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CASE REPORT

Ulnar-basilic arteriovenous fistula with multilocular gigantic aneurysmal dilatation: a case report

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Introduction: Arteriovenous fistula dysfunction has been associated with a range of problems such as thrombosis, stenosis, dilatation, and infection. **Case presentation**: We present the case of a 64-year-old patient with chronic kidney disease on hemodialysis and with aneurysmal dilatation of the ulnar-basilic arteriovenous fistula, having an increased risk of rupture. A temporary dialysis catheter is placed in the left femoral vein, an aneurysmal basilic vein is ligated at the anastomosis, aneurysmal dilatation is emptied by compression, and a right radiocephalic arteriovenous fistula is performed. The patient undergoes hemodialysis on the second day and subsequently three times a week for six weeks until the new arteriovenous fistula develops. He returns for aneurysmal sac resection. **Conclusion**: The purpose of this paper is the presentation and management of a 15-year-old ulnar-basilic arteriovenous fistula with multilocular aneurysmal development and an imminent rupture.

Keywords: aneurysm, arteriovenous fistula, hemodialysis, vascular access, chronic kidney disease

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Introduction

Arteriovenous fistula (AVF) dysfunction has been linked to a number of problems. The most common complications are steal syndrome, aneurysmal dilatation, stenosis, thrombosis, and infections [1]. The prevalence of aneurysm development ranges between 5% and 7%, and it might be true, presenting all segments of the vascular wall, or it might be false(a pseudoaneurysm), with lined fibrous tissue and thrombosis [2]. Rapid surgical revision seems to be an appropriate and repeatable treatment strategy for regaining dialysis access and reliably maintaining AVF performance [3].

The ideal vascular access for patients with hemodialysis should offer the possibility of puncture with two needles, a flow rate of at least 300 ml/min, and minimal risk of complications. An autogenous arteriovenous fistula is the most favourable pathway for hemodialysis in patients with chronic stage V kidney disease, with the lowest rate of complications and the longest patency [4]. Currently, dysfunctions of arteriovenous fistulas play an important role in the mortality of dialysis patients, therefore all vascular access paths must be exploited. Thus, the first site of performing an AVF is at the level of the upper limbs, then at the level of the lower limbs. The material used is primarily autogenous and in the second-place prosthetic. Only in the last instance, when all the other means and materials have failed, the use of a permanent dialysis catheter becomes mandatory [5].

Case presentation

We present the case of a 64-year-old patient, chronic smoker, hypertensive, with type II diabetes, chronic kidney disease stage V on hemodialysis, with a complicated ulnar-basilic AVF, created 15-years prior. At the time of the clinical examination, the presence of a giant aneurysmal sac with an increased risk of rupture in the proximal third of the left forearm, medial aspect, of 5.20/7.15 cm (anteroposterior/latero-lateral) and the presence of numerous aneurysmal dilatations along the trajectory of the left basilic vein could be inspected and palpated. (Figure 1).

The ultrasound examination revealed aneurysmal dilatations with parietal thrombosis and increased velocities in the ulnar-basilic AVF and cephalic vein thrombosis along the entire course, without the possibility of performing a brachio-cephalic AVF.

Due to the imminent risk of rupture, we decided to hospitalize the patient in the Vascular Surgery Clinic, where a temporary dialysis catheterisation of the left femoral vein was established and at the same time, under local anesthesia, the ligation of the aneurysmal basilic vein was performed near the anastomosis. Also, the aneurysmal dilatations were emptied by compression and compressive bandage, and a right radiocephalic AVF was performed (Figure 2).

Fig. 1. Ulnar-basilic fistula with multilocular aneurysmal dilatation.

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Fig. 2. Intraoperative photo: ligature of ulnar-basilic AVF, right after the anastomosis between the ulnar artery and the basilic vein.

On the 2nd day post-intervention, the patient underwent a hemodialysis session through the temporary venous catheter and was discharged in good general condition, with the characteristic thrill absent at the level of ulnar-basilic AVF and the arteriovenous communication thrill present at the level of the right radio-cephalic AVF. The patient underwent hemodialysis sessions 3 times a week, for 6 weeks, until the new AVF matured. Subsequently, dialysis will be performed using the right radiocephalic AVF.

