Radiology Case Reports 18 (2023) 3549–3552

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.elsevier.com/locate/radcr

Case Report

Selective thrombolysis trans-catheter for safe and effective subacute stent graft occlusion treatment ☆

Hung Nguyen Duc, MD, Lam Truong Hoai, MD, Long Nguyen Tuan, MD, Minh Tran Duc, MD, Linh Duong Cong, MD*

Tam Anh General Hospital, Hanoi, Vietnam

ARTICLE INFO

Article history:
Received 11 May 2023
Revised 9 July 2023
Accepted 17 July 2023

Keywords:
Endovascular aneurysm repair
Stent graft occlusion
Catheter-direct-thrombolysis

ABSTRACT

A 74-year-old man developed a subacute thrombosis with a stent graft occlusion, 4 months after an endovascular aneurysm repair. He presented with lateral lower limb ischemia and presented intermittent claudication. Using an intra-arterial thrombolysis transcatheter infusion and angioplasty. We report successful endovascular and medical treatment. The patient recovered without complications and was discharged.

Introduction

Graft thrombosis is an uncommon but serious complication of endovascular aneurysm repair (EVAR), which causes significant morbidity and mortality. We describe a case of a late presentation of subacute EVAR thrombosis with lower limb ischemia and claudication

Presentation of case

A 74-year-old man with a 51-mm infrarenal abdominal aortic aneurysm (AAA) was admitted (Figs. 1A and B), who presented with abdominal pain with a background of poorly controlled hypertension diabetes type II, and hyperlipidemia. Although the aneurysm's morphology was acceptable for EVAR by com-

Abbreviations: EVAR, endovascular aneurysm repair; AAA, abdominal aortic aneurysm; CT, computed tomography; DUS, Doppler ultrasound.

☆ Competing Interests: The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

* Corresponding author.
E-mail address: truonglamcs@gmail.com (L.T. Hoai).

