International Journal of Research and Review
www.ijrrjournal.com E-ISSN: 2349-9788; P-ISSN: 2454-2237

Case Report

Hemodialysis Access Associated Pseudoaneurysms Closure by Amplatzer Vascular Plug II and Stent-Graft

Ramesh Patel[1], Rohit Goel[2]

[1,2]Department of Cardiology, Geetanjali Medical College & Hospitals, Udaipur, Rajasthan-313002, India

Corresponding Author: Ramesh Patel

ABSTRACT

Pseudoaneurysm is a well-known vascular access complication of angiography and percutaneous intervention. Traditionally, thrombin injection is a well-accepted technique in treating pseudoaneurysms but possess significant risk of distal lower extremity thrombosis leading to severe consequences. Various case reports reported the novel approach for closing these pseudoaneurysms. We describe a case of successful treatment of pseudoaneurysms by using a stent-graft and Amplatzer vascular plug vascular closure device.

Keywords: Pseudoaneurysm; thrombosis; vascular occlusion device

INTRODUCTION

A pseudoaneurysm is an arterial wall deficiency, which leads to accumulation of oxygenated blood in the nearby extra-luminal region forming a sac surrounded by soft tissue and compressed thrombus. [1] Consequently, a pseudoaneurysm is formed as a result of fibrin wall formation nearby the swelling with actual disruption of three-layers of the arterial wall rather than with the expansion of all wall layers. [2] Pseudoaneurysm is a relatively rare complication of autogenous vascular access in patients on hemodialysis and usually arises from repeated needle puncture. [3] Pseudoaneurysm incidence is estimated to be 2% to 10% of dialysis access grafts. [4] Traditional treatment of pseudoaneurysms requires surgical repair and subsequent insertion of new graft material. By treating the pseudoaneurysm with an endovascular stent-graft, patients can avoid invasive surgery and prolong the life of their existing graft. [5] We have reported a case in which hemodialysis access related two pseudoaneurysms at two different access sites were treated percutaneously by Amplatzer vascular plug II (AVP II) and with a stent-graft.

CASE REPORT

A 67-year-old male patient presented with pulsatile swelling in both right groin and right elbow which were rapidly enlarging. He had been undergoing hemodialysis twice a week due to end-stage renal disease. The fistula was not yet constructed. Color Doppler examination revealed pseudoaneurysms at both access sites. A computed tomography scan (CT-scan) showed a large thrombus filled pseudoaneurysm with a diameter of 122x96mm (Figure 1A) arising from a branch of profunda femoris and a 36x35mm (Figure 1B) pseudoaneurysm arising from the brachial artery. Due to financial constraints of the patient, a stent-graft was planned in the brachial artery and AVP II

was used in the branch of profunda femoris artery. The left artery was accessed by placing a 7F Balcon sheath through which a shuttle sheath was placed till right common femoral artery. A 6F JR guide was used to selectively hook branch of profunda femoris and with the help of 0.035Terumo wire, an AVP II 16mm was placed by using the standard technique (Figure 2A, 2B). Using the same access and removing the Balcon sheath, a 6F JR guide was used to hook right brachiocephalic artery and a 0.032 wire was passed through the brachial artery and Viabahn stent-graft of 5x25 mm was deployed across the site of origin of the pseudoaneurysm (Figure 3A, 3B). A check angiogram after 15 minutes showed no filling of pseudoaneurysm at both the sites and the patient was discharged in a stable condition.

