank test). Secondary functional patency rates in the first period at 12 and 24 months were 70,13% and 67,42%, in the second period 84,69% and 81,27% respectively ( $p=0,009448$  in the log-rank test). For types of vascular accesses most frequently occurred in our database, where reliable statistical analysis was possible, primary, primary assisted and secondary patency rates were significantly higher in the second period for RCAVF and for BCAVF, but not for brachio-basilic AVF (BBAVF) (details in Table 2).

Table 1

Access type	Episode/access/year	1 <sup>st</sup> period	2 <sup>nd</sup> period	p-value
All access types	thrombosis/access/year	0,0252	0,0186	0,00023
	malfunction/access/year	0,0146	0,0445	
	reinterventions/access/year	0,0398	0,0631	
RCAVF	thrombosis/access/year	0,0250	0,0262	0,31652
	malfunction/access/year	0,0154	0,0262	
	reinterventions/access/year	0,0404	0,0524	
BBAVF	thrombosis/access/year	0,0048	0,0078	0,53841
	malfunction/access/year	0,0019	0,0571	
	reinterventions/access/year	0,0067	0,0649	
BCAVF	thrombosis/access/year	0,0364	0,0051	0,00465
	malfunction/access/year	0,0091	0,0484	

	reinterventions/access/year	0,0455	0,0535	
	thrombosis/access/year	0,0556	0,0544	
AVG	malfunction/access/year	0,0222	0,0544	0,31323
	reinterventions/access/year	0,0778	0,1088	

Table 2

Access type	Patency type	1 <sup>st</sup> period		2 <sup>nd</sup> period		p-value
		12 months	24 months	12 months	24 months	
RCAVF	Primary	55,27%	55,27%	85,19%	78,09%	0,00051
	Primary assisted	56,44%	56,44%	85,19%	78,09%	0,00053
	Secondary	59,29%	56,36%	89,53%	77,14%	0,00050
BBAVF	Primary	74,31%	70,93%	81,72%	81,72%	0,10371
	Primary assisted	75,07%	71,80%	81,72%	81,72%	0,10371
	Secondary	79,20%	76,03%	82,19%	82,19%	0,10313
BCAVF	Primary	70,87%	70,87%	86,47%	86,47%	0,02516
	Primary assisted	74,83%	74,83%	86,47%	86,47%	0,02598
	Secondary	72,08%	72,08%	87,41%	87,41%	0,02516

Conclusion:

Introduction of integrated multidisciplinary management of vascular hemodialysis access according to guidelines improved outcomes of RCAVF and BCAVF.