

# A giant ascending aortic aneurysm associated with a ruptured sinus of Valsalva into the right atrium: Role of multimodality imaging

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December 1, 2022

## Abstract

A giant ascending aortic aneurysm associated with a ruptured sinus of Valsalva is rare. A 53-year-old male patient successfully underwent Bentall procedure after multimodality imaging which enable the correct diagnosis to be established and intraoperative transesophageal echocardiography provides additional information on the surgical planning.

## Introduction

Giant ascending aortic aneurysm(AAA) is a rarely encountered condition and only few cases were reported presently<sup>1</sup>. The most dreadful complications include dissection and rupture. Conservative management leads to low life expectancy. Surgical management is recommended in such cases. We herein report a rare case of giant AAA associated with a ruptured sinus of Valsalva into the right atrium, which was successfully treated with open surgical repair.

## Case Report

A 53-year-old man was admitted to our hospital for the progressive enlargement of ascending aortic aneurysm (AAA) during serial follow-up. His clinical symptoms were intermittent cough and mild exertional dyspnea.

Chest radiography showed widened mediastinum and increased cardiothoracic ratio (Fig 1A). Transthoracic echocardiography revealed a giant AAA(11.3×9.7cm) with sinotubular junction effacement, compressing right atrium and tricuspid annulus (Fig 1B-1C). Computed tomography angiography confirmed the presence of AAA (12.3×11.5cm) (Fig 1D). It compressed the left and right atrium, and superior vena cava (Fig 1E). The volume-rendered three-dimensional image showed a huge AAA with a normal aortic arch and descending aorta (Fig 1F).

Surgical repair of this large AAA was recommended to prevent potentially life-threatening complications. A detailed transesophageal echocardiography was done intraoperatively. Apart from the giant AAA, pre-bypass transesophageal echocardiography revealed a rupture of the sinus of the Valsalva aneurysm with shunting into the right atrium. (Fig 2A) and bicuspid aortic valve. The rupture in the aneurysmal wall measuring 0.3cm was shown intuitively by a three-dimensional echocardiogram (Fig 2B). At operation, a giant AAA occupied almost the entire pericardial cavity (Fig 2C). The aortic valve was confirmed to have 2 leaflets, and a ruptured sinus of Valsalva was identified (Fig 2D). The patient underwent a successful Bentall procedure and the repair of a ruptured sinus of Valsalva. Weaning from cardiopulmonary bypass and postoperative course were uneventful, The patient was discharged from the hospital 10 days after surgery.

## Discussion

A giant AAA is a rare disease which is defined as an aneurysm more than 10 cm in diameter<sup>2</sup>. The AAA's size, rapid expansion, and calcification are associated with an increased risk of rupture<sup>3</sup>. To our knowledge, a giant AAA associated with a ruptured sinus of Valsalva into the right atrium has not been reported previously. Transthoracic echocardiography is the first-line imaging modality in detecting proximal ascending aortic structure. Computed tomography angiography and magnetic resonance angiography have nowadays become commonly used imaging modalities in confirming the diagnosis of AAA and precise its dimensions. Intraoperative transesophageal echocardiography is a versatile diagnostic and monitoring tool to assist with surgical decision-making in the operating room<sup>4</sup>. In our case, transthoracic echocardiography and computed tomography angiography failed to detect the rupture in the sinus of the Valsalva aneurysm. Intraoperative transesophageal echocardiography provides additional information to the surgical team and assists in adjusting the surgical plan. Our case highlights that multimodality imaging plays a paramount role in making a definite diagnosis of a giant AAA associated with a ruptured sinus of Valsalva into the right atrium.

**Conflicts of interest:** None declared.

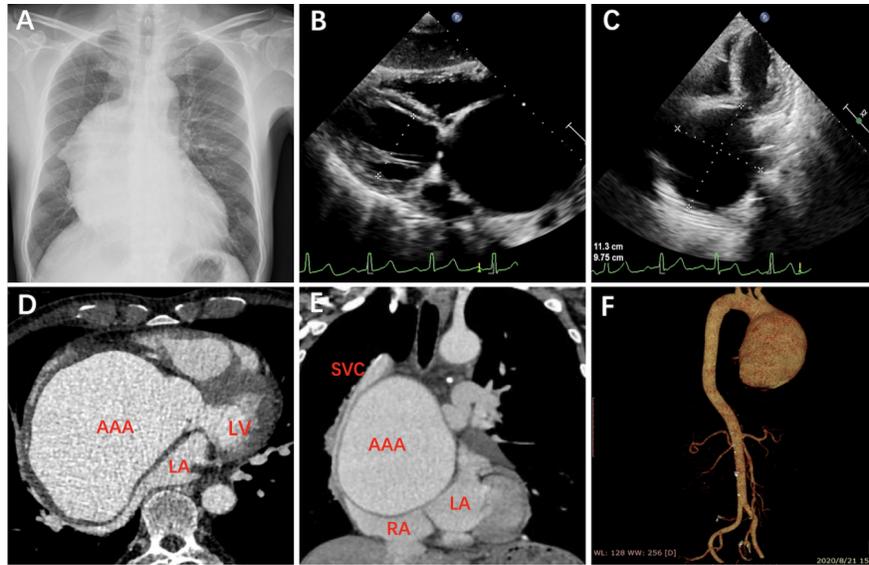
**Informed consent:** Informed consent was given by the patient.

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## Figures Legend:

### Figure1

Chest radiography showing widened mediastinum (A); TTE showing the giant AAA(11.3x9.75cm) with sinotubular junction effacement (B); TTE demonstrating the giant AAA compressed left atrium, right atrium, and tricuspid annulus (C); Contrast-enhanced computed tomography revealing ascending aortic aneurysm compressing the left atrium, right atrium, superior vena cava, (D and E); The 3-dimensional computed tomography showing a giant AAA, normal aortic arch, and descending aorta(F)



**Figure2**

Transesophageal echocardiography and 3-dimensional transesophageal echocardiography demonstrating an orifice in the sinus of the Valsalva aneurysm communicating with the right atrium (A and B); Intraoperative photo revealing the giant ascending aortic aneurysm (C); Intraoperative photo displaying the orifice in the aneurysmal wall (white arrow; D)

