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Ascending Aorta Saccular Aneurysm: An Unexpected Reason For Acute RCA Occlusion

Asendan Aort Sakküler Anevrizması: Akut RCA Oklüzyonu İçin Beklenmedik Bir Neden

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Abstract

Saccular aortic aneurysms are rare pathologies which are true aneurysms that contain all histological layers of the aorta. Although an aortic diameter of 3 cm or more is generally accepted as an aneurysm, the surgical indication age is usually above 5 cm. SAA, on the other hand, can be operated by its diagnosis, since they are dysmorphic aneurysms and more prone to rupture regardless of their diameters. As in our case, a SAA may cause acute coronary syndromes, patients may apply with acute myocardial infarction. Although a SAA involving a coronary ostia is a very rare cause of acute coronary syndrome, it still should be kept in mind. In November 2022, A 57 year old male patient with inferior AMI due to an occlusive complication of a sacculary aneurysm involving the right coronary artery (RCA). Consequently, the patient was operated urgently. Aneurysm was excised and a graft coronary artery bypass was performed to RCA. Postoperative follow-up and treatment were uneventful and the patient was discharged on the 11th postoperative day.

Keywords: Acute Miocard Infarction, RCA Occlusion, Aortic Saccular Aneurysm.

Özet

Asendan aorta sakküler anevrizmaları nadir görülen patolojilerdir. Aortanın tüm histolojik katmanlarını içerir. Genellikle aorta çapı 3 cm ve üzerinde olması anevrizma olarak kabul edilse de cerrahi endikasyonu genellikle 5 cm ve üzeri olarak değerlendirilir. Sakküler anevrizmalar ise dismorfik anevrizmalar olmaları nedeniyle çaptan bağımsız olarak opere edilebilirler. Zira, spontan rüptür ve komplikasyon riski fuziform anevrizmalara göre daha yüksektir. Bizim vakamızda olduğu şekliyle akut koroner sendroma neden olabilirler. Koroner ostiumları içine alan bir sakküler anevrizma akut koroner sendromlar için nadir bir neden olsa da akılda bulundurulmalıdır. Kasım 2022'de, 57 yaşında erkek hasta acilde akut inferiyor miyokard infarktüsü olarak tanı aldı ve yapılan tetkiklerinde sağ koroner arteri de içine alan sakküler aortik anevrizmaya bağlı oklüzif komplikasyon olduğu görüldü ve acil şartlarda operasyona alındı. Postoperatif takip ve tedavisi sorunsuz seyreden hasta 11. gün taburcu edildi.

Anahtar Kelimeler: Akut Miyokardiyal İnfarkt, RCA Oklüzyonu, Aortik Sakküler Anevrizma.

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INTRODUCTION

Thoracic aortic aneurysms is reported as 3-4% (1) among reported deaths. The cause changes depending on patient age, connective tissue diseases, congenital causes such as bicuspid aortic valve, inflammatory diseases, high blood pressure and various syndromes are common. Generally, it occurs due to a medial degeneration of the elastic wall of the aorta for a non-inflammatory reason. SAA constitutes a less common sub-group. Etiology is often secondary to infectious pathologies where the risk of rupture and complications is higher. Infective endocarditis, syphilis, fungal infections, AIDS and iatrogenic causes are the most frequent reasons.

In cases of SAA located in the ascending aorta, the surgery to be performed varies due to the presence of annuloaortic ectasia, involvement of Valsalva sinuses and aortic valve insufficiency. Generally, the Bentall Procedure is preferred. As in our case, focal excision of the SAA is rarely sufficient. We performed aneurysmectomy and RCA saphenous graft coronary bypass.

CASE REPORT

A 57 year old female patient was admitted to the emergency department with increasing severity of chest pain, palpitation and discomfort. Coronary angiography (CAG) performed rapidly due to inferior AMI findings on ECG and Troponin I value being too high to be measured above 50,000 ng/L.

