



## Case Report

# Simultaneous endovascular repairs of concomitant ruptured abdominal aortic aneurysm and huge silent thoracic aortic aneurysm



Ahmet Karabulut<sup>a,\*</sup>, Selim Aydın<sup>b</sup>

<sup>a</sup> Department of Cardiology, Acibadem University School of Medicine, Acibadem Atakent Hospital, Istanbul, Turkey

<sup>b</sup> Department of Cardiovascular Surgery, Acibadem Atakent Hospital, Istanbul, Turkey

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## ABSTRACT

Ruptured abdominal aortic aneurysm (rAAA) is an emergent condition that carries higher mortality rate. Although there had been development of interventional and surgical technique besides improved critical care, mortality rates were still varied between 35 and 53% in the reported series. Preoperative shock was reported as a major factor predicting mortality rate. Feasibility of simultaneous endovascular repair of rAAA and silent thoracic aortic aneurysm (TAA) is not known. Herein, we aimed to demonstrate the advantage of simultaneous endovascular repair of rAAA and silent TAA in the settling of hemodynamic and neurologic instability. We proposed that simultaneous repair of silent aneurysm would eliminate second procedural risk and also further rupture risk, especially in high-risk patients.

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## 1. Introduction

The estimated incidence of simultaneous thoracic and abdominal aneurysms is approximately 10–20% of all aortic aneurysms, which necessitate more complex therapy.<sup>1,2</sup> Simultaneous or staged therapy of multilevel aortic aneurysms is still debatable. Small, case series showed feasibility of single-stage therapy of multilevel aortic aneurysms. However, these case reports usually represent hemodynamically stable patients.<sup>1,3</sup> Herein, we aimed to demonstrate feasibility of simultaneous endovascular repair of ruptured abdominal aortic aneurysm (rAAA) and silent thoracic aortic aneurysm (TAA) in the comatose patient who underwent successful resuscitation.

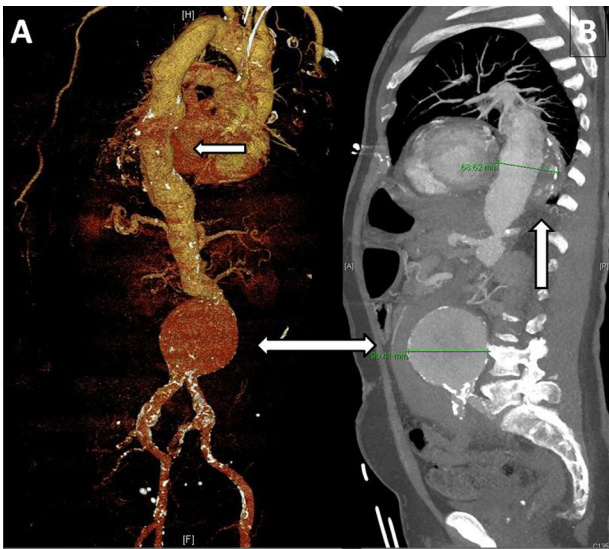
## 2. Case report

A 70-year-old male patient was admitted to emergency department with a complaint of syncope. In the presentation, the patient was unconscious with respiratory arrest. Blood pressure could not be taken and rhythm showed severe bradycardia. The patient was intubated and immediate resuscitation was performed

for 5 min; with additional inotropic agents, systolic blood pressure was secured between 60 and 80 mmHg. Computed tomography showed infrarenal 9.3 cm rAAA and 7 cm silent TAA with intramural thrombosis and hematoma (Fig. 1). Abdominal aortic aneurysm was ruptured from right lateral border and there was evidence of retroperitoneal hemorrhage (Fig. 2). At the presentation, serum creatinine was 1.3 mg/dl and hemoglobin was 11.1 g/dl. The patient was transferred to catheter laboratory for endovascular repair. Control hemoglobin before the procedure was 7.1 g/dl and 3 units of red blood cell suspension and 2 units of fresh plasma were perfused during periprocedural period. Ruptured AAA was closed with Medtronic endurant graft stent with two iliac legs (Fig. 3). After that, further therapy for silent TAA was discussed and silent, huge TAA was closed with Medtronic valiant graft stent (Fig. 4). Both, celiac trunk and superior mesenteric artery were preserved and graft stent was deployed above the ostium of celiac trunk. Additional 90 cc contrast agent used for second intervention and procedure was prolonged just for 10 min. After that, the patient followed up in the intensive care unit. Postprocedural hemoglobin was 10.4 g/dl and serum creatinine was 2.6 mg/dl. The patient was extubated 24 h after intervention without neurologic dysfunction. Renal failure was observed in the second postoperative day with a peak serum creatinine level of 4.1 mg/dl and hemodialysis was performed for a while. First week serum creatinine level was 1.5 mg/dl and hemoglobin was 10 g/dl. Finally, the patient was transferred to general inpatient service to perform further therapy without neurologic complication.

\* Corresponding author at: Acibadem Atakent Hospital, Department of Cardiology, Halkalı Merkez Mah, Turgut Özal Bulvarı, No: 16, 34303, Kucukcekmece, Istanbul, Turkey.