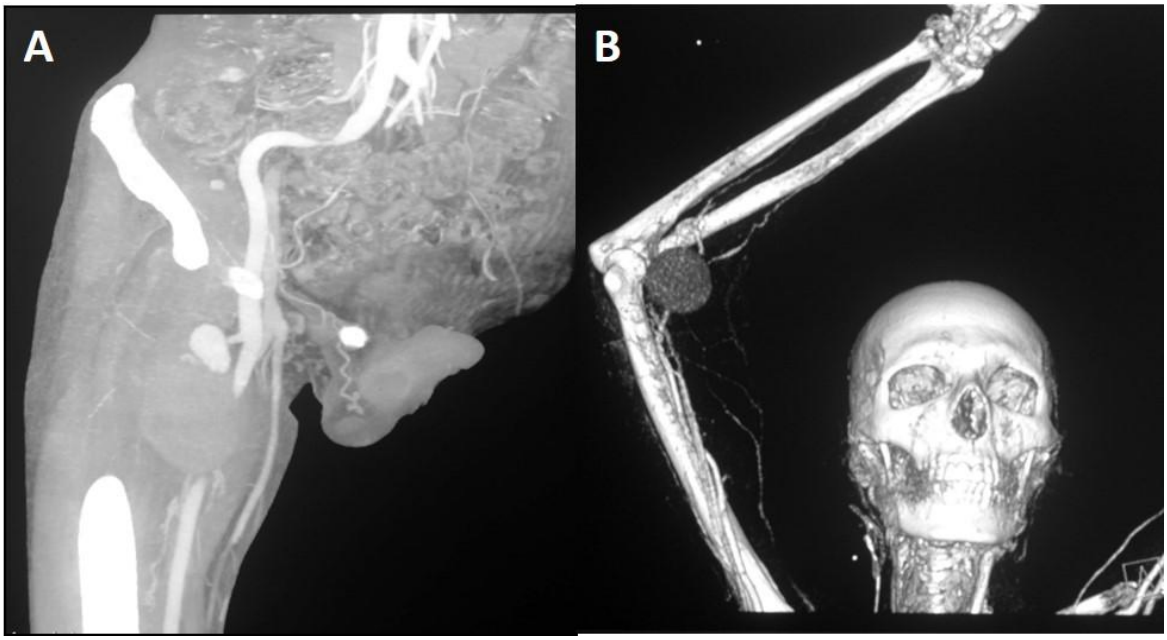

Figure 1: Computed tomography scan (CT-scan) showing: (A) pseudoaneurysm arising from the branch of profunda femoris artery; (B) pseudoaneurysm at elbow site.

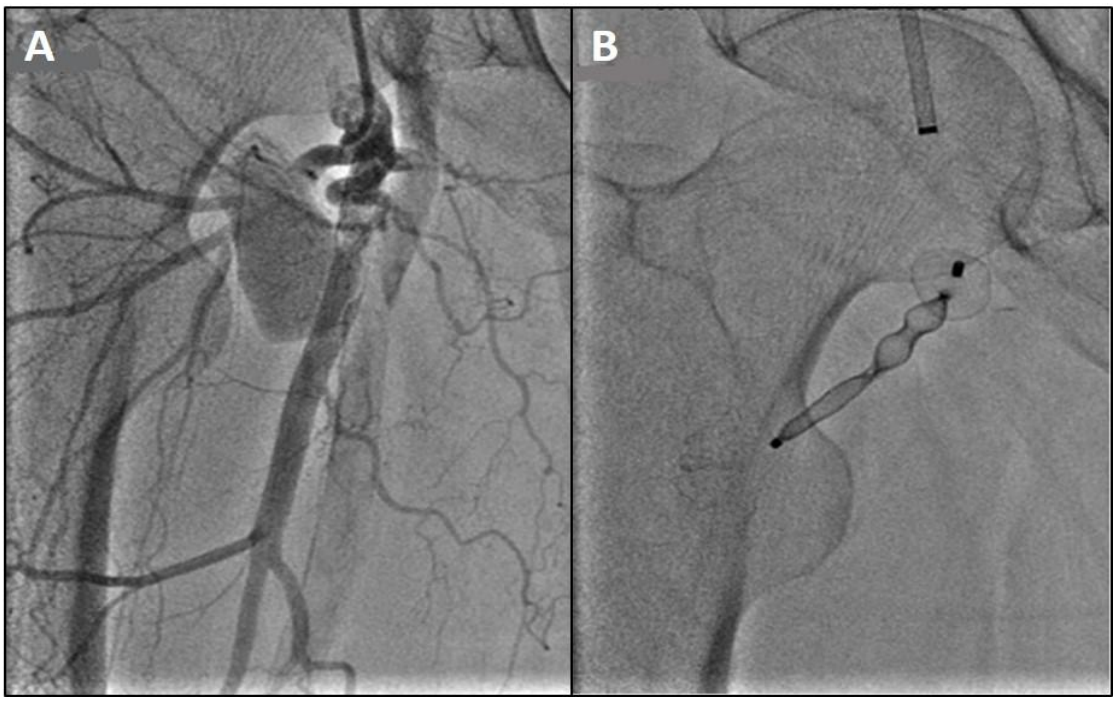

Figure 2: Angiogram showing: (A) pseudoaneurysm arising from the branch of profunda femoris artery; (B) after deployment of Amplatzer vascular plug II at profunda femoris artery.

