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CASE REPORT

Banding for Hyperflow of Native Arterivenous Fistula: A Case Report in Andre Festoc Center in Bamako

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Abstract

Introduction: The native arteriovenous fistula (AVF) for hemodialysis is the surgical anastomosis between a neighboring artery and vein in order to have sufficient blood flow for hemodialysis [5] .These vascular approaches can have complications such as hemorrhage, thrombosis, infection, stenosis, aneurysm, high flow and distal limb ischemia [6] . Arteriovenous fistula hyperflow for haemodialysis is defined as a fistula flow rate in excess of 1.5 liters per minute [1-2].

Observation: This is a 47-year-old patient, followed for 07 years for progressive hepatitis B, diagnosed with CKD since 2020. She benefited from a humerobasilic AVF (with which she was dialyzed for 03 years) and was referred to us for management of hyperflow on the AVF. The patient presented with bleeding at the AVF puncture sites after each session, with hemostasis becoming increasingly difficult through compression. This prompted a Doppler ultrasound, which revealed a hyperflowing AVF (flow rate 2840ml/min). The left humeral AVF showed a significant flutter and a high-intensity thrill. Doppler ultrasonography of the AVF revealed hyperflow of the proximal AVF at 2340ml/min over the brachial artery. The basilic vein was patent, with a diameter of 9.6mm and a depth of 2.9mm. No stenosis or aneurysm on the AVF. The patient was offered two treatment options: banding of the AVF or ligation of the AVF combined with fabrication of a new AVF on the contralateral upper limb. Banding was therefore carried out. The outcome was favorable, with AVF flow reduced to a quarter of the initial rate.

Keywords: Banding, Arteriovenous Fistula, Hyperflow, Festoc Center, Bamako.

1. Introduction

Chronic kidney disease (CKD) remains a major public health problem worldwide due to its medical and socio-economic repercussions [4].The native arteriovenous fistula (AVF) for hemodialysis is the surgical anastomosis between a nearby artery and vein with the aim of achieving sufficient blood flow for hemodialysis [5]. These vascular approaches can have complications such as hemorrhage, thrombosis, infection, stenosis, aneurysm, high flow and distal limb ischemia [6]. These can be life-threatening in the short to medium term [7]. Hyperflow of arteriovenous

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fistula for hemodialysis is defined as a flow rate at the fistula of more than 1.5 liters per minute [1-2]. It is often the cause not only of complications downstream of the anastomosis, such as ischemic complications of varying severity, but also of central complications, such as heart failure.

2. Observation

This is a 47-year-old patient, followed and treated for 07 years for progressive hepatitis B, diagnosed as CKD since 2020 and dialyzed twice a week. She benefited from a humerobasilic AVF (with which she was dialyzed for 03 years) and was referred to us by the Nephrology Department for management of an AVF hyperflow. The history of her illness dates back to early 2020, with the rapidly progressive onset of edema of the lower limbs, followed by a state of anasarca. This prompted a consultation at the Nephrology Department of CHUME 'Le Luxembourg', where investigations concluded that he had CKD. A left humerobasilic AVF was then made, and she received dialysis twice a week. The patient presented with bleeding at the AVF puncture sites after each session, and hemostasis became increasingly difficult with compression. This prompted a Doppler ultrasound scan, which revealed a hyperflowing AVF (flow rate 2840ml/min).

The patient was then referred to the vascular surgery department for further management. On admission, the patient's general condition was good, BP 130/70 mmHg, SpO2 94%, conjunctivae lightly stained. There was a prominent beat over the left humeral AVF and a high-intensity thrill. Cardiac and pulmonary examinations were unremarkable.

Doppler ultrasonography of the AVF revealed hyperflow of the proximal AVF at 2340ml/min on the brachial artery. The basilic vein was patent, with a diameter of 9.6mm and a depth of 2.9mm. No stenosis or aneurysm on the AVF.

The patient was offered two treatment options: banding of the AVF or ligation of the AVF with simultaneous creation of a new AVF on the contralateral upper limb. The patient chose the second option. Progress was favourable, with a one-quarter reduction in AVF flow.

Early intra-operatively, the murmur and thrill on the AVF were present with diminished intensity.

A follow-up Doppler ultrasound performed two days later reported proximal AVF flow at 585ml/min. Drainage vein caliber was 12.4mm and depth 1.2mm. There was no stenosis or aneurysm.

Figure 1. *(upper operative view) : Banding on the cephalic vein*

Figure 2. *(anterior operative view): vein cerclage*

3. Discussion

The definition of hyperflow can be absolute if it takes into account fistula-level flow, or relative if fistula-level flow is related to cardiac output [1-2]. The commonly accepted absolute and relative values for hemodialysis fistula AVF hyperflow are 1.5 liters per minute or 20% of cardiac output, respectively [1-2].

This is a relatively frequent complication occurring at a distance from the creation of the vascular approach and whose treatment, when the approach has been radial artery, is relatively straightforward, with ligation of the upstream arterial segment arterial segment, with the fistula then supplied solely by the downstream segment via the palmar arch.

The problem is more complex when the approach is via the humeral artery. Ideally, the vascular approach should be completely repaired,attempts to reduce flow by «ban ding» usually result in failure, or evenfailure, or even thrombosis [8-9].

During AVF hyperflow, the increase in flow is conditioned by the donor artery and its ability to dilate.donor artery and its capacity to dilate, but also by the age of the access. This is a serious but rare complication of AVFs, occurring in 1% to 8% of patients with severe clinical signs. Arteriovenous bypasses, which rapidly develop stenosis of the venous anastomosis, are less prone to hyperflow.

In the series by Jiber [3] et al, it accounts for just 3.22% of AVF complications, far behind early thrombosis (19.35%), late thrombosis (25.80%), stenosis (12.90%), aneurysm (12.90%) and infection (9.67%) (5).

Various correction methods have been described, the common denominator of which is flow reduction [15]. In general, a high-flow AVF should be removed if a more distal, lower-flow AVF can be created [11].

The advantage of anastomotic recalibration is that it requires little repair and does not consume venous or arterial capital. This treatment consists of isolating the anastomosis by clamping all its branches. The anastomosis is then repaired by reducing its long axis to around 4 mm for brachial fistulas (6 mm for radial fistulas) [14].

Hyperflow should be reduced if it is poorly tolerated from a cardiac point of view, or if distal ischemia occurs as a result of vascular steal [10].

Numerous techniques of varying complexity have been proposed for flow reduction [10]. The DRIL technique is used exclusively for the treatment of flight syndrome, while the whereas the surgical Banding technique can be used to treat flight syndrome and heart failure caused by hyperflow [10].

In the case of high flow on a distal fistula, ligation of the proximal artery, leaving only the distal artery to feed against the flow, reduces flow by half.

In the case of high flow in a proximal fistula, the RUDI technique is used, i.e. ligation of the origin of the drainage vein at the elbow, followed by re-feeding of the vein via a prosthetic bypass connected at the wrist to a small-calibre artery [11-12-13].

4. Conclusion

AVF hyperflow for hemodialysis is a rare complication, but may be encountered in our setting. Its diagnosis, based on flow measurement at the vascular access point (absolute hyperflow), or on the ratio between cardiac output and vascular access flow (relative hyperflow), remains widely accessible.

5. References

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