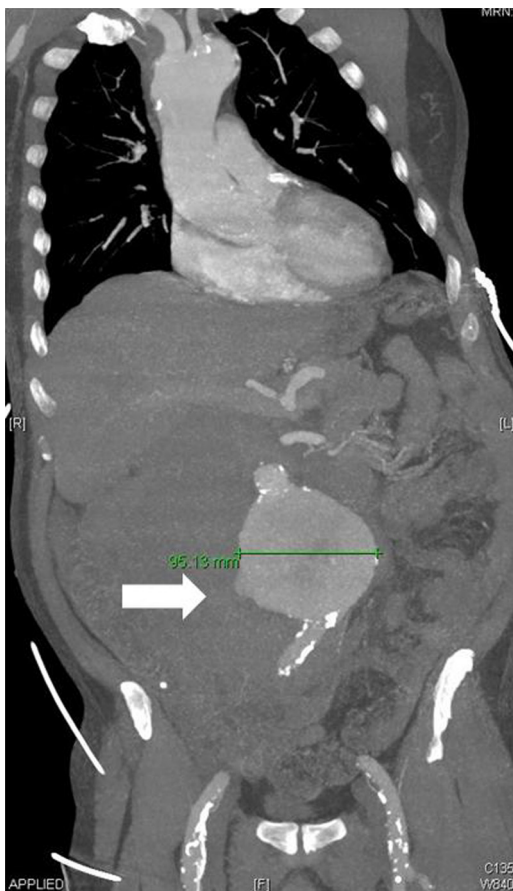
E-mail address: [drkarabulut@yahoo.com](mailto:drkarabulut@yahoo.com) (A. Karabulut).



**Fig. 1.** Computed tomographic aortography showing ruptured abdominal aortic aneurysm and huge thoracic aorta aneurysm with intramural thrombus (arrows indicate the site of aneurysms).

### 3. Discussion

Ruptured abdominal aortic aneurysm is an emergent condition that carries higher mortality rate. Although there was development of interventional and surgical technique besides improved critical care, mortality rates were still varied between 35 and



**Fig. 2.** Protrusion from the right lateral border of abdominal aortic aneurysm indicates the site of the rupture (white arrow).



**Fig. 3.** Closure of ruptured abdominal aortic aneurysm with Medtronic valiant graft stent system.

53% in the reported series. Preoperative shock was found as a major factor predicting mortality rate.<sup>4</sup> Feasibility of simultaneous endovascular repair of rAAA and TAA is not known. We showed that simultaneous endovascular repair of rAAA and silent TAA may be logical even in the case of hemodynamic and neurologic instability. Simultaneous repair of silent aneurysm would eliminate second procedural risk and also rupture risk, especially in a high-risk patient.

Concurrent occurrences of abdominal and thoracic aortic aneurysms are uncommon and simultaneous treatment strategies were not well defined. Although one-stage therapy eliminates risk of second intervention, it is associated with higher morbidity risks, including neurologic and renal complication due to prolonged operative and fluoroscopy time, higher blood loss, and contrast exposure.<sup>1,3</sup> Neurologic complication is more common in the repair of TAA and combined incidence of stroke and paraplegia was approximately 5%.<sup>5</sup> Endovascular repair of TAA may also deteriorate preexisting neurologic instability. On the other hand, TAA is more likely to rupture without warning, and they are rapidly fatal within minutes compared to AAA. Thus, concomitant management of both aneurysms may be logical in the high-risk patient to decrease risk of second intervention besides prevention of rupture risk.<sup>6</sup> We preferred the simultaneous repair in accordance with the decision of the heart team. The neurologic condition of the patient was not clear and Glasgow coma scale was five. Moreover, the patient had hemodynamic instability, which predicts higher mortality rate. Despite the risk of neurologic deterioration and other morbidities, thoracic intervention will increase the cost of procedure prominently, which could result in a payment-related



**Fig. 4.** Repair of huge thoracic aorta aneurysm with Medtronic valiant graft stent system.

argument with the insurance company in the case of mortality. Nonetheless, thoracic aneurysm diameter was exceeding 7 cm with intramural hematoma formation, which predicts prominent rupture risk. Procedural characteristic of the patients, including short duration of the rAAA repair and zone 4 location of the thoracic aneurysm, encouraged us to prefer simultaneous repair. In addition, shorter cardiopulmonary resuscitation time with a shorter history of prehospital transport period was another factor that influenced our TAA repair decision. Long resuscitation period with obscure neurologic status would not favor the simultaneous repair of asymptomatic TAA.

#### 4. Conclusion

Simultaneous repair of rAAA and silent TAA might be feasible even in the presence of neurologic instability and hemorrhagic shock. Earlier, neurologic coma may not reflect the permanent neurologic dysfunction. Short duration of the rAAA repair and short-segment TAA beneath left subclavian artery may favor the simultaneous repair of rAAA and silent TAA. Prominent enlargement of the aneurysm and high procedural risk may also be

evidence for simultaneous endovascular repair of multilevel aortic aneurysms.

#### Conflicts of interest

The authors have none to declare.

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