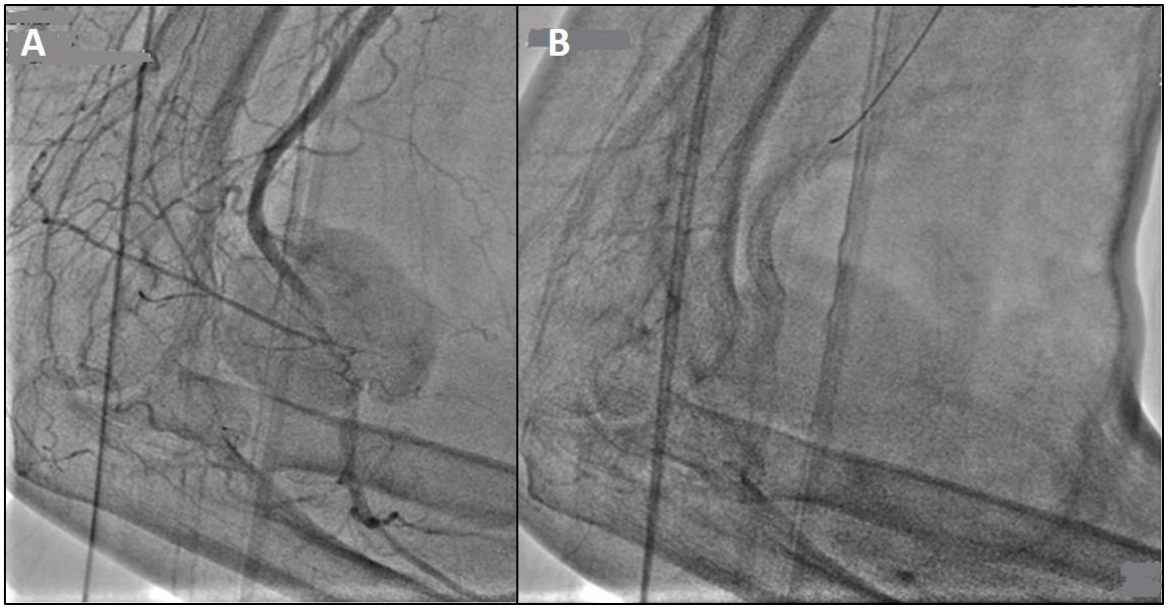

Figure 3: Angiogram showing: (A) pseudoaneurysm arising from the branch of the brachial artery; (B) after deployment of stent-graft at the brachial artery.

DISCUSSION

Hypothetically, patients requiring renal replacement therapy aspire to renal transplantation but at some point in their treatment, most patients with ESRF will require hemodialysis and up to 60% treated with hemodialysis at any one time. Pseudoaneurysms most commonly originate from needle punctures and repeated usage of large needles or poor and traumatic puncture techniques can cause the formation of pseudoaneurysms in the native vascular graft. [5] Thrombin injection is a widely accepted and effective technique of treating pseudoaneurysms. [6] Due to the risk of distal embolization of the thrombin and resultant thrombosis of the distal artery, wide-necked pseudoaneurysms in any arterial site are not suitable for percutaneous thrombin injection alone. [7] Hence, the size of the aneurysm, width of the neck, location and anatomic relationship to the adjacent epicardial and endocardial structures are important in deciding the type of percutaneous device.

