



The Enigma of Stanford Type I Aortic Dissection: Right Coronary Artery Involvement

ALBANY MEDICAL COLLEGE

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Hannah Soliman, BA¹; Adam Abbas, MD²; Amira Elfergani¹; Nala Bughrara²; Sharan Prasad B.S.³; Omar Daghestani⁴; Farzana Afroze, MD²; Nibras Bughrara, MD²

¹Albany Medical College, ²Albany Medical Center, Department of Anesthesiology, Jacobs School of Medicine and Biomedical Sciences³, Albany Medical Center, Department of Cardiology⁴

Introduction

- Stanford type A aortic dissection (TAAD) is a cardiovascular emergency with high morbidity and mortality requiring urgent surgical repair (1).
- Coronary artery involvement occurs in ~10-15% of cases and significantly increases mortality (2,1).
- Right coronary artery (RCA) compromise is problematic, predisposing to right ventricular dysfunction, arrhythmias, and cardiogenic shock (3,1).
- Ostial involvement may be missed on imaging, and intraoperative findings may necessitate urgent RCA grafting (4,1).
- Early recognition and aggressive postoperative support are critical, though outcomes remain poor in complex presentations (3,1).

Case Description

49-year-old male with ESRD, HTN, HLD, OSA, and PUD presented with acute tearing chest pain radiating to the back and right leg numbness. Imaging revealed an Type A acute aortic dissection (TAAD) originating at the aortic root measuring 4.7cm and ascending measuring 4.3 x 4.5cm. Emergent surgical repair of the ascending aorta was performed; a damaged RCA branch was noted after completion of the proximal anastomosis requiring re-arrest and CABG. Preoperative and postoperative EF were normal. CVICU course included bilateral pleural effusions, pneumothorax, persistent bleeding near the pulmonary artery, hypothermia, and leukocytosis. Vasopressor requirements were weaned throughout the week, but remained on low dose dobutamine. A new RLL opacity was found on X-ray. Bronchioalveolar lavage revealed numerous mucous plugs. Intra-arrest TEE showed RCA graft failure and akinetic RV. Resuscitative efforts were halted during CPR after discussion with the family.

