Spontaneous Rupture of Abdominal Aorta Pseudoaneurysm: a Case Report

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ABSTRACT

Pseudoaneurysms are false aneurysms that mostly occur at the site of arterial injury. Pseudoaneurysm is the most frequent complication after catheter-associated interventions and occurs because of an insufficient closure of the puncture site. However, there are several reported cases of patients with pseudoaneurysm without a prior history of vascular intervention. We described a case of ruptured giant abdominal aortic pseudoaneurysm in a patient with no prior history of vascular intervention, with an initial complaint of abdominal pain. The patient successfully received EVAR therapy using a kissing graft

***Keywords**: pseudoaneurysm, abdominal aorta, rupture.*

INTRODUCTION

Pseudoaneurysms are false aneurysms that mostly occur at the site of arterial injury. Besides hematomas and arteriovenous fistulas, pseudoaneurysm is the most frequent complication after catheter-associated interventions and occurs because of an insufficient closure of the puncture site. The rate of pseudoaneurysm occurrence after diagnostic intervention varies between 0.06% and 0.18%. On the other side, the occurrence of pseudoaneurysm following therapeutic intervention ranges from 0.7% to 6.25%.[1] Pseudoaneurysm has pulsatile in and outflow of blood through the neck, thus providing risk to growth and rupture.

Here, we report a rare case of ruptured abdominal aortic pseudoaneurysm with no prior history of catheter-based intervention. This report aims to report the case with rare nature to give readers a new perspective.

CASE ILLUSTRATION

A 48-year-old man with a history of diabetes mellitus and hypertension was referred to the emergency department by a peripheral hospital with the suspicion of an abdominal aortic aneurysm. The patient works as a police officer. Two weeks before admission, the patient presented with abdominal pain. The patient was hospitalized for twelve days and was observed with a suspected abdominal aortic aneurysm before being referred. At admission to the emergency department, the patient tested positive on the SARS-CoV2 screening swab test and was admitted to the isolation unit.

The patient underwent laboratory examination and CT angiography. Laboratory examination revealed normocytic normochromic anemia suspected to be caused by chronic disease, and hypoalbuminemia with bilateral pitting edema on lower extremities. CT angiography reported the finding of a giant abdominal aortic pseudoaneurysm rupture with the size of the sac 5.5 x 10.7 x 7.7 cm. The giant sac was pushing the middle part of the left ureter and resulted in left hydroureter and hydronephrosis.

Endovascular aneurysm repair (EVAR) was planned but after multidisciplinary discussion, it was decided to wait for the patient to test negative for SARS-CoV2 before doing the procedure. The patient underwent an angiography examination before the EVAR procedure. Angiography examination shows contrast leakage in the abdominal aorta.

The procedure was started with a cut down of the right and left femoral arteries, and continued with the insertion of a 6F sheath on the right femoral artery and 7F on the left femoral artery. The Pigtail 5F catheter was inserted through the left femoral artery and pushed into the abdominal aorta. Aortography and pressure measurement was conducted. Aortography revealed a leakage lesion on the distal abdominal aorta. The 6F sheath from the right femoral artery was changed into a SENTRANT 16F sheath, and an Amplatz extra stiff wire was inserted. Graft stent EVAR ENDURANT IL sized 16x13x82 mm was then inserted with the help of extra stiff wire Amplatz, and positioned throughout the lesion. The graft stent was deflated right at the lower bound of the left renal artery. Evaluation with aortography showed endo-leakage and the distal part of the graft stent which was not deployed perfectly in the bifurcation of the common iliac artery. Dilatation of the proximal and distal parts of the stent was performed using balloon RELIANT 12F. The procedure was continued with the insertion of stent BEGRAFT 7.0x57 mm throughout the right common iliac artery and BEGRAFT 8.0x57 mm in the left common iliac artery, both overlapping with the previous EVAR stent graft. BEGRAFT stents were deflated each at 13 atm and 12 atm for 60 seconds respectively (kissing graft). Aortography was performed and showed no endo-leakage. The procedure was ended with the suture of the right femoral area.