In CAG (Figure 1) left system was intact. The right RCA ostium could not be seated. Therefore, nonselective aortic root angiography for aortic root and RCA were visualized. A saccular aneurysm observed in the aortic root on the right side. RCA originated from this aneurysm. RCA antegrade filling was extremely weak. Perfusion was from the left, retrogradely.

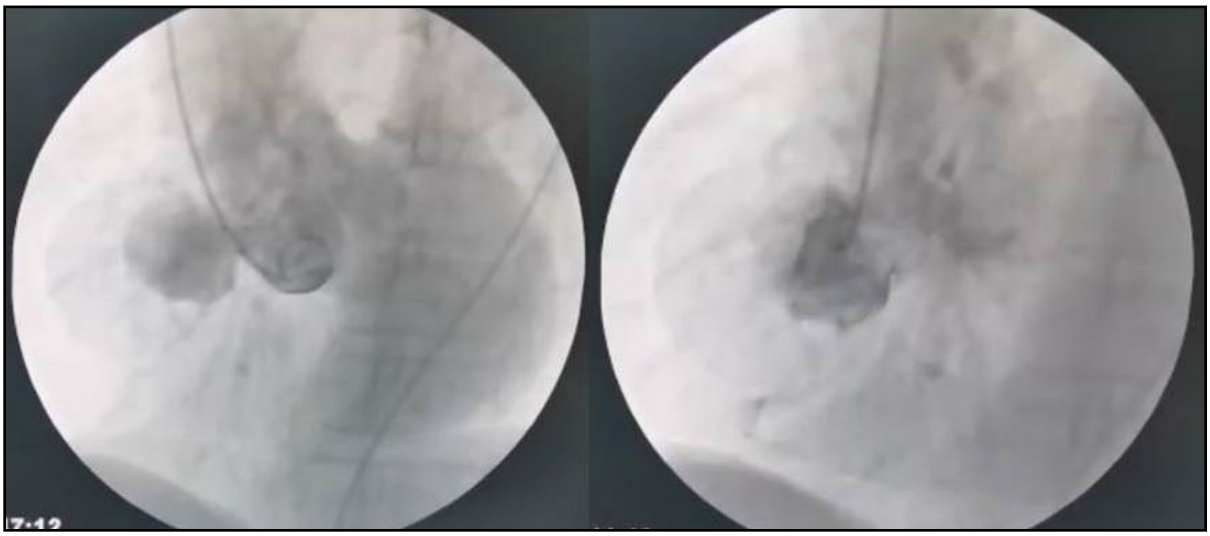

Figure 1. In CAG Left System

In preoperative transthoracic echocardiography (Figure 2); there was no aortic valve pathology and aortic valve insufficiency. Thus, we decided a valve-sparing surgery rather than the Bentall procedure.

In IV contrast thorax computerized tomography (CT) (Figure 3 a). SAA was observed in 4x5x4 cm diameters on the right sinotubular junction. No other vessel pathology was observed.