Visualization

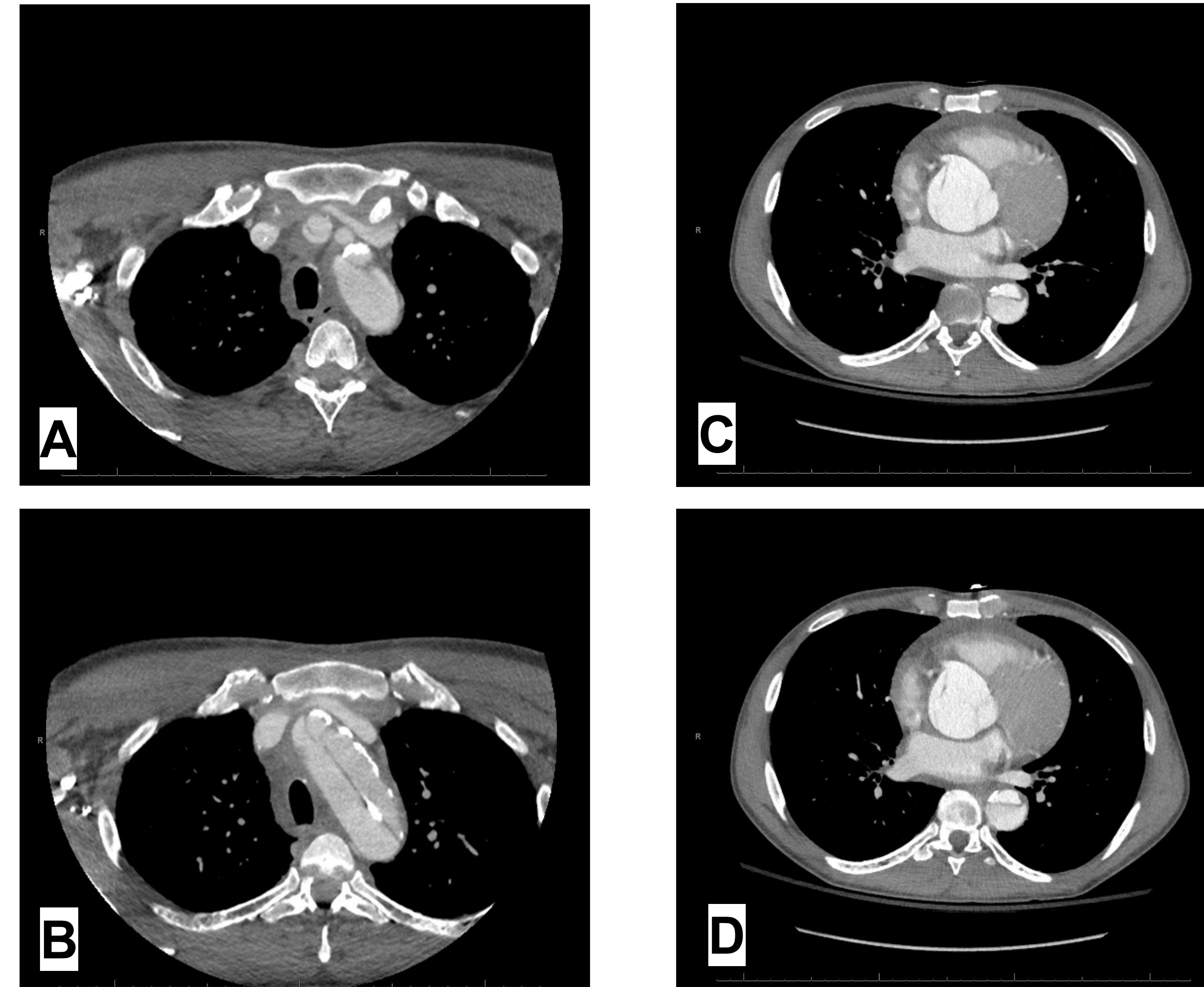


Figure 1 Axial CT Thorax Showing in Panel A from left to right the Brachiocephalic artery, Common Carotid artery, and Subclavian Artery. The false lumen of the ascending aorta (Panel A), aortic arch (Panel B), and sinotubular junction (Panels C and D). The right coronary artery is observed on the anterior surface of the heart (Panels C & D).



Figure 2 Transhepatic Lung View displaying fluid in the right pleural sac, and fluid in the abdominal cavity. The thoracic spine is visible at the most posterior segment of the image.