In evolution, the patient returned for resection of the aneurysmal sac. A longitudinal incision at the level of the basilic vein was performed under general anesthesia, with an additional ligation proximal and distal to the aneurysmal sac. We isolated and opened the aneurysm, removing the intra-aneurysmal thrombus, then partially resected the aneurysmal sac, and lastly sutured the remaining portion. We performed rigorous hemostasis and ligated the collaterals of the basilic vein (Figure 3).

Postoperatively, the patient exhibited a minimal hematoma at the level of the postoperative wound, without signs of ischemia or local hemorrhage, without nerve damage. He was monitored, with good postoperative evolution, and discharged on the 4th-day, hematoma-free.

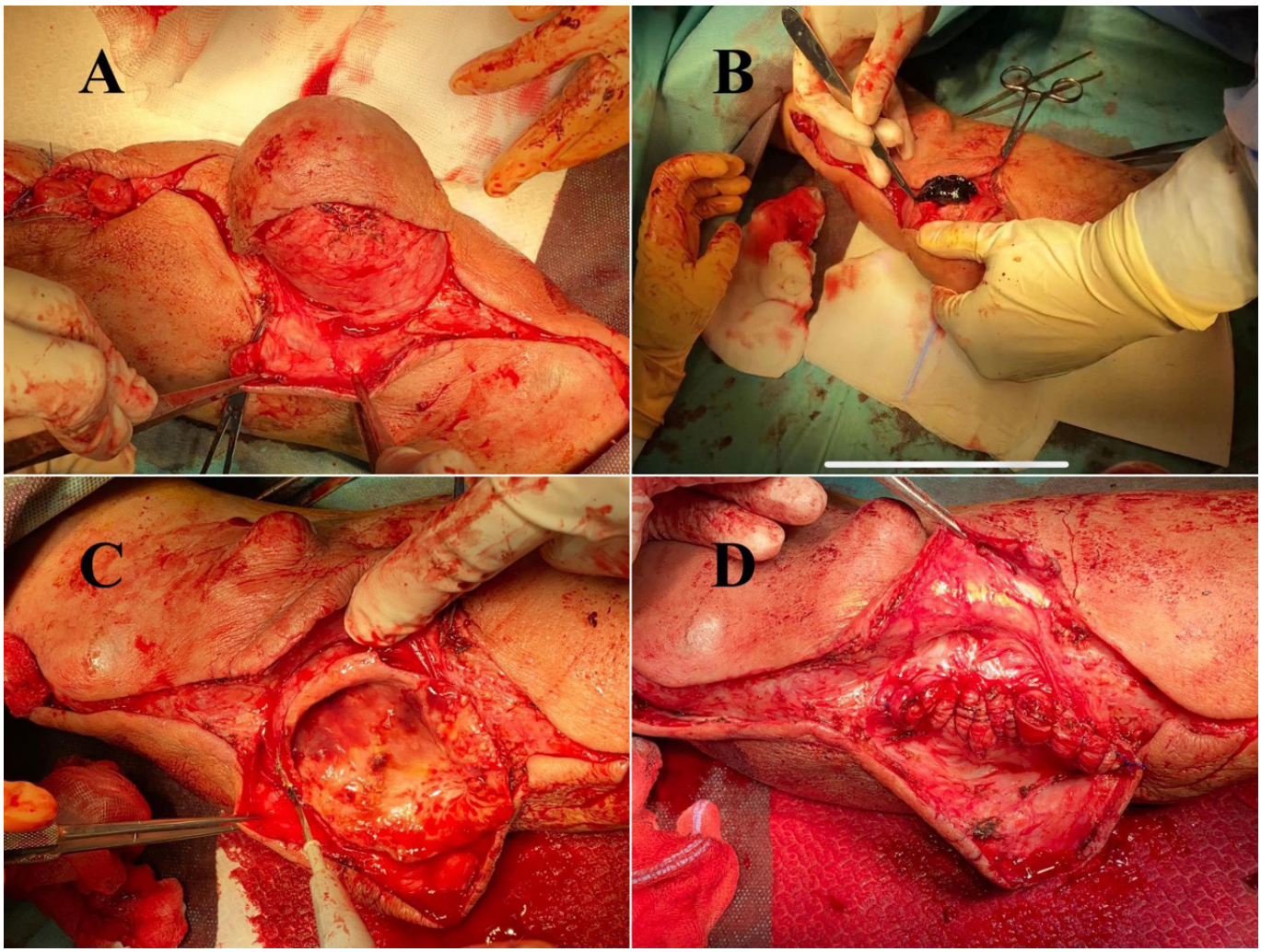

Fig. 3. Intraoperative pictures: preparation of the aneurysmal sac (A), incision and evacuation of the thrombotic material from the aneurysm (B), the remaining portion after excision of the aneurysm (C) and the final appearance after suturing the remaining portion (D).

Discussion

The Kidney Disease Outcomes Quality Initiative (K-DOQI) recommendations have underlined the significance of an autogenous AVF for hemodialysis access. It is important to keep an autogenous AVF viable since they are less likely to be infected and thrombosed than synthetic grafts, but they come with their own share of risks. One of the problems that can occur is the development of a venous aneurysm (VA), which has a 0%-6% incidence rate. Severe aneurysmal AVF can be treated with closure or excision by prosthetic interposition. Inflammation, skin necrosis, hemorrhage, rupture, thrombus formation, and poor circulation leading to insufficient dialysis are among the other complications of autogenous AVF [6].

One research included a total of 14 hemodialysis patients with complex VAs, who had partial aneurysmectomy. Before surgery, a color Doppler ultrasonography was performed on all patients to estimate aneurysm diameter, identify, and detect stenosis and thrombosis, and evaluate the flow via the AVF. Nine of all these individuals had AVF in the upper arm (brachio-basilic and brachio-cephalic transposition). The surgical procedures were effective in all participants, without any complications. The chosen surgical repair was the partial resection of the VA, done by inserting a silicone catheter in the fistula and eccentrically excising a portion of the wall, then suturing it and saving the functionality of the fistula. This was not our case, the large diameter and the imminence of rupture forced us to be more radical and ligate the basilic vein at first presentation. In our case, an important part of the decision consisted in clinically finding numerous dilatations along the basilic vein, which rendered the effort of saving it as an outflow vein futile. During the 6-48-month follow-up period of the 14 patients with the partially resected VAs, the AVFs continued to be patent, with no recurrent aneurysms [7].

