

Case Report

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Reviving A Arteriovenous Fistula after Ligation, Using the Perforator System

Mihai Cucu^{1*}, Alexandra Andronache², Ema Maria Pantiru², Tiberiu Emilian Birca¹ and Victor Sebastian Costache²

¹Department of Vascular Surgery, Sanador Clinical Hospital, Bucharest, Romania

²Department of Cardiovascular Surgery, Sanador Clinical Hospital, Bucharest, Romania

ABSTRACT

The key to this case presentation is based on the particular anatomy of the patient. This 34-year-old CKD patient had a previous ulnar-basilic AVF in the left limb which was used for dialysis for a few months and was ligated shortly after the renal transplant, in the same year. The AVF was done in a one stage fashion with a short transposition segment as a personal preference of the previous surgeon. Also, the patient had an axillary level brachial artery bifurcation. This made possible reviving the old AVF circuit using the cubital fossa perforator, through the comitant radial vein, and into the basilic vein. The newly executed AVF was patent at 2 weeks when the patient came in for the whole basilic vein transposition.

There are not many cases in vascular access literature of old basilic vein AVFs revived through the deep venous system.

By using a short graft to construct a graftula that will supply the previous AVF, or using a long segment graft to create a forearm loop or a brachial to axillary AVF, the chances of graft to vein anastomosis stenosis and thus the need for another procedure. Using the patient's anatomy for creating/reviving a native AVF on the non-dominant upper arm, we can prolong the need for a graft AVF.

*Corresponding author

Mihai Cucu, Department of Vascular Surgery, Sanador Clinical Hospital, Bucharest, Romania.

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Introduction

Background Information

Chronic kidney disease (CKD) patient's venous system is very important and must be preserved by the medical staff as much as possible, either if the patient is in renal replacement therapy, the predialysis stage, or the patient will benefit from a renal transplant in the near future. A graft AVF has a limited time span, either if the graft is punctured or not. So, every possible alternative must be taken in consideration when creating an AVF, contributing to the patient's life PLAN. There are no guidelines on whether the vascular access of a kidney transplant patient must be ligated or not but that is usually not the case, especially if the patient's vascular access has no complications. When closing an AVF of a renal transplant patient you always must think where the next one can be created when the renal graft will become dysfunctional. Ultrasound is mandatory when evaluating a CKD patient before ligating a non-complicated AVF.

Case Presentation

A young 34 years old CKD patient presented to the hospital for vascular access. She was currently on dialysis on a right IJV inserted CVC which was working within normal parameters. She was clinically stable and had a body mass index below 18.

She had a previous renal transplant in 2012 which was functional for 7 years, then, due to graft dysfunction, returned to dialysis. Pretransplant, the patient had a right IJV CVC which was used for a short period of time as her first AVF matured. This AVF was presented at first as a brachial-basilic on the non-dominant arm. This was done in a one stage manner, with a short transposition of the basilic vein. After the renal transplant, this AVF was closed, not due to complications, but as a personal preference of the nephrologist. This was done through a small incision on the median side of the left arm, which made possible the ligation of the basilic vein. After the renal graft became dysfunctional, the patient was forced to start dialysis again, through a right IJV inserted CVC. Six years later she was referred to our hospital for vascular access creation.

Ultrasound Findings

On the surgeon's ultrasound evaluation of the patient we found that the patient had an axillary site bifurcation of the brachial artery on both her limbs. The right limb (dominant) had a cephalic vein below 1 mm in the forearm, non-existent on the arm, and a thick walled basilic vein of 2.5 mm. On the left limb (non-dominant), the cephalic vein was below 1 mm in the forearm, non-existent in the arm. The basilic vein in the left limb was ligated near the anastomosis of the previous AVF and was fibrotic and with no lumen in the third caudal segment of the arm. Cranial to this site, the basilic vein had a diameter greater than 4 mm and had a normal

axillary vein drainage. After the ligation of the basilic vein, this remained permeable due to the radial comitant vein which drained in the basilic vein in the middle third of the arm. The perforator vein in the cubital fossa had a diameter of 3 mm.

Management , Follow up and Outcome

Under local anesthesia, through a longitudinal incision in the cubital fossa, we exposed the radial artery, the perforator and the comitant radial vein. After clamping, a longitudinal arteriotomy was done and we did the anastomosis between the radial artery and the perforator vein with a 7.0 Prolene continuous suture. Thrill was immediately palpable after declamping. As a personal preference, we usually do the basilic vein transposition at 2 weeks after the initial AVF creation. We proceeded the same way and at 2 weeks we did the basilic vein transposition. Intraoperative findings included: a 4-5 mm dilated radial vein with arterialised flow which drained into the basilic vein. The latter, after dissection, had a diameter greater than 8 mm even caudal to the radial comitant vein. The creation of this AVF needed no reanastomosis in the radial artery due the fact that the radial artery was parallel to the draining radial vein and no kinking of the venous segment appeared. Due to diameter miss-match and the possibility of creating a very probable stenosis site, we did not implant the radial vein into the distal segment of the basilic vein. Furthermore we considered that this would provide a bigger cannulation segment in the future.

Discussion

Other possible AVFs for this patient might have been: reimplantation of the comitant radial vein into the distal part of the basilic vein; a grafta type construction with a short straight graft interposed between the radial artery and the distal segment of the basilic vein; a loop tunneled graft between the ulnar artery and the distal basilic vein. All of these probably would have led to a venous to venous/graft stenosis; even abandoning the previous AVF with an ulnar to axillary loop tunneled graft would have had the same probable outcome [1]. There is no general consensus whether AVFs should or should not be ligated after kidney transplant, if there are no complications. Usually, the nephrologist monitors the vascular access and refers the patient to the surgeon if complications arise [2]. According to the United States Data System only 4.6% of kidney transplant patients have their VA ligated, due to lack of guidelines in this matter [3]. Upper arm site have a higher blood flow and usually require ligation, as opposed to the distal forearm AVFs, due to high steal syndrome risk [4]. Higher blood flow leads to more intimal hyperplasia and stenosis probability in the swing segment. High blood flow and stenosis leads to aneurismal formation and local complications - thrombosis, infection and or rupture that require immediate attention and surgical revision. Also, high blood flow AVFs can lead to high output heart failure witch can alter the patient in the post-transplant setting [5]. Uncomplicated AVFs usually are not ligated with the lack of guidelines in this matter but one must always keep in mind the patient's QDOKI Life PLAN. Studies show that by keeping the AVF after transplant, it will not affect the renal graft [2]. A young patient with no clear signs of access complications, with little native variants of AVFs should be carefully evaluated in decision making of access closure.

Summary

In conclusion, care must be taken when ligating a renal transplant patient's vascular access, with no actual guidelines on the remaining vascular access of these patients. Infection, hemorrhage, steal syndrome are clear signs of a complicated access, otherwise with no indication on ligation. Ultrasound evaluation executed by the surgeon prior to access creation is a non-invasive and accessible

tool, mandatory for patient correct evaluation and decision making. Using the deep venous system to regain patency of a previously ligated AVF is a distinct modality of prolonging the need for a graft and should be taken in consideration.

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Ethics/ Informed Consent Statement: Following comprehensive information on the nature of the procedure the patient agreed upon to proceed and gave a well-informed written consent.

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