

Irena Głowińska¹, Jerzy Głowiński², *Jolanta Małyszko¹, Michał Myśliwiec¹

Arteriovenous fistula in the elderly dialysis patients

Przetoka tętniczo-żylna u pacjentów dializowanych w starszym wieku

¹Department of Nephrology and Transplantology, Medical University of Białystok

Head of Department: prof. Michał Myśliwiec, MD, PhD

²Department of Vascular and Transplantation Surgery, Medical University of Białystok

Head of Department: prof. Marek Gacko, MD, PhD

Summary

Introduction. The growing population of elderly and inclusion them into dialysis requires satisfactory and safe vascular access.

Aim. The aim of our study was to analyze different types of arteriovenous fistula (AVF) depending on age specially forearm fistulae in the elderly.

Material and methods. We screened 212 consecutive patients. Patients were divided into two groups: < 65 years of age versus ≥ 65 years of age.

Results. A total of 203 patients were operated. One hundred ninety two AVF used for hemodialysis after first creation were analyzed. In that study population, 118 patients were 65 years or older. In group 1 (patients younger than 65 years old) 45 patients were male (61%) and in group 2-61 patients were males (52%). A total of 122 forearm fistulae, 58 brachial fistulae and 12 brachial PTFE grafts were created.

Conclusions. Our study shows that the creation of native AVF is not limited by the patient's age.

Key words: arteriovenous fistula, elderly, end-stage renal disease, hemodialysis

Streszczenie

Wstęp. Starzenie się społeczeństwa i włączanie do hemodializ coraz starszych pacjentów wymagają zapewnienia sprawnego i bezpiecznego dostępu naczyniowego w schorowanej grupie chorych.

Cel pracy. Celem pracy była analiza rodzajów dostępu naczyniowego, wytwarzanego u pacjentów, w zależności od wieku, w szczególności sprawdzenie możliwości wykonania przetok na przedramieniu u chorych po 65. roku życia.

Materiał i metody. Badaniem objęto kolejnych 212 pacjentów zgłoszonych do wytworzenia przetoki av. Pacjentów podzielono na dwie grupy wiekowe: < 65. roku życia i ≥ 65. roku życia.

Wyniki. Operowano 203 pacjentów, analizą objęto 192 dostępy drożne, użyte do hemodializy po pierwotnej operacji. W badanej populacji 118 chorych przekroczyło 65 rok życia. W grupie 1, do 65. roku życia było 45 mężczyzn (61%), grupa 2 liczyła 61 mężczyzn (52%). Ogółem wykonano 122 przetoki na przedramieniu, 58 przetok na ramieniu, ponadto implantowano 12 protez na ramieniu.

Wnioski. Z naszej analizy wynika, że wykonanie dostępu naczyniowego, w postaci przetoki z naczyń własnych, rzadziej przy użyciu protezy, nie podlega dużemu wpływowi wieku pacjenta.

Słowa kluczowe: przetoka tętniczo-żylna, pacjent starszy, schyłkowa niewydolność nerek, hemodializa

INTRODUCTION

The population of end stage renal disease patients increases each year in Poland and all over the world. Mean age of patients starting hemodialysis exceeded 60 years. More frequently this type of treatment includes octogenarians (1). The feasibility of arteriovenous fistula in patients older than 65 years old has been studied in recent years (2). The increased frequency of comorbidities like diabetes, hypertension, coronary artery disease, heart failure or arteriosclerosis worsen the prognosis (3).

Clinical problems related to lack of or ineffective vascular access for hemodialysis are major courses of mortality. According to KDOQI and EBPG guidelines native arteriovenous fistula (AVF) is the best vascular access for hemodialysis (4, 5). The main AVF asset compering to central venous catheter (CVC) is longer patency, small risk of complications, low mortality and reduced cost. When the creation of native AVF is impossible synthetic prosthesis may be implanted – arteriovenous graft (AVG). Despite the proven advantages of

native AVF synthetic prosthesis provides more than 50% of vascular access (6). Moreover there are suggestions of cardiotoxicity of arteriovenous fistula in elderly population and that it should be replaced by central venous catheter (7). The optimal choice of vascular access remains a controversial issue.

AIM

The aim of our study was to analyze types of different vascular access according to patients age specially a feasibility of forearm fistulae in the elderly.

MATERIAL AND METHODS

Our study is a retrospective analysis of prospectively gathered data on creation of vascular access for haemodialysis.

We screened 212 consecutive patients reported for vascular access. We included patients in a predialysis period or dialysed with CVC or with peritoneal catheter.