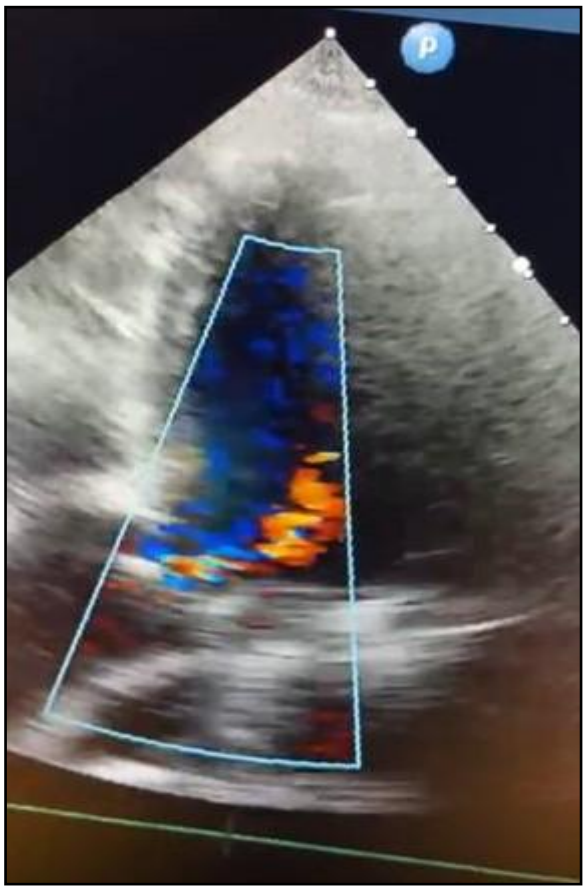

Figure 2. Preoperative Transthoracic Echocardiography

In figure 3 (b), postoperative excised aneurysm with normal aortic lumen.

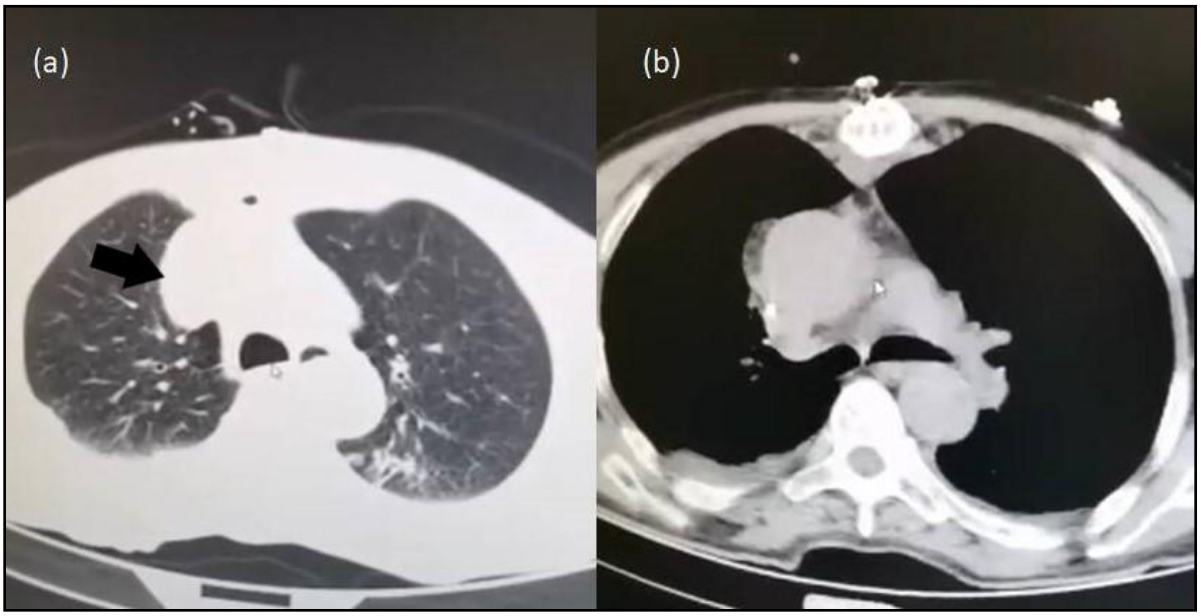

Figure 3. IV Contrast Thorax Computerized Tomography (CT) (Figure 3 A), Postoperative Excised Aneurysm With Normal Aortic Lumen (Figure 3 B)

Selective RCA saphenous graft bypass with aneurysmectomy and patchplasty was decided for the patient, via CPB.

After sternotomy, the pericardium was opened and SAA was revealed (Figure 4).

Figure 4. After Sternotomy, the Pericardium was Opened and SAA was Revealed

After aortic cross-clamping and cardioplegic arrest, the SAA was totally excised. We observed that the aortic valve and sinotubular junction were intact (Figure 5).

