

Basilic Vein Transposition: A Good Vascular Route for Hemodialysis Patients

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Introduction: Hemodialysis is a necessary treatment for life in patients with chronic renal failure when peritoneal dialysis and renal transplantation can not be an option. In this study, the results of basilic vein transposition (BVT) procedures performed in our clinic for hemodialysis were retrospectively analyzed.

Materials and Methods: In our study, 21 patients who underwent BVT between January 2018 and November 2019 were evaluated retrospectively. Eight patients had previously undergone a brachio basilic fistula in another center, and one patient previously had a brachio basilic fistula in our center. Twelve patients underwent both brachio basilic fistula and BVT in the same session, while the other nine patients had only BVT, duration of dialysis, fistula maturation, follow-up, and follow-up complications.

Results: BVT was performed at both non-dominant arms and in the fistula arm if the patient had brachio basilic fistula before and in the other patients. Arteriovenous fistula (AVF) was created at a dominant arm if the non-dominant arm was non-suitable. Bleeding occurred in two patients that did not require surgery again. Two patients had superficial tissue infection resolved by antibiotherapy, and two patients underwent thrombectomy and provided patency at one patient.

Conclusion: Although BVT is not the first choice, it is a method that can be used safely if the radiocephalic and brachiocephalic fistulas do not work or if there is no suitable vessel in these regions.

Keywords: Basilic vein, transposition, hemodialysis, renal failure

Introduction

Hemodialysis is a necessary treatment for life in patients with chronic renal failure when peritoneal dialysis and renal transplantation can not be an option. Also hemodialysis is more preferred than peritoneal dialysis because of its lower complication rate and higher patient tolerance (1, 2). A good vascular access route

for hemodialysis is of vital importance. Transient and permanent catheters for hemodialysis, grafts and the patient's autogenous vessels are used (3). In the first approach, the patient's own autologous radiocephalic and brachiocephalic AVFs are recommended and AVF surgery was started for the first time in 1965. In recently advised second approach, the BVT application

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is recommended, and in 1976, it was performed for the first time (4-6).

In the present study, the results of patients undergoing BVT performed in a single center were reviewed retrospectively.

Materials and Methods

Patients who underwent BVT between January 2018 and November 2019 in a single center were evaluated. BVT operation can be planned as a one-stage or two-stage procedure. In our study, eight patients had previously undergone brachio basilic AVF created in another center and one patient in our center. Therefore, one stage BVT procedure was performed in these patients in two stages, and the other 12 patients in one stage.

All the patients had a history of radiocephalic and brachiocephalic AVF. All the patients underwent preoperative and postoperative Doppler ultrasound to examine preoperative basilic vein trace and brachial artery and were marked. All patients were operated with local anesthesia provided with 2% prilocaine hydrochloride following surgical site cleaning. Preoperative prophylaxis was given (1 gr cefazolin). Anastomoses were performed with 8/0 polypropylene with end to side technique. Skin incision was performed from brachio basilic vein anastomosis to the axillary vein. The muscle fascia was opened and all the basilic vein side branches were ligated and freed. The basilic vein was placed in a subcutaneous pocket, which would not allow any curl and constriction. One minivac drain was placed.

Patients were discharged after an average of 6 hours. In addition, all patients were called for control approximately 15 days after the procedure for AVF and wound control. Doppler ultrasound was performed in all patients and

AVFs were evaluated. The mean follow-up period was $12,1 \pm 5,3$ months.

Data Collection & Statistical Analysis

Viable clinical data were collected through retrospective statistics were conducted using SPSS version 24 (IBM Corp., NY, USA). Data were presented as mean $\pm$ standard deviation for continuous variables and as ratios or percentages for categorical variables

Results

Demographic data, concomitant diseases, and smoking showed (Table-1) and information about BVT procedure (Table-2). Twenty (57%) of the patients were male and 9 (43%) were female. The mean age was $64,4 \pm 10,5$ years, and the most common additional disease in our patients was current hypertension 13 (62%) and diabetes was found in 8 (%38) patients.

