

## Answer

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The correct diagnosis is C: Ruptured sinus of Valsalva aneurysm. The differential diagnosis included acute myocardial infarction (AMI), aortic dissection and massive pulmonary embolism. Chest pain, shock, elevated jugular venous pressure and anterolateral ischemic changes are most compatible with AMI and cardiogenic shock. In AMI with shock, reduced coronary perfusion pressure reduces the effectiveness of intravenous thrombolytic agents, making primary angioplasty the treatment of choice. However, the above findings in a young male with back pain and a wide mediastinum raise the possibility of aortic dissection (causing coronary artery occlusion). Massive pulmonary embolism could also present in this fashion, but would be unlikely to produce a wide mediastinum. Also against the diagnosis of pulmonary embolism is the fact that this patient had no risk factors for venous thromboembolism. Sinus of Valsalva aneurysms most often come to medical attention when they rupture into a cardiac chamber, creating a right-to-left shunt and causing congestive heart failure.

Aortography is unavailable at our hospital, therefore was not a diagnostic option. Transesophageal echocardiography (TEE) is sensitive for aortic dissection and pericardial tamponade; however, our hospital's echocardiographers were all at a US conference and the patient seemed too unstable to

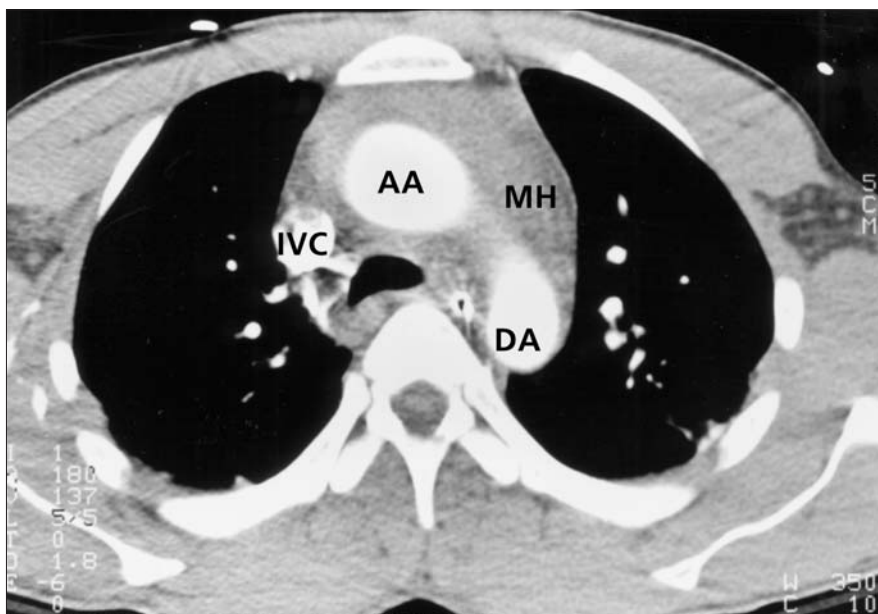


Fig. 1. Mediastinal hematoma, which appears as a grey mass surrounding the ascending and descending aortic arch. AA = ascending aorta; MH = mediastinal hematoma; DA = descending aorta; IVC = inferior vena cava.

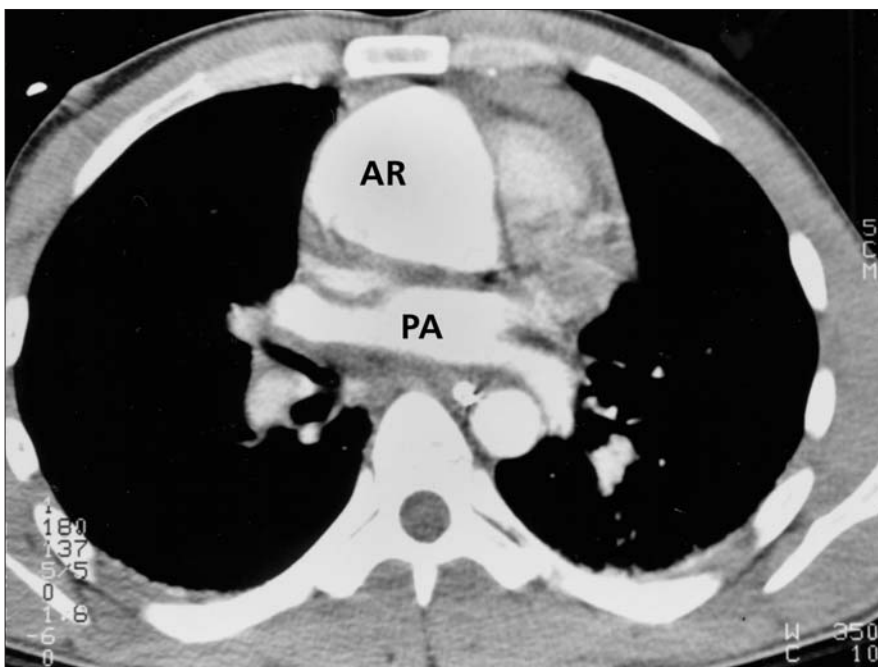


Fig. 2. A cut just below the bifurcation of the pulmonary artery. The large contrast-filled structure anteriorly is the dilated aortic root. AR = aortic root; PA = pulmonary artery.