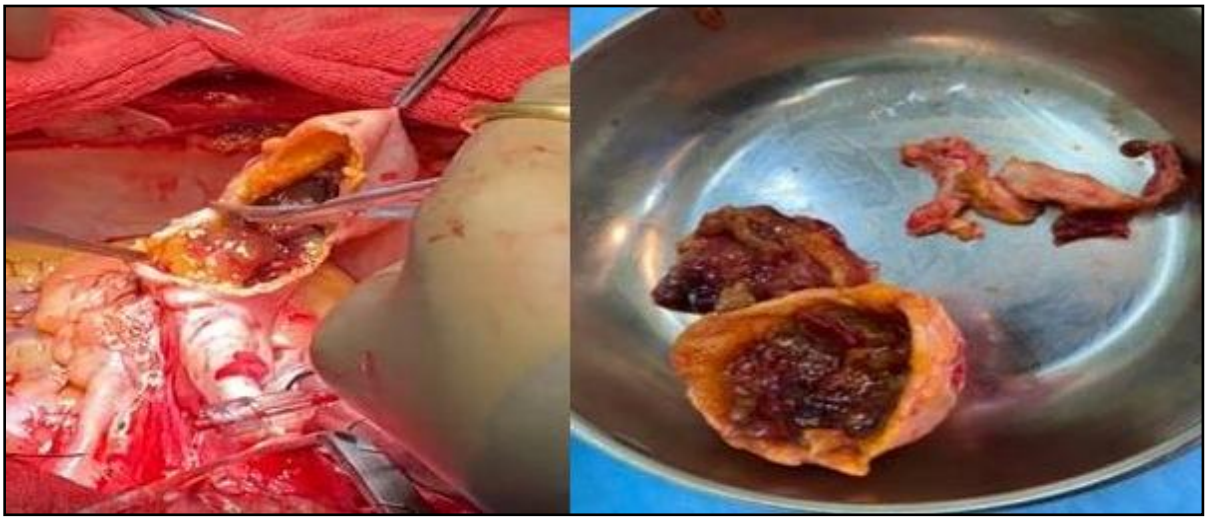

Figure 5. Observed that the Aortic Valve and Sinotubular Junction were Intact

SAA area was primarily repaired with pledged sutures with a PTFE graft and patchplasty was performed (Figure 6).

Sequentially, a saphenous graft RCA was anastomosed end-to-side to RCA trunk.

Proximal anastomosis was placed in the intact part of the ascending aorta.