A Dutch randomized trial reported an incidence of access-related pseudoaneurysms is 0.049 to 0.1 per patient in a year. [8] In this case, pseudoaneurysm was developed at sites of repeated trauma due to vascular access and enlarging pseudoaneurysm requires a traditional treatment. Neal R. Barshes et al. [9] concluded that endovascular repair with stent-grafts is safe and effective to treat arteriovenous fistula pseudoaneurysm and prosthetic graft pseudoaneurysm. The pseudoaneurysm exclusion was largely based on wallgraft and it is noteworthy that Viabahn endoprosthesis can be used in pseudoaneurysm removal. Due to some disadvantages of this device such as high cost, interference with surgical revision, and equivocal long-term patency rates have thus far limited its use. [10] Similarly, in this case, due to some financial limitations of the patient AVP II was used in the branch of profunda femoris artery. The AVP is an evidenced embolic device that can be an excellent alternative to coils or detachable balloons to embolize medium to large vessels with high flow. This device has suitable options for the treatment of pseudoaneurysms and has got faster occlusion, minimal migration, and recanalization. [11] Similar to this case, Prasanna Venkatesh Kumar et al. [12] have also reported a case of 14 mm AVP II deployed for the closure of ascending aortic

pseudoaneurysm. Although, AVP II is not a first-line choice for pseudoaneurysm closure when effective endoprosthesis is available. However, using other devices available such as the AVP has proven to be a safe and feasible alternative to sealing the pseudoaneurysm

CONCLUSION

Repeated hemodialysis access related pseudoaneurysms can be treated successfully by stent-graft and AVP II. The AVP can be a cheaper solution against stent-graft in selected patients and selected site. The size, diameter of pseudoaneurysm and relative anatomy are important in planning percutaneous approaches. It is also important for the endovascular specialist to identify the right cohort of patients to treat using this novel technique and to consider all technological equipment available when technical difficulties are encountered.

REFERENCES

1. Saad NE, Saad WE, Davies MG, et al. Pseudoaneurysms and the role of minimally invasive techniques in their management. Radiographics. 2005;25(suppl_1):S173-S89.
2. Zierler RE, Zierler BK, editors. Duplex sonography of lower extremity arteries. Seminars in Ultrasound, CT and MRI; 1997: Elsevier.
3. Pandolfe LR, Malamis AP, Pierce K, et al., editors. Treatment of hemodialysis graft pseudoaneurysms with stent grafts: institutional experience and review of the literature. Seminars in interventional radiology; 2009: © Thieme Medical Publishers.
4. Maleki MH, Noori E, Adhami A, et al. Complication of hemodialysis access (pseudoaneurysm): a case report. Acta Medica Iranica. 2014:173-4.
5. Zibari GB, Rohr M, Landreneau M, et al. Complications from permanent hemodialysis vascular access. Surgery. 1988; 104(4):681-6.
6. Loh EJ, Allen R. Endovascular treatment of refractory iatrogenic femoral artery pseudoaneurysm using Amplatzer vascular plugs following unsuccessful retrograde Angio-Seal deployment. The Indian journal of radiology & imaging. 2019;29(2):211.
7. Keeling AN, Naughton PA, McGrath FP, et al., editors. Successful endovascular treatment of a hemodialysis graft pseudoaneurysm by covered stent and direct percutaneous thrombin injection. Seminars in dialysis; 2008: Wiley Online Library.
8. Keuter XH, De Smet AA, Kessels AG, et al. A randomized multicenter study of the outcome of brachial-basilic arteriovenous fistula and prosthetic brachial-antecubital forearm loop as vascular access for hemodialysis. Journal of vascular surgery. 2008;47(2):395-401.
9. Barshes NR, Annambhotla S, Bechara C, et al. Endovascular repair of hemodialysis graft-related pseudoaneurysm: an alternative treatment strategy in salvaging failing dialysis access. Vascular and endovascular Surgery. 2008;42(3):228-34.
10. Vesely TM, editor. Role of stents and stent grafts in management of hemodialysis access complications. Seminars in vascular surgery; 2007: Elsevier.
11. Wang W, Li H, Tam MD, et al. The amplatzer vascular plug: a review of the device and its clinical applications. Cardiovascular and interventional radiology. 2012;35(4):725-40.
12. Kumar PV, Alli O, Bjarnason H, et al. Percutaneous therapeutic approaches to closure of cardiac pseudoaneurysms. Catheterization and Cardiovascular Interventions. 2012;80(4):687-99.

How to cite this article: Patel R, Goel R. Hemodialysis access associated pseudoaneurysms closure by Amplatzer vascular plug II and stent-graft. International Journal of Research and Review. 2019; 6(11):606-609.

******