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transfer. Contrast-enhanced helical CT is sensitive for central (massive) pulmonary embolism and useful to demonstrate aortic dissection. A contrast-enhanced chest CT was performed; it demonstrated a prominent mediastinal hematoma (Fig. 1), a dilated aortic root (Fig. 2) and hemopericardium (Fig. 3). No aortic aneurysm or dissection was identified.

The patient was transferred emergently to a tertiary level hospital for cardiothoracic surgical consultation. At thoracotomy, the surgeon discovered a ruptured right sinus of Valsalva aneurysm and 1 liter of intra-pericar-

dial blood. A supracoronary aortic graft was performed, and the aortic valve was re-suspended without complications. A postoperative echocardiogram demonstrated normal left ventricular function, and the patient was discharged home 6 days after admission.

### Sinus of Valsalva aneurysm

Sinus of Valsalva aneurysm (SVA) is a rare condition that results from separation of the medial and intimal layers of the aortic root,<sup>1</sup> usually at the right coronary cusp, near the origin of the

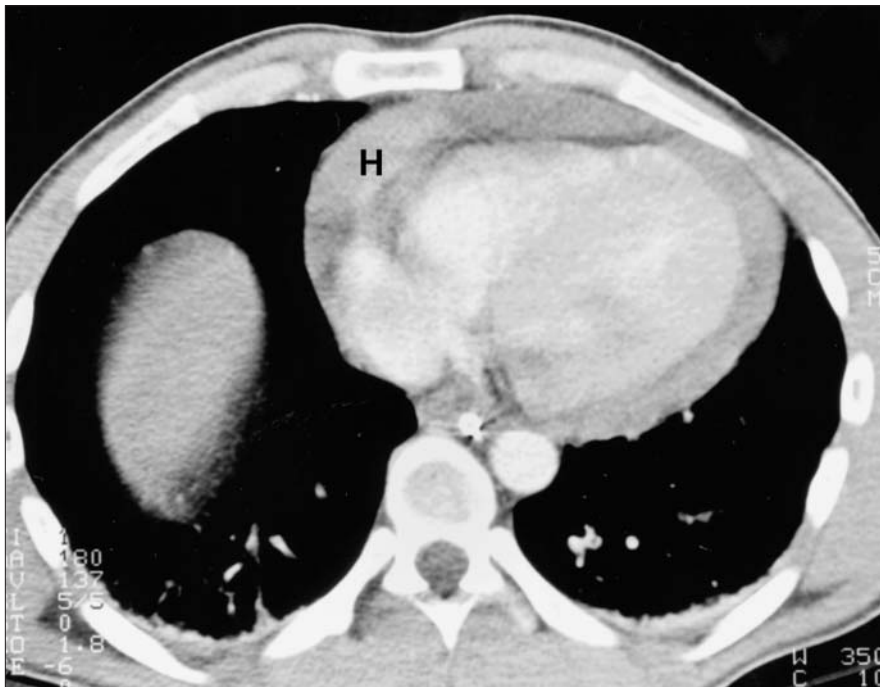
right coronary artery. SVA is thought to be of congenital etiology, although bacterial endocarditis has been implicated in some cases.<sup>2</sup> SVAs are clinically silent unless rupture occurs (most often during the third decade of life). Rupture typically occurs directly into a cardiac chamber, creating a right to left shunt with consequent congestive heart failure.<sup>1</sup> Free intrapericardial rupture with cardiac tamponade, as seen in this patient, is uncommon and generally catastrophic.<sup>3</sup> This would argue for urgent repair of large unruptured aneurysms.<sup>4</sup>

### References

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2. Au WK, Chiu SW, Mok CK, Lee WT, Cheung D, He GW. Repair of ruptured sinus of Valsalva aneurysm: determinants of long-term survival. *Ann Thorac Surg* 1998;66:1604-10.
3. Munk MD, Gatzoulis M, King DE, Webb GD. Cardiac tamponade and death from intrapericardial rupture of sinus of Valsalva aneurysm. *Europ J Cardiothorac Surg* 1999;15:100-2.
4. Hockmuth D, Nelson M, Phillips, S. Free rupture of a sinus of Valsalva aneurysm. *Iowa Med* 1997;87:326-7.

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**For the Challenge, see page 270.**



**Fig. 3.** A cut half-way up the heart. The grey circumferential band around the heart is hemopericardium. H = hemopericardium.