The patient showed stable condition with decreased bilateral pitting edema. However, the patient still suffered from flank pain suspected to be caused by a retroperitoneal abscess due to a hematoma, thus the patient was planned to undergo open abdominal surgery to evacuate the hematoma. Upon open abdominal surgery, the patient was stable and moved to the general ward.

DISCUSSION

Pseudoaneurysm is frequently associated with arterial injury following a catheter-based diagnostic or therapeutic intervention. The rate of pseudoaneurysm occurrence after diagnostic intervention varies between 0.06% and 0.18%, meanwhile, rate of pseudoaneurysm following therapeutic intervention ranges from 0.7% to 6.25%. The most common site of pseudoaneurysm is femoral pseudoaneurysm due

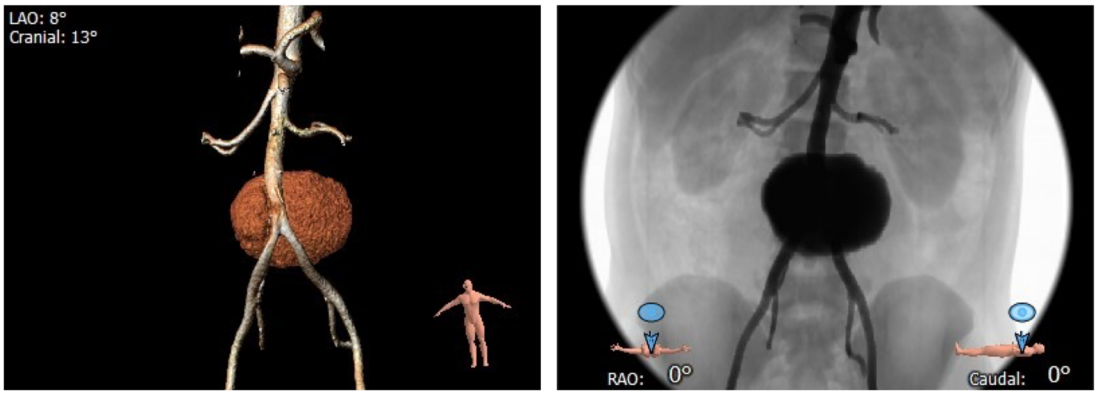

Figure 1. CT angiography showed a giant abdominal aortic pseudoaneurysm rupture with the size of the sac 5.5 x 10.7 x 7.7 cm.

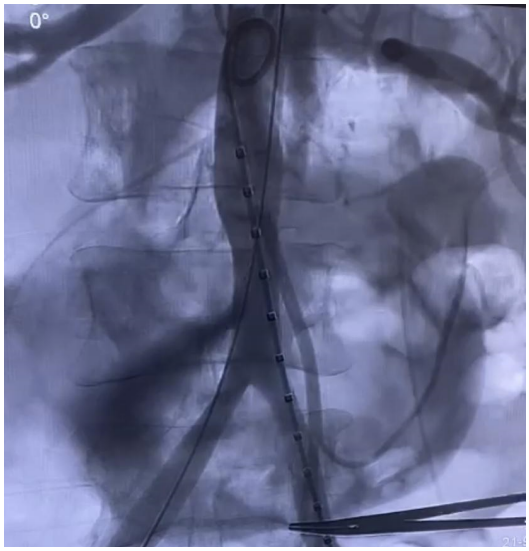

Figure 2. Angiography showed a giant abdominal aortic pseudoaneurysm rupture with the size of a sac 5.5 x 10.7 x 7.7 cm.

Figure 3. Angiography showing well-positioned graft stent upon EVAR procedure.

to its role as the primary access for endovascular procedures. The clinical sign that can be found in patients with pseudoaneurysm includes swelling, pain, large or growing hematoma, and audible bruit upon the lesion location. The main difference between a pseudoaneurysm and an aneurysm is that a pseudoaneurysm has a "to-and-fro curve" depicting the systolic and diastolic inflow and outflow of blood. The gold standard for diagnosing pseudoaneurysm is duplex sonography, with sensitivity and specificity of 94-99% and 94-97% respectively.