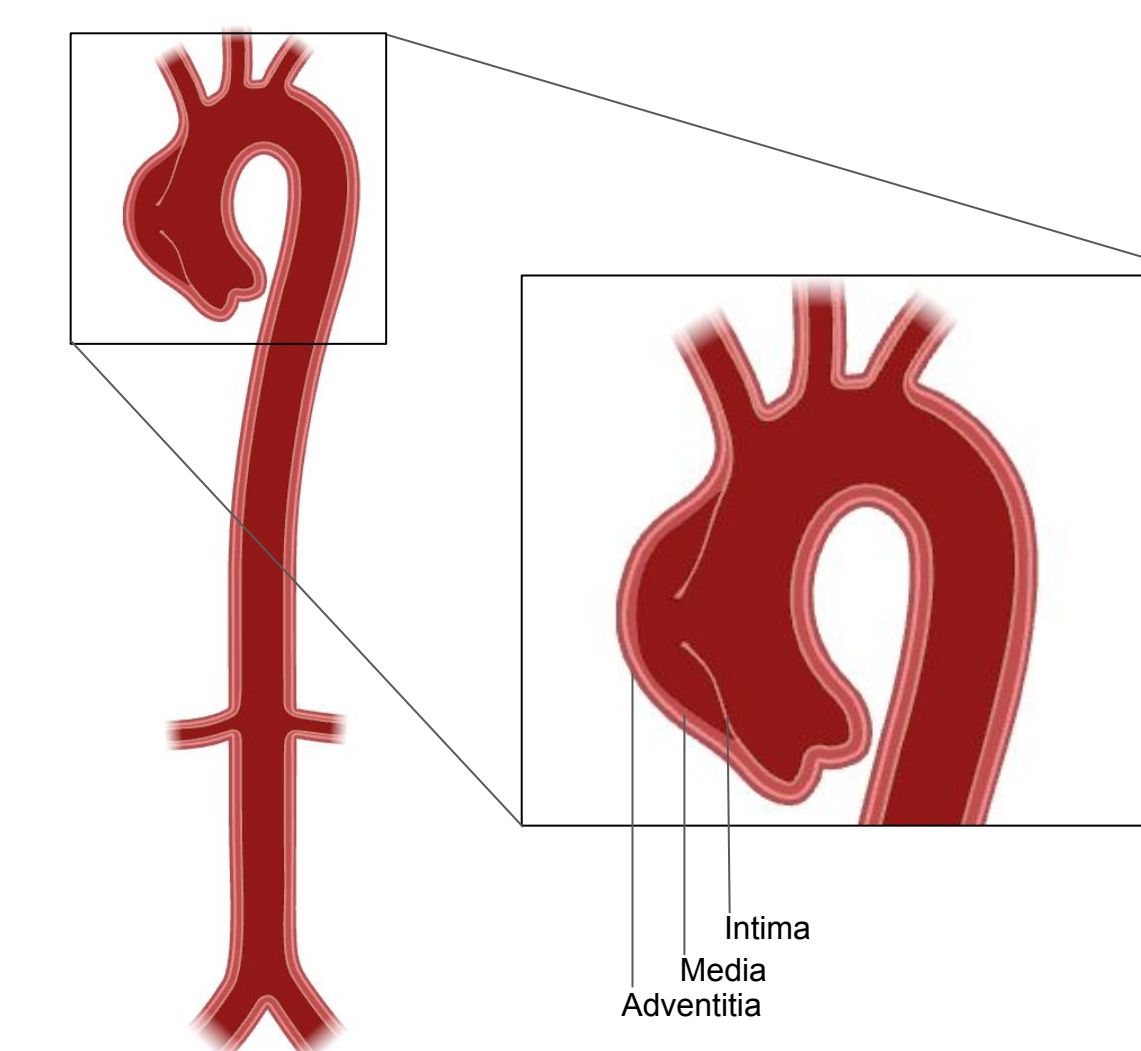


Figure 3 An illustration of an aortic aneurysm. Components taken from [Biorender.com](https://www.biorender.com) (6).

Discussion

This case highlights the complexity of managing extensive Type A aortic dissection in patients with significant comorbidities. Although imaging did not confirm coronary involvement, intraoperative right coronary artery compromise required urgent grafting, further complicating the already challenging surgical repair. Postoperative complete heart block, persistent bleeding, and mixed shock states pointed toward evolving cardiopulmonary compromise, and despite aggressive ICU management, the patient progressed to cardiogenic shock and cardiac arrest. Intra-arrest TEE demonstrated severe right heart failure, an underrecognized complication following aortic surgery, underscoring the importance of anticipating postoperative RV dysfunction in high-risk patients with renal disease, major volume shifts, and myocardial strain. Early recognition and consideration of mechanical circulatory support with percutaneous coronary intervention in appropriate candidates may improve outcomes, particularly in cases complicated by graft failure or unusual coronary anatomy (5).

Conclusion

In summary, this case underscores the challenges of managing extensive TAAD complicated by right coronary involvement, highlighting the limitations of preoperative imaging and the consequences of intraoperative coronary injury. Despite timely grafting and comprehensive postoperative support, the patient developed acute right ventricular failure, a rare but highly lethal complication, particularly in individuals with significant comorbidities such as renal disease. This case reinforces the need for heightened vigilance, multidisciplinary coordination, and early recognition of right ventricular dysfunction, as well as the potential role of advanced circulatory support in select high-risk patients.

References:

