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Case Report

Simultaneous pulmonary artery and Stanford type B aortic dissections via the ductus arteriosus ☆,☆☆,★,★★

Jonathan W. Revels, DO[a,*], *Sherry S. Wang, MBBS*[b], *Jennifer Febbo, MD*[a], *Sowmiya Murali, MD*[a], *Kimberly Luft, MD*[c]

[a] *Department of Radiology, University of New Mexico, MSC 10 5530, Albuquerque, NM 87131, USA*
[b] *Department of Radiology and Imaging Sciences, University of Utah, Salt Lake City, UT*
[c] *Summit Radiology Services, Cartersville, GA*

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ABSTRACT

Pulmonary artery dissection is an exceedingly rare and highly lethal diagnosis that can result in arterial rupture; hence, it is most often identified postmortem. Moreover, pulmonary artery complications resulting from aortic dissection are uncommon occurrences that have seemingly only been reported in cases of Stanford type A aortic dissections. Due to the rarity of pulmonary artery dissections, there is no current established algorithm for treatment of these patients, unlike aortic dissections. We herein present a case of a 40-year-old male with history of uncontrolled hypertension who developed acute back and leg pain that was subsequently diagnosed with a Stanford type B aortic dissection that extended into the main pulmonary artery by way of the ductus arteriosus. Although the patient received appropriate care for his aortic dissection and hypertensive emergency, he eventually died due to development of extensive additional vascular insults: cerebrovascular accidents, compartment syndrome, and myocardial infarction. To our knowledge, this is the first case of combined pulmonary artery dissection and Stanford type B dissection in the literature, which unfortunately adds to the understanding that cases of pulmonary artery dissection tend to have a grim prognosis.

☆ Patient consent statement: Patient and/or next of kin consent could not be obtained due to the patient being transferred to an outside hospital. All patient identifying information has been stripped from the images and movie files. Additionally, no patient identifying information is used in the case report.

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* *Corresponding author*.
E-mail address: Revels.DO@gmail.com (J.W. Revels).

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Introduction

Given that pulmonary artery dissection is exceeding rare, it is unlikely to be the top differential consideration in a patient with chest pain. However, pulmonary artery dissection should be considered if the patient has a history of pulmonary hypertension, congenital heart disease, or recent pulmonary arterial intervention. We herein present what we believe is the first reported case of a Stanford type B aortic dissection with associated pulmonary arterial complications, as well as the first case describing an aortic dissection propagating along the ductus arteriosus to also involve the main pulmonary artery.

Case report

A 40-year-old male with history of uncontrolled hypertension, daily alcohol use, and daily marijuana use, presented to the emergency department with extreme back and leg pain. On physical exam, he was in apparent distress, his systolic blood pressure was repeatedly greater than 200 mm Hg, and his heart rate remained elevated above 160 beats per minute. The remainder of the physical exam was reported to be unremarkable; specifically, radial pulses were symmetric. Given the patient's symptoms and vitals, further assessment with a contrast-enhanced computed tomography angiogram (CTA)

