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Original article

ARTERIO-VENOUS FISTULA CREATION FOR HEMODIALYSIS. WHAT IS HAPPENING IN BULGARIA?

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ABSTRACT

Purpose. The arterio-venous anastomosis (AVA) continues to be the "gold standard" for vascular access in patients undergoing haemodialysis. This retrospective study aims to analyze the causes that led to End Stage Renal Disease (ESRD), the type of native AVA, their localization, and their patency.

Material and Methods. The study included the last 100 consecutive and random AVAs constructed in our clinic. 68 men of average age 62.3 (+/-10.8) years and 32 women of average age 59.9 (+/-15.8) years were operated. The main causes that led to ESRD were: Glomerulonephritis - 33%, Hypertension- 24% and Diabetes- 20%. The overweight patients were 33% and the smokers - 30%.

Results. AVA has been successfully constructed in 82% of the patients on the left hand and in 18% on the right hand. A distal latero-terminal radio-cephalic fistula (DLTRC) was constructed on only 8% of the patients. The most common type of anastomosis was an L.T. radio-cephalic in the forearm - 58%, followed by an L.T. brachio-cephalic fistula - 19% and latero-lateral, radio-cephalic in the forearm - 14% of the patients. The early fistula patency was - 80%, one-year cumulative patency was 94%.

Conclusion. The analysis of our results shows that the relative share of the overweight and diabetes population is increasing today. In practice, solutions for the construction of primary forearm anastomosis are increasingly common.

Keywords: hemodialysis, vascular access, arterio-venous anastomosis, fistula patency,

INTRODUCTION

The number of patients undergoing hemodialysis is increasing annually, and hallmark of their quality of life is the type of their vascular access [1, 2]. According to the Dialysis Outcomes and Practice Patterns Study (DOPPS), as of 2013, the relative share of patients with native fistula is in the range of 49-92% among the countries participating in the study [3].

According to Michael Allon and Michelle Robbin (2002), the accessibility of dialysis treatment for elderly patients and those with accompanying comorbidities has sharply reduced the possibility of providing quality vascular access. The fistula patency has decreased over the last fifty years 2 to 5 times, mainly for these reasons [4].

The aim of our study was to determine the type, location and patency of construction of consecutive arteriovenous fistulas.

MATERIAL AND METHODS

The study was retrospective, using available medical documentation. All patients signed an informed consent approved by the Ethics Committee of Medical University, Pleven. The study includes the last 100 consecutive AVAs constructed in our clinic in 2020. Sixty-eight men with a mean age of 62.3 (+/-10.8) years and thirty-two women with a mean age of 59.9 (+/-15.8) years were operated on. The main causes of ESRD were: glomerulonephritis - 33%, hypertension - 24% and diabetes - 20%. Overweight patients were 33% and the smokers - 30%.

RESULTS

AVA was successfully constructed in 82% of patients on the left arm and in 18% of the right ones. Only 8% of patients developed distal latero-terminal radiocephalic fistula (DLTRC) – Figure 1.

Fig. 1. Distal latero-terminal radiocephalic anastomosis (our case).

The most common type of anastomosis was proximal L.T. radiocephalic anastomosis - 58% (PLTRC), followed by L.T. brachiocephalic fistula (LTBC) - 19% and proximal laterolateral, radiocephalic (PLLRC) - in 14% of patients. The early patency of the fistula was - 80%, the one-year cumulative patency was 94%.

The mean age of patients with distal fistulas is lower (60.4 vs 54.1 age) than that of patients with proximal fistulas (p=0.016). Seven of the patients with distal anastomoses were male, and the gender differences in this location were statistically significant (p=0.003).

DISCUSSION

As early as 1984, P. Ratcliffe et al. established that late referral of patients with end-stage renal disease is a major cause of higher morbidity, mortality, medical costs and lower quality of life [5]. Studies conducted in different countries found that more than half of patients started hemodialysis before the creation/maturation of the native fistula [6]. Careful preoperative clinical and instrumental evaluation is required to decide both the site and type of anastomosis. Unfortunately, we must note that regardless of the technical skills and improved capabilities of the medical professionals and the consumables used, it's not possible to construct a native fistula in all patients. According to the 2006 NKF-K/DOQI guidelines, vascular access can be defined as functional when the flow is >600 mL/min, the vein has a minimum diameter of 6 mm and does not exceed a depth of 6 mm. The time associated with achieving these characteristics varies from 1 to 3 months after the AVF surgery [7]. On the other hand, is the objective state of the problem, which can be determined by several examples: 1. in 2010, 75% of men and 58% of women in England were overweight or obese [8]; 2. in developed countries, the relative share of patients with diabetes mellitus, as the main cause of chronic kidney disease (CKD) in the 5th stage, requiring hemodialysis treatment is about 40%. In the USA, this increase between 1990 and 2002 is estimated at 221% [9, 10].

These objective changes concerning the general status and comorbid condition of both the entire population and, in particular, that part of it that needs hemodialysis treatment have changed the classic views on the maturation and exploitation of native fistulas. The Dialysis Access Consortium (DAC) study found that 60% of A.V. fistulae were not eligible for dialysis for at least 5 months, and 20% had thrombosed by 6 weeks. Rates of primary dysfunction or failure have been reported in up to 50% of some centers, particularly those with aggressive fistula placement policies [11].

S. Sultan et al. (2012) published a study of 495 primary anastomoses. They found a 4-year survival rate for proximal anastomoses of 68.9% (+/- 8%), while survival for distal anastomoses was 7.3% (+/- 4.9%), $p < 0.0001$. Other studies with fewer patients and shorter follow-up times found no essential differences [12]. A. Al-Jaishi et al. (2014) published a meta-analysis of 46 articles, including a total of 12,383 anastomoses and found primary failure in 23%, one-year patency in 60% (71%), and two-year patency in 51% (64%) [13].

J. Kim et al. (2015) reported their study of 191 native fistulas and found an increase in the relative proportion of primary cubital anastomoses

in recent years from 38% to 56% (p=0.01). On the other hand, the primary one-year patency of the anastomoses increased over the same period from 56% to 70% (p=0.001), and maturation shortened from 82.5 to 76 days (p=0.046) [14].

Michael Allon (2019) shares that immature AVF is between 30% to 60% of all creating and requires additional interventions, especially in distal localization [15].

CONCLUSION

Our data confirm the results, showing that there are objective reasons why proximal anastomoses are an increasingly common solution in clinical practice. After meticulously ' performing preoperative vascular mapping of the arm, the decision about the site of the upcoming anastomosis should be made without unnecessary emotions, based on the examination data. In addition to the vascular status, our decision should be guided by the expected functionality of the fistula - timely maturation, length and depth of the draining vein, predictable flow and good survival.

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