Patients with a history of previous arteriovenous fistulae were excluded. Patients were divided into two age groups: one group contains patients less than 65 years old and the second group older than 65 years old. 9 patients with no possibility to create AVF were excluded from further analysis. The same surgeon was qualifying all patients before surgery and was performing the operation. Clinical examination and ultrasound Doppler of arteries and veins of upper extremity were performed. Criteria for forearm fistula were: arterial diameter minimum 2 mm, vein diameter (after tourniquet – 2.5 mm). Most procedures were performed under local anesthesia with intravenous sedation. In a few cases regional plexus block was apply. Anastomosis of radial artery and cephalic vein in a side-to-end fashion using a continuous 6.0 polypropylene suture. In case of brachial artery a standard end-to-side technic was used. When native vessels were inadequate for anastomosis a synthetic prosthesis was implanted. In our study it was the same prosthesis GoreTexStrech 6 mm used in all cases. Postoperative assessment of fistula function was performed after 10 days and the next one in 6-8 weeks. As successful we recognized fistulae with at least 30 day functional patency and only those were involved into further analysis.

RESULTS

Two hundred and three patients were operated on. During observation period 11 access in total were not used: two patients didn't started dialysis, 3 AVF and 1 prosthesis thrombosed in short postoperative period, we noted 5 maturation failures. Further investigation involved one hundred and ninety two patent accesses used for hemodialysis. Demographic data of studied groups are presented in table 1. In studied population 118 patients were 65 or older. In group 1 (patients younger than 65 years old), 45 patients were males (61%). Group 2 contained 61 males (52%). The major causes of end stage renal disease were diabetes, glomerulonephritis, hypertension, ADPKD. More frequent comorbidities were hypertension, diabetes, coronary artery disease, heart failure.

Table 1. Demographic data.

	Age < 65 years old	Age ≥ 65 years old
N	74	118
Mean age	49.8 ± 11.5	74.6 ± 5.3
Males	45 (60.8%)	61 (51.6%)
Etiology		
Diabetes	13 (17.5%)	30 (25.4%)
Hypertension	7 (9.4%)	20 (16.9%)
Glomerulonephritis	23 (31.1%)	17 (14.4%)
ADPKD	4 (5.4%)	8 (6.8%)
Other	27 (36.6%)	43 (36.5%)
Comorbidities		
Diabetes	17 (22.9%)	35 (29.6)
Hypertension	63 (85.1%)	106 (89.8%)
Coronary heart disease	15 (20.2%)	56 (47.1%)
Heart failure	10 (13.5%)	41 (34.7%)

The types of vascular access are shown in table 2. There were 122 forearm fistulae, 58 upper arm fistulae, 12 prostheses. Among 122 forearm fistulae there were 97 distal/wrist and 25 proximal ones.

Table 2. Types of vascular access.

Anatomical site	Age < 65 years old	Age ≥ 65 years old
N	74	118
Forearm	46 (62%)	76 (64%)
Arm	23 (31%)	35 (30%)
Graft	5 (7%)	7 (6%)

DISCUSSION

We present a preferable vascular access in elderly patients. We verified a hypothesis that native arteriovenous fistula, specially forearm one, was difficult to create. A drawback of distal fistulae especially in elderly is high rate of failure exceeding 10% (early thrombosis or maturation failure) (8). In our material detailed pre-operative assessment and expertise of vascular surgeon reduced the rate to 5.4%.

Brachiocephalic and brachio basilic fistulae are traditional vascular access in the elderly patients (9). Those high-flow fistulas are blamed for heart failure and distal ischaemia (10, 11).

Fistulas created in the proximal forearm included Gracz fistulae replace arm fistulae (12). It gives a chance of a good access for elderly patients. Another implication of a broad use of Gracz fistula is a change in classical division into forearm and arm. Perforating vein fistula in valuable alternative in elderly patients (13). Increasing number of our patient undergo forearm anastomosis using radial instead of brachial artery.

It is more often questionable if elderly patients with so many comorbidities should be included into dialysis program (14). The progress of kidney disease is usually slower what justifies more conservative and less

aggressive approach (15). There are papers proving that optimal conservative treatment results in better survival rate (16).

The age becomes less important barrier in modern medicine era. Our study proved that forearm fistula is feasible in elderly patients and may successfully serve for hemodialysis. Other publications revealed that long term patency of such fistulas is comparable with younger patients and the age is not a risk factor of thrombosis (17). Biological age of a particular patient and comorbidities have a great significance. Unfortunately, hemodialysis patient population is more exposed to cardiovascular complications. Diabetes, malignancies, malnutrition, anaemia, Ca-P disorders favours many complications and frequent hospitalisations (18).

There are publications suggesting harmful influence of AVF on heart, causes pulmonary hypertension and heart failure (19). However there are no convincing evidence for actual fistula cardiotoxicity. On the other hand shorter survival rates among patients on CVC competing to AVF were described (20).

We didn't analyzed patients with CVC, yet native AVF was possible to create in 85% of patients reported for such a procedure.

We demonstrated in our paper that creation of AVF less frequently AVG is not influenced by patients age. Individualization of treatment according to the rule "patient first not fistula first" is optimal strategy among expanding and ageing population of patients with end stage renal disease.

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Address/adres:

*Jolanta Małyszko

Department of Nephrology and Transplantology

Medical University of Białystok

ul. Żurawia 14, 15-540 Białystok

tel.: +48 (85) 740-94-64

e-mail: jomal@poczta.onet.pl