https://doi.org/10.1016/j.radcr.2023.07.031

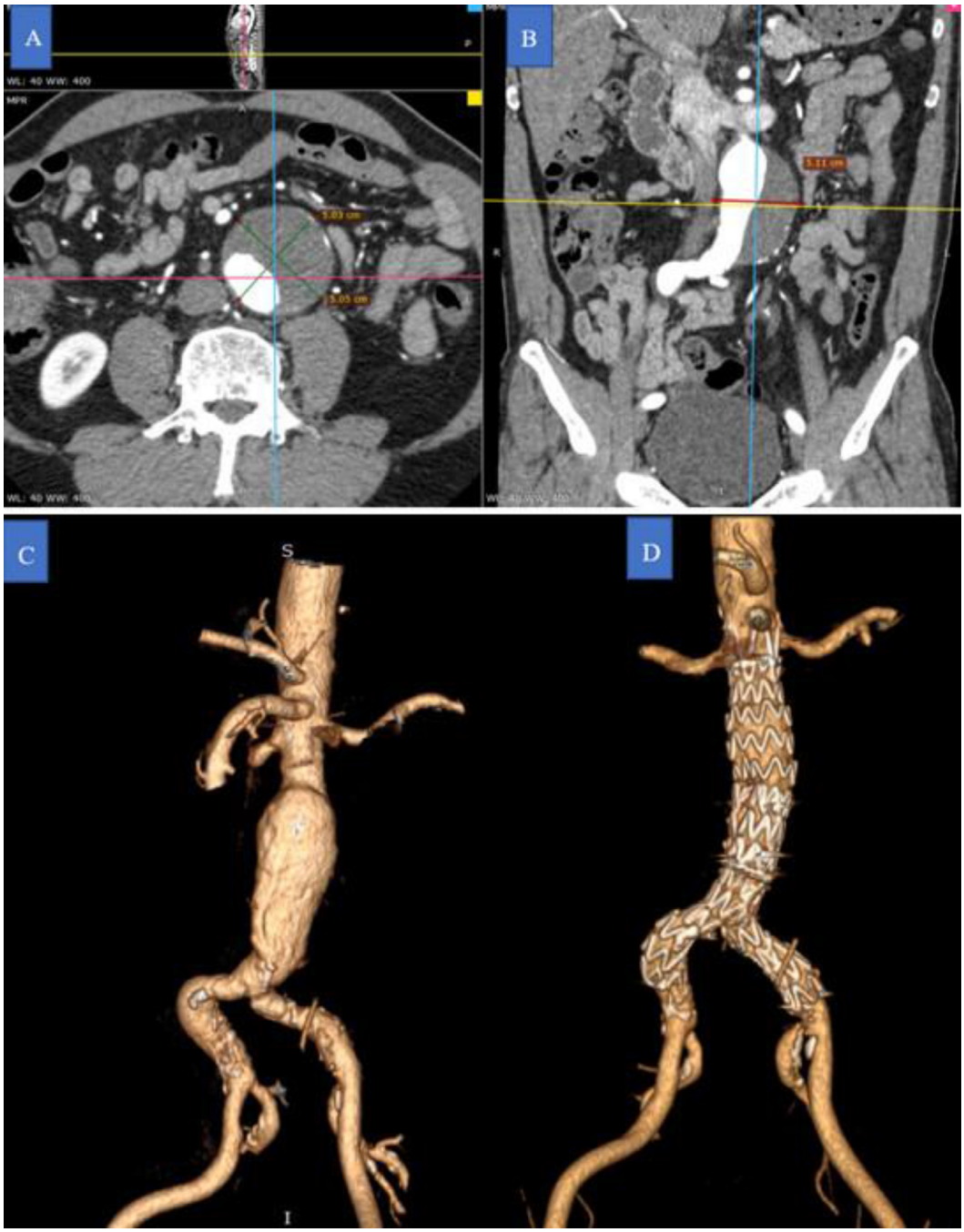

Fig. 1 – (A, B) CT angiogram showed a 51-mm infrarenal abdominal aortic aneurysm (AAA); (C) 3D CT angiogram showed kinking of the right external iliac artery; (D) 3D CT angiogram showed result after the procedure.

puted tomography (CT) angiography, the neck had several unfavorable characteristics, including corner folding (Fig. 1C). The procedure was carried out with local anesthesia (to each groin). Each access site was preclosed with 2 Proglides before receiving bilateral 7 French access. Ultrasound guidance was used for percutaneous access. It was decided to extend the endograft to the internal iliac artery on the right side. A Sentrant (Medtronic) sheath was sized up to 16 French on the left, and the main body of the device was inserted through the right femoral access. The main deployment went smoothly, but the cannulation of the endograft gate proved difficult. A Reliant (Medtronic) molding balloon was employed and the aortic bifurcation was targeted with 12 × 40 mm angioplasty balloons. The endograft's continued patency has been confirmed post-procedure, and there is no sign of thrombosis (Fig. 1D).

Four months post-discharge, the patient reported intermittent claudication that had been present in his right leg for a month, which was getting progressively worse. This was restricting his ability to walk normally and participate in physical activities. On neurological examination, there was decreased sensation in his right leg, but his motor function and physiologic reflexes were normal. Our angiography revealed

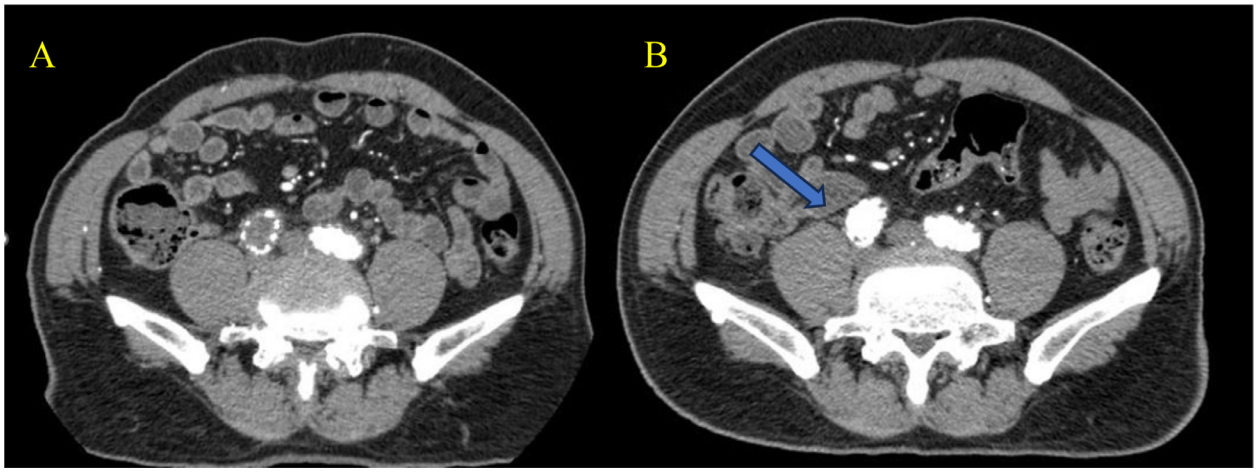

Fig. 2 – CT scan revealed full recovery which is the right femoral artery after 4 weeks (blue arrow) (A panel is preintervention, B panel is postintervention).

that the right common iliac artery was completely occluded, with collateral supply flow from the contralateral internal iliac artery.

We decided on a crossover catheterization from the left brachial to advance the infusion catheter to the level of the thrombus by placing a multiside hole catheter in the right external iliac artery of the endograft (Fountain Catheter, Merit). This was facilitated by the easy guidance of the wire through the thrombus (Terumo soft wire). This was followed by the administration of a 5 mg Actilyse bolus, a 1 mg/h infusion to the left side arm, and the initiation of a 1000 unit/h IV heparin infusion. The patient was transferred to the intensive care unit for observation during the thrombolysis. After 6 hours, a Doppler ultrasound was taken to confirm a positive pulse. The thrombolysis infusion was then. The following day the patient returned to the Cathlab for a follow-up angiogram which demonstrated a partly recanalized aortoiliac system. We used the kissing balloon technique again to manage the aortic bifurcation, which restored normal flow with no distal thrombotic or embolic complications. In the postoperative period, anticoagulation was continued with rivaroxaban 2.5 mg plus aspirin 81 mg 14 weeks postoperatively, a follow-up CT angiogram confirmed full recovery.