In a case series, on a duplex ultrasound examination, 23 patients were discovered to have upper extremity aneurysms of the outflow vein. The size of the aneurysms in these patients was 3.3 cm. Only four individuals were asymptomatic while 19 were symptomatic. The aneurysm was also repaired and the fistulas were saved [2].

Other existing studies have argued that repairs of complex VAs offer better outcomes in the lower arm when compared with the ones performed in the upper arm. Radiocephalic anastomosis revision, for example, has the best results in terms of patency than any AVF revision documented in the literature [8]. Furthermore, radiocephalic fistulas with complex real or false aneurysms can be reconstructed using a short polytetrafluoroethylene (PTFE) graft (6 cm) interposition.

A significant number of papers reported another surgical solution, specially designed to avoid the need for a synthetic graft interposition. This type of VA excision is a longitudinally partial one, dubbed ReduxAn by its performers (reduction aneurysmoplasty). The limits of the procedure also include large and/or multiple VAs [9–14]

Complex and large VAs, as in our case, are sometimes beyond revision and the damages done by having to undergo a ligation during massive bleeding, as a result of rupture, have to be put in balance when making a therapeutical decision.

Conclusion

Early detection and monitoring of arteriovenous fistula complications lead to a high rate of surgical success and preservation of vascular access for hemodialysis. Late presentation of complex VAs leads to the impossibility of rescuing the outflow vein.

Authors' contribution

EMA: conceptualization, data curation, formal analysis, investigation, methodology, project administration, supervision, validation, visualization, writing - original draft; RK: data curation, formal analysis, investigation, methodology, project administration, supervision, validation; AVM: investigation, methodology, project administration, super-vision, validation; ER: conceptualization, investigation, methodology, validation; EMA: supervision, visualization, writing - review and editing.

Conflict of interest

None to declare.

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