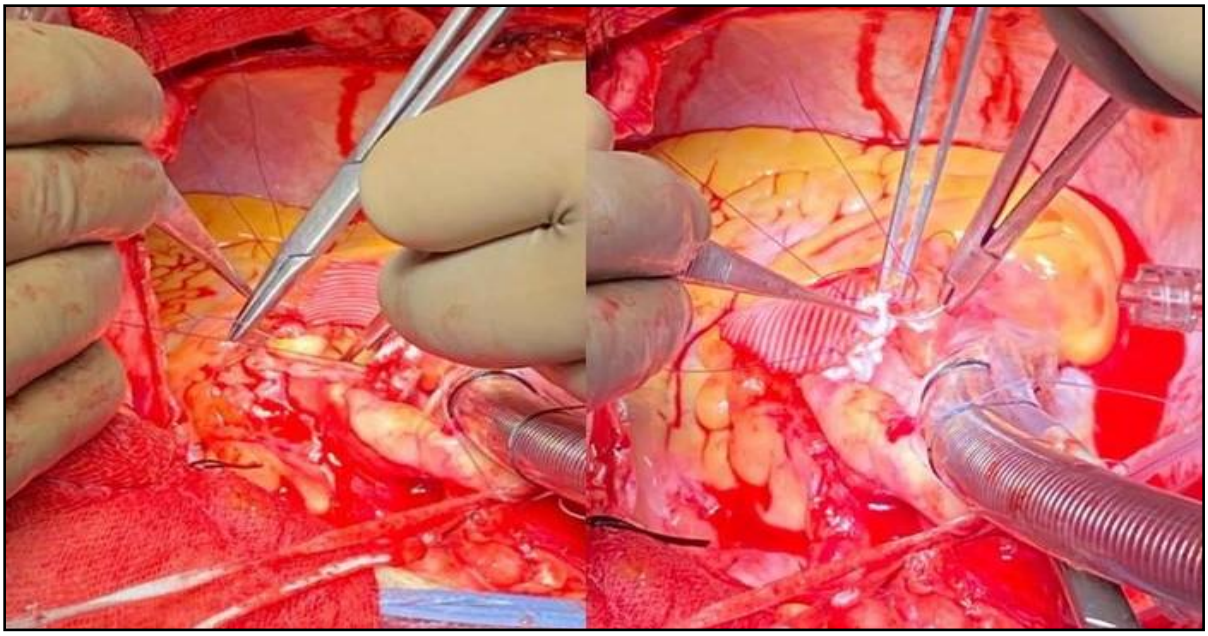

Figure 6. SAA area was Primarily Repaired with Pledged Sutures with a PTFE Graft and Patchplasty was Performed

The operation was terminated conventionally. It was confirmed that there was no bleeding from the patchplasty. The operation was completed complication free. Following 3 days of ICU, he was discharged on the 11th postoperative day.

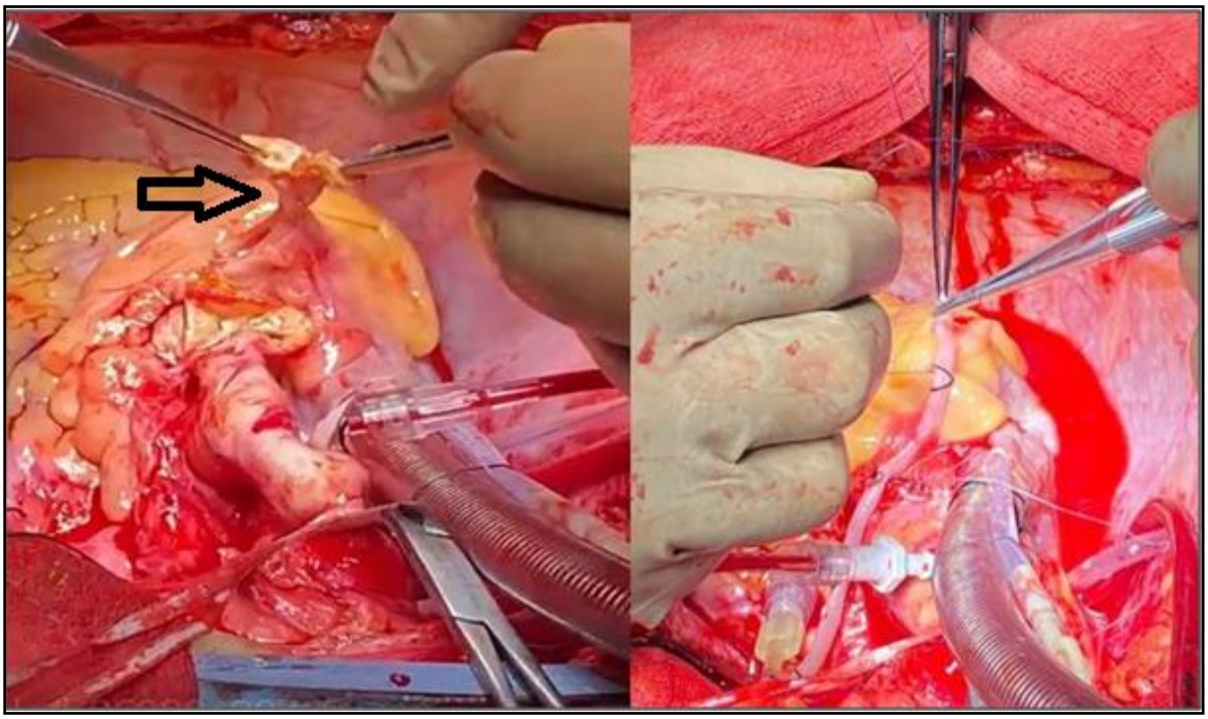

Figure 7. The Operation Was Terminated Conventionally

Histopathological samples were studied with a calsified soft tissue free of any malignant feature by 4x1.5x2 cms in diameter. Furthermore, characteristic histopathological findings of a hereditary connective tissue disease were not detected. This histological evaluation was obtained by Hematoxylin and Eosin (H&E) X10 staining of tissue and cell sections (Figure 8).