Follow up

Four weeks after the procedure, a CT scan confirmed the endograft's continued patency and the absence of any thrombus (Fig. 2).

Discussion

Those who have experienced claudication or limb ischemia during the last 6 months due to an obstruction in one of the lower extremity arteries are more likely to develop thrombus, especially under endovascular intervention. Subacute thrombosis, which is most likely multifactorial in origin, is an uncommon complication [1]. The antithrombic dose was most likely inadequate, the procedures were longer than anticipated, and obstructive atherosclerotic artery disease was persisting.

This is the description of the treatment of subacute thrombosis following EVAR by thrombolysis and re-angioplasty. The decision is to treat subacute thrombosis with catheter-directed intra-arterial thrombolysis instead of surgery due to the high risk of surgery. The high thrombosis burden is significantly associated with manual thrombus aspiration associated with increased cardiovascular mortality and ischemic strokes resulting from an embolism. Alternative therapeutic approaches include open surgery and graft explantation, which are linked to significant perioperative morbidity and mortality. Intra-arterial thrombolysis was regarded as the least invasive management technique to restore blood flow, with bleeding being the main complication. There is an ongoing debate over its advantages and decreased risk of bleeding associated with local thrombolysis compared to systemic thrombolysis [2]. The Meta-Analysis Comparing Catheter-Directed Thrombolysis Versus Systemic Anticoagulation Alone for Submassive Pulmonary Embolism deduced that Major and minor bleeding, blood transfusions, and hospital length of stay did not change significantly between local and systemic intra-arterial thrombolysis. Local intra-arterial thrombolysis and kissing balloon technique were associated with significantly lower in-hospital, 30-day, and 90-day mortality. The evidence supporting Catheter-direct-thrombolysis as first-line therapy is strengthened by this study [3]. Although it was unclear whether the patient was suitable for thrombolysis given the time constraints, it was still found to be effective in this case. The cessation of fibrinolysis marks the beginning of chronic thrombus clearance which normally takes 1-3 months, however, in unusual cases can take over 7 months following thrombus development [4]. This could suggest thrombolysis despite the longer time frame.

The Ultra-slow PROMETEE trial revealed that low nonfatal complications and mortality seem to be associated with ultraslow (25 hours) infusion of low-dose (25 mg) t-PA without bolus for Prothetic valve thrombosis patients without loss of effectiveness. Hence we adopted a low-dose approach. In addition, we implemented the kissing balloon angioplasty stent graft again to restore full blood flow. The bifurcation-covered stent graft procedure's risk of significant side-branch blockage is reduced using the kissing balloon technique, with improved safety and effectiveness.

Doppler Ultrasound (DUS) is an important diagnostic tool, especially in facilities with a specialized vascular laboratory. This method is portable, easily accessible, affordable, and quick. It is non-invasive noncontrast and hence has no associated nephrotoxicity [5]. DUS has an important role in the follow-up of thrombolysis therapy.

Conclusion

The combination of kissing balloon angioplasty and intra-arterial catheter direct thrombolysis demonstrates a favorable outcome for subacute endograft thrombosis. This management strategy restored arterial perfusion whilst maintaining all of the advantages of an endovascular technique in a patient with considerable medical co-morbidity.

Availability of data and materials

Data and materials used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Ethics approval

Our institution does not require ethical approval for reporting individual cases or case series.

Patient consent

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

REFERENCES

[1] Phade SV, Keldahl ML, Morasch MD, Rodriguez HE, Pearce WH, Kibbe MR, et al. Late abdominal aortic endograft explants: indications and outcomes. Surgery 2011;150(4):788–95.
[2] Macovei L, Presura RM, Georgescu CA. Systemic or local thrombolysis in high-risk pulmonary embolism. Cardiol J 2015;22(4):467–74.
[3] Ismayl M, Machanahalli Balakrishna A, Aboeata A, Gupta T, Young MN, Altin SE, et al. Meta-analysis comparing catheter-directed thrombolysis versus systemic anticoagulation alone for submassive pulmonary embolism. Am J Cardiol 2022;178:154–62.
[4] Czaplicki C, Albadawi H, Partovi S, Gandhi RT, Quencer K, Deipolyi AR, et al. Can thrombus age guide thrombolytic therapy? Cardiovasc Diagn Ther 2017;7(Suppl 3):S186–96.
[5] Corvino A, Catalano O, de Magistris G, Corvino F, Giurazza F, Raffaella N, et al. Usefulness of Doppler techniques in the diagnosis of peripheral iatrogenic pseudoaneurysms secondary to minimally invasive interventional and surgical procedures: imaging findings and diagnostic performance study. J Ultrasound 2020;23(4):563–73.