In this case, the patient had no prior history of vascular intervention. This patient had a prior history of controlled hypertension and diabetes mellitus. However, the association of hypertension and diabetes mellitus with the occurrence of abdominal aortic pseudoaneurysm are still lacking. One of the risk factors that may cause pseudoaneurysms is penetrating or blunt trauma.[2] Compression of the abdominal aorta against the rigid vertebral column increases the intra-aortic pressure, which may cause vascular damage and aortic rupture.[3] Dual platelet inhibition along with the use of additional anti-coagulants (triple-therapy) are also relevant risk factors of pseudoaneurysm.

A small pseudoaneurysm can close spontaneously and thus does not need further treatment. In some cases, pausing the current anticoagulant therapy is sufficient to prevent further growth of the pseudoaneurysm. Spontaneous thrombosis of the cavum mostly occurs in cases of small pseudoaneurysm. In 88–93% of cases, the pseudoaneurysm closes spontaneously after bed rest or compression with bandages or other systems. However, a growing pseudoaneurysm increases the risk of rupture and compression to the surrounding organ, thus altering the patient's hemodynamics. Pseudoaneurysms sized more than 2-4 cm, those increasing in size or those associated with a large surrounding hematoma should be treated. The treatment options for pseudoaneurysm comprise ultrasound-guided compression therapy, ultrasound-guided thrombin injection, operative therapy, and transcatheter intervention. Until 1990, operative therapy was the primary treatment for pseudoaneurysm, with a success rate of 100%. However, operative therapy has intraprocedural and post-procedural complications up to 21%. The complications included bleeding, infections, healing disorders, thrombosis, edema, permanent neuralgia, and lymphatic fistulas, thus operative therapy was not primarily preferable. Endovascular methods are nowadays available to treat pseudoaneurysms, such as the implantation of a stent or coil. In this case, the patient was previously planned to receive open repair surgery due to a lack of

EVAR stent with precise size. The doctor in charge then modified the use of BE graft stent. The patient received percutaneous transcatheter EVAR limb extensions that were connected to BE graft stent in both branches of common iliac arteries.

Studies explaining the comparison between EVAR and operative therapy for pseudoaneurysm were still lacking. However, a systematic review and meta-analysis conducted by Antoniou *et al*[4] concluded that EVAR results in a better outcome during the first six months but carries an increased risk of aneurysm-related mortality after eight years compared to surgery for patients with abdominal aortic aneurysm. This study included seven RCTs reporting a total of 2.983 patients. The result of this study shows significantly lower odds of 30 days (OR, 0.36; 95% CI 0.20-0.66) and in-hospital mortality with EVAR (RD -0.03; 95% CI -0.04 to 0.02). Results found no significant difference in all-cause mortality at any time between EVAR and operative therapy (HR 1.02; 95% CI 0.93-1.13; p = 0.62). The hazard of all causes (HR 0.62; 95% CI 0.42-0.91) and aneurysm-related death within six months (HR 0.42; 95% CI 0.24-0.75) was significantly lower in patients who underwent EVAR. With further follow-up, the pooled hazard estimate moved in favor of open surgery; in the long term (>8 years) the hazard of aneurysm-related mortality was significantly higher after EVAR (HR 5.12; 95% CI 1.59-16.44).

CONCLUSION

Abdominal aortic pseudoaneurysms are mostly caused by endovascular intervention. However, spontaneous abdominal aortic pseudoaneurysm may occur due to blunt trauma, penetrating trauma, or consumption of dual antiplatelet therapy in combination with one anticoagulant. Pseudoaneurysm may rupture and cause hemodynamic instability due to internal hemorrhage, thus it needs to be treated properly. A pseudoaneurysm can be treated with ultrasound-guided compression therapy, ultrasound-guided thrombin injection, operative therapy, or transcatheter intervention. Pseudoaneurysms occurring in these patients do not commonly happen in the absence of prior vascular intervention or surgery. Therefore, adequate interventional therapy is needed to prevent fatal rupture complications. EVAR compared to operative therapy has a better outcome, thus may be the treatment of choice to treat pseudoaneurysm.

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