Brachiocephalic A-V fistula through the median cubital vein; A reliable option to failure of forearm fistulas. A case report from CHU Yaoundé

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A B S T R A C T

INTRODUCTION: Renal replacement therapy in end-stage kidney disease relies on dialysis in low-income countries. This maintenance treatment needs a reliable vascular access and is done through central venous catheter or creation of A-V fistulas. Several types of A-V fistulas can be done but due to some individual conditions, those possibilities may be exhausted rapidly.

CASE PRESENTATION: A 31 year old female was diagnosed with an end stage renal disease for which she was prescribed maintenance dialysis. She first denied her condition and went to traditional healer. After some months her medical state worsened and she was dialyse with catheter and refer to us for A-V fistula construction. The first two attempts on the forearm failed and we found small radial artery both proximally and distally on the left forearm. We finally did a left brachiocephalic fistula with initial retrograde flow on the median cubital vein.

DISCUSSION: Despite arm base fistula may be theoretically easy to build because of bigger size vessels, brachiobasilic fistula may be less effective due to difficult venipuncture. Brachiocephalic fistula through median cubital vein may be more effective option with no further procedure needed.

CONCLUSION: Brachiocephalic fistula should be considered as option in vascular access especially when a reliable option is needed after previous attempt failure.

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1. Introduction

Vascular access for permanent hemodialysis is a key issue in treating a patient with chronic renal failure [1–3]. It needed an artery of good size without wall damage from underlying disease as atherosclerosis, calcification and a patent superficial venous network that has not been spoiled by a repetitive venous puncture [4]. For each individual patient, the condition is variable and it is mandatory to clinically evaluate the possibilities to choose the most suitable for timely maturation. On the other side several surgical sites of native A-V fistula has been developed in the surgical literature as well as several tips to improve the effectiveness of fistulas as elevation, superficialization and retrograde flow [5,6]. Superficialisation and retrograde flow have been use for Brachiobasilic fistulas because of the difficulties of puncture while the vein is deep-seated.

For the brachiocephalic fistulas, the retrograde flow goes through a median cubital vein at the Elbow to reach the cephalic vein that is more easily accessible at the arm level. For some cases when the cephalic vein is already damaged, blood may return through a consistent perforating vein to the deep system [7]. We report here a case of brachiobasilic fistula through a median cubital vein that was used for a patient with two anterior angioaccess failures on the same limb. This case report is in line with the SCARE criteria [8].

2. Case report

The patient in this case report aged 31 Year old was diagnosed with an end-stage renal disease due to hypertension for which she started hemodialysis in December 2016. She first denied the medical treatment as recommended and went to traditional healers. After sometimes her case worsens and she was transferred to Yaoundé General Hospital, where the dialysis was initiated as an emergency with a temporal catheter. She was addressed to us for a permanent vascular access in March 2017 (three months after

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3. Discussion

Vascular access for maintenance hemodialysis has been a significant advance in the management of end-stage chronic renal failure [3,10,11]. The first such access was realized since 1966 by Brescia and Cimino who did a radio-cephalic A-V fistula at the distal forearm for maintenance dialysis. Several types of A-V shunt has been described since that time and it is agreed that hierarchically it remains the “workhorse” for the creation of A-V shunt [11–13]. Many factors nevertheless influence the choice of a type of vascular access among which the patency of the venous network, the quality of the pulse feel on that site or through Doppler assessment, the age of the patient with a general principle to avoid distal fistulas in children due to small size vessels. Some vascular differences may be congenital such as high division of the brachial artery with a small radial artery at the wrist that incidence is reported to be as high as 15–20% [7]. Our patient had a small distal radial artery (DRA) that to our opinion was the reason for failure in the previous two attempts but we could not do angiography of the upper limb. We could have done another trial on the distal right forearm but we believe since the anatomy could be the same it wouldn’t have been more successful. The A–V fistula with the retrograde flow is known and use in angioacess for dialysis but with outflow based on perforating veins in the antecubital fossa [13]. In this case, the flow was directed to the cephalic arm vein by ligating the perforating vein at the elbow and the forearm cephalic vein. The dilatation of the vein that we usually do by injection of the saline mix with hep-
arin (100 UI for 10 ml of 0.9% saline) is useful for venous dilatation and possibly valves destruction that favor early maturation. This procedure seems the best to take advantage of the cephalic vein patency at the arm level where it is seldom punctured for IV line or blood sample. Vascular mapping with ultrasound in such cases may be helpful to locate the vessels and to confirm the patency before undertaking the surgery. The main difficulty of this fistula is to be certain of the cephalic vein patency before undertaking the procedure since it is sometimes difficult in obese patients and if the blood outflow from the dialysis machine was anteriorly done on that vein segment. There is also need to have an approach that can allow the fistula creation and the ligation of the perforating vein and forearm cephalic vein. In this case, we did two separate incisions (Fig. 3) but it can also be done through a single incision but with the risk of scarring at the elbow fossa and some functional limitation. Despite all the precautions taken to choose the site of the fistula and to make the anastomosis, several complications may occur among which the most annoying is clotting of the fistula and concomitant failure [14–16]. With the time going many tips and tricks have been developed to overcome those complications as close monitoring both clinically and with ultrasound, fistula dilatation, early revision [17,18]. Each measure needs to be done in the clinical context of patient and may sometimes be unrealistic. It is therefore essential to choose at the onset a type of fistula that will prevent the patient to go through uncertainty [19,20].

4. Conclusion

Secondary vascular access remains a challenging situation for the surgeon specifically when the conditions of the past failures are not evident. Patients are frightened by the past failure experience and the physician is getting short of vascular sites possibilities. Use of a reliable site for fistula construction becomes an important clue in recreating motivation of the patient and improves compliance with treatment. A brachiocephalic fistula is a very proof effective one because of an artery of very good size and a vein of good caliper and patency. The surgeon must overcome the difficulties of surgery mainly with a nontraumatic and meticulous technique of dissection, anastomosis and limitation of secondary outflow through common and uncommon tributaries of the median cubital vein.

Conflict of interest

The authors declare no conflict of interest.

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Ethical approval

This study was approved by the scientific research committee in the CHU of Yaoundé.

Consent

The patient gave her consent to the scientific use of her case and the figures herein.

Author contribution

Guifo ML, Teuwafeu DG, Bwelle MG, Bang G A contribute in the collection of the data and the manuscript writing. Chichom MA, Ndoumbé A, Essomba AG critically revise the manuscript.

Registration of research studies

Not applicable.

Guarantor

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Fig. 3. The brachiocephalic fistula after wound healing and beginning of venipuncture.
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