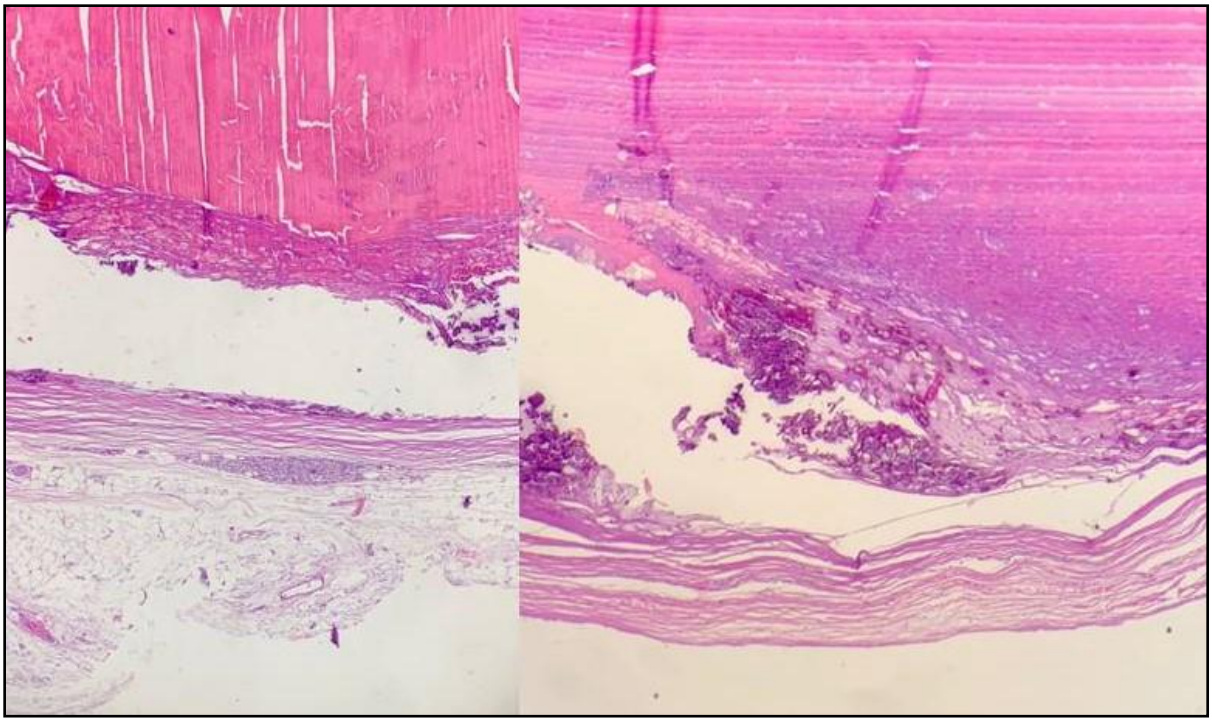

Figure 8. Histological Evaluation

DISCUSSION

Within the classification, aneurysm may include aortic root, ascending aorta, aortic arch, descending aorta and different associations. The co-existence of aortic root dilatation is called 'annuloaortic ectasia'. In different scientific publications, it has been reported that the incidence of thoracic aneurysm is between 3-5% with increasing imaging examination method efficiency. Idiopathic and non-inflammatory aneurysms are usually defined in adults and with connective tissue diseases. Bicuspid aorta, aortic dissections, hypertension and several syndromes such as Ehlers-Danlos, Marfan and Loeys-Dietz can be counted in etiology. Aneurysms formed after inlammatory processes occur at a later age with aortitis. Causes such as giant cell arteritis syndromes and Takaysu arteritis are common. The female to male ratio does not show significant differences (1).

Aortic aneurysms can be divided into two main groups morphologically; fusiform and saccular. Our patient had a saccular aneurysm in ascending aorta. Among the aetiological factors of SAA, vasculitides with a high inflammatory component, bacterial infections, fungal infections, iatrogenic trauma and to a lesser extent, syphilitic aortitis can be listed. Our case did not have a recent infectious status. He also did not describe a chronic connective tissue disease. There was no intraluminal intervention except for a coronary angiography history about a year ago.

Absence of annular and/or sinotubular dilatation and intact aortic valves positively affected our surgical risk.

The presence of acute or chronic severe inflammatory diseases were also stated as among the causes of increased mortality. Bicuspic aorta is one of the most common congenital cardiac defects in 1% of the population. There is a high familial tendency when present with aortic aneurysms. In this condition, it reveals an autosomal dominant character (2). Replacement of the aortic root and/or aortic valve complicates the surgical management. We were able to perform a direct aneurymectomy with CPB. Subsequently, the SAA area was primarily

repaired with a vascular patch. The RCA orifice was totally occluded because it was in the aneurysmal sac. Therefore, in the last stage of our surgery, native RCA was ligated proximally and occluded. Then, CABG was performed with a saphenous vein graft via aorto-coronary end-to-side anastomosis. The saphenous graft was observed as working efficiently after CPB was terminated.

Since our patient did not have a mycotic infection, connective tissue disease or a syphilitic status, the thought that it was an aneurysm that developed directly after an aortic trauma during a previous coronary angiography attempt was dominant, but naturally, it was not possible to present any definitive evidence on this subject. Although aneurysms that are presented due to catheter trauma are mostly reported as pseudoaneurysms. But a true aneurysms involving all layers of the aortic wall may also occur, as in our case (3).

In the histopathological examination, chronic connective tissue disease, acute or chronic inflammatory processes were ruled out in tissue samples stained with H&E. Therefore, the aneurysm that we excised was classified as a noninflammatory true aneurysm.

In non-inflammatory etiologies, medial degeneration, which is the basic physiopathological picture, can be found in the wall of the aorta (4). Medial degeneration is classified as mild, moderate and severe. It is directly related to the risk of rupture. In severe cases, extracellular matrix changes are also added to the picture and the resistance of the aortic vessel wall to pressure decreases. Elastic fiber loss and/or fragmentation in the media layer is also added to the condition histopathologically. The aortic wall erodes and the risk of spontaneous rupture increases.

Since the intraluminal pressure distribution is scattered in an aneurysm with saccular morphology, as in ours, luminal wall resistance due to histopathological disorders progresses much more rapidly towards dissection. In particular, arterial hypertension is the most important triggering mechanism. Moreover, the highest peri-operative mortality rates occur in aneurysms due to mycotic infections. Almost all of these patients have sepsis and related syndromes (5).

In conclusion, the prognosis of aneurysm depends on its size, localization, accompanying pathologies, and the presence of arterial hypertension. When dissection and rupture occur, the situation is usually incompatible with life. In fusiform aneurysms, 55 mm is generally accepted as the surgical indication margin. However, as in our case with saccular aneurysms with a higher risk of rupture, there is no surgical criterion to be determined by a precise aneurysm diameter. We believe that surgery should be planned with the detection of SAA.

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Conflict of Interest: The authors of this paper declared no conflicts of interest.

Informed Consent: The patient was informed for publication of the case report andaccompanying imagesconsent was obtained.

Ethical Declaration: The study was conducted in accordance with the World Medical Association Declaration of Helsinki “Ethical Principles for Medical Research Involving Human Subjects”. Ethics committee approval has been granted from our institution.

Author Contribution: Data collection and processing: MA, MY, ST, BA; literature review: MA, MY, ST, BA; Control and writing MA, MY, ST, BA.

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