Table-1. Demographic data of the patients, concomitant diseases and smoking

Variables	N / mean	% / SD
Age(years)	64.4	10.5
Sex(M/F)	12/9	%57/%43
Diabetes mellitus	8	%38
Hipertension	13	%62
Heart disease	5	%24
Peripheral arterial disease	3	%14
Smoking	12	%57

SD: standard deviation, M:Male, F:Female

The mean duration of dialysis until BVT was $32,1 \pm 1,2$ months. The radiocephalic or brachiocephalic fistula created to patients at least one time; the mean number of fistulas opened was $2,61 \pm 1$. BVT on the non-dominant left arm in 16 (76%) patients and dominated right arm in 5 (24%) patients. All the patients with BVT underwent dialysis, and the mean duration of dialysis was 20 ± 4.2 days in two-stage fistulas, whereas the duration of fistula maturation was

35,3±15,2 days in both patients who underwent single-stage and BVT in the same session. The mean flow rate was 310±35,4 ml/min on venous doppler USG before dialysis. The mean follow-up period was 12,1±5,3 months. None of the patients were reoperated for surgical bleeding, but two patients (%10) were followed up for minimal bleeding. Two patients developed superficial tissue infection in the first 15 days and were treated with antibiotherapy.

In 2 patients (%10), fistula thrombosis occurred while the patient underwent dialysis from the AVF, and one patient (%5) was reoperated with early thrombectomy, while the other patient who intervened late his fistula occluded and did not use again for hemodialysis. No pseudo-aneurysm, hematoma, lymphorrhea were observed in our patients in 4 (19%), mild edema was seen in the extremity undergoing BVT.

Table-2. Information about BVT

Variables	N / mean	% / SD
One stage / Two stage	13/8	%62/%38
Dialysis before surgery (month)	32.1	21.2
Maturation time (day)	35.3	15.2
Site of surgery (right/left)	5/16	%24/%76
Previous AVF	2.61	1
AVF flow rate	310	35.4
Following time	12.1	5.3

Discussion

In the patients with hemodialysis, AVF with autologous and prosthetic grafts are used together with temporary and permanent catheters. The primary method of choice was the use of radiocephalic and brachiocephalic AVFs, which were easily accessible, capable of providing the necessary flow for hemodialysis and allowing frequent vascular access (7). BVT

is recommended secondary inpatient when these AVF failed (8). Although basilic vein is difficult to intervene because of its dept and fascia layer, it is possible to overcome these difficulties with BVT. Besides, because it is difficult to access this vein, it is more difficult to damage as it is not used in clinical tests and treatment and vein is naturally protected (9, 10).

Various factors such as diabetes, hypertension, heart disease, peripheral arterial disease, and smoking, adversely affect the duration of AVF exposure. In our study, the most common complication was thrombosis and both of the patients had hypertension, diabetes mellitus and still smoking. When AVF thrombosis develops, early diagnosis and treatment may enable AVF to be used again. In one patient, thrombosis developed and treated early; thus, the AVF continued to work. In one patient, late thrombosis could be intervened, and fistula occluded in the 4th month after the opening of AVF. The thrombosis rate was 10% and was found to be lower than in similar studies (11). Although BVT operations can be performed 2 ways (as one-stage or two-stage procedure), it is not clear which process is more successful (12). However, both methods can have their advantages. Since the fistula opening and BVT procedure are performed in the same session in one stage BVT procedure, fistula maturation is shorter when the first operation to the second operation is considered. In two-stage BVT, the release and transposition of the arterialized basilic vein are more accessible, and when the first created AVF is not performed, the patient does not have an additional long incision.

As it is not expected for two-stage basilic vein maturation, early dialysis attempt is presented after the second operation (13). Although many researchers have not found a significant

difference between the two interventions, some have reported that one stage BVT procedure has higher patency rate and faster maturation, and some have reported fewer complications and higher patency in a two-stage BVT procedure (14-17). Vascular localization of the upper extremities before and after surgery should be evaluated with Doppler ultrasound in order to determine all possible complications, follow-up of fistula maturation and flow (18).

Conclusion

We suggested that BVT could be performed with high success rate and less complications in cardiac patients who have radiocephalic and brachiocephalic AVF and have not been used for various reasons.

Conflict of Interests

The author has declared no conflict of interest for the present article.

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