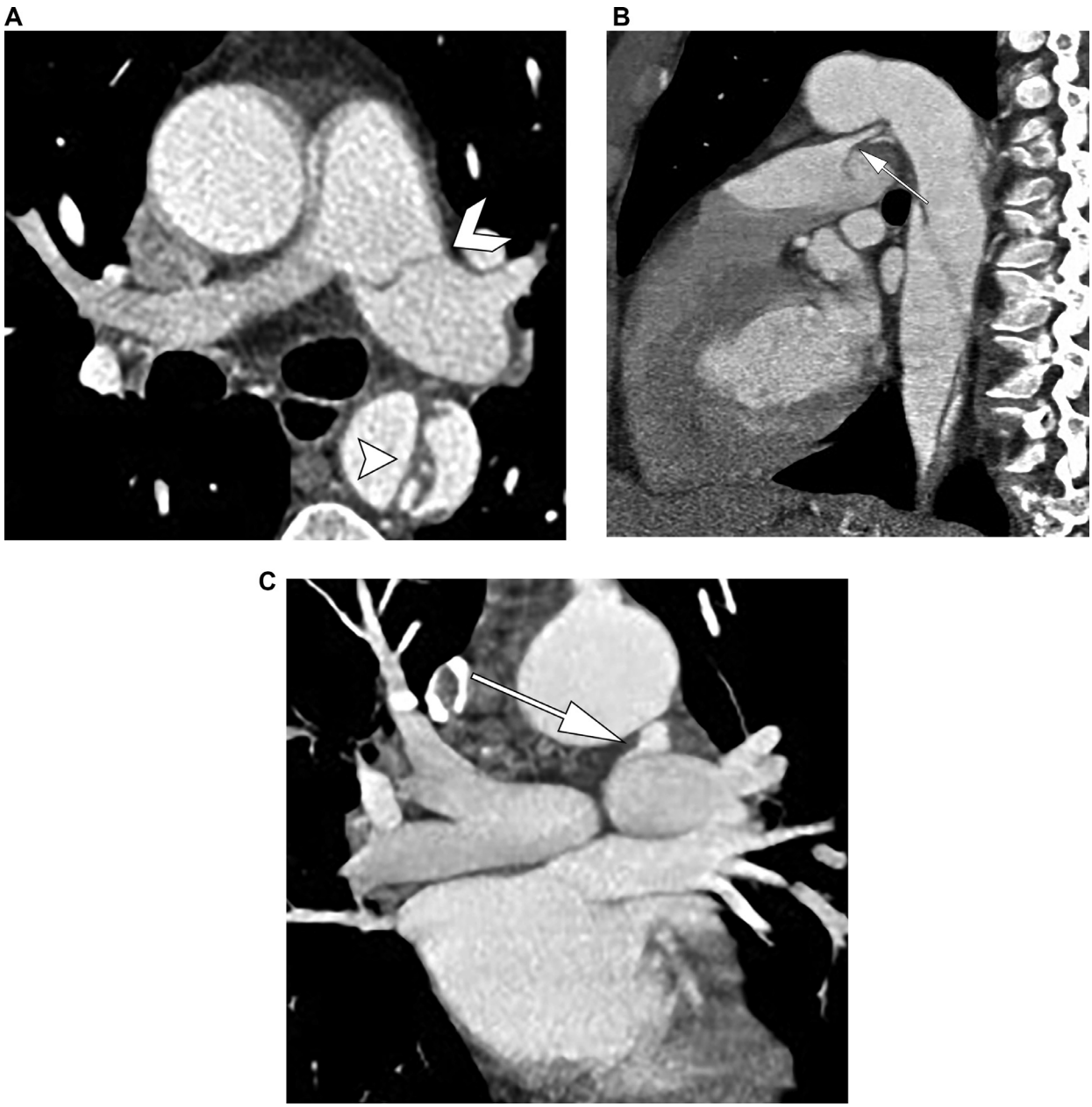

Fig. 1 – Stanford type B thoracoabdominal aortic dissection on a contrast enhanced CTA. (a) Axial image at the level of the proximal descending thoracic aorta demonstrating dissection flaps in both the left pulmonary artery (chevron), and descending thoracic aorta (arrow head). (b and c) Sagittal and coronal maximum intensity projection (MIP) images demonstrating the aortic dissection continuing along the ductus arteriosus (arrow).

was performed due to concern for potential acute aortic syndrome. The CTA revealed a large Stanford type B aortic dissection beginning at the level of the left subclavian artery with propagation along the ductus arteriosus to involve the left pulmonary artery (Fig. 1 and Supplemental movies). The patient was immediately transferred to a higher level of care hospital for vascular intervention where he reportedly received an aortic endograft stent. He unfortunately suffered multiple cerebrovascular accidents, developed bilateral lower extremity compartment syndrome with subsequent unilateral amputation, and eventually died following an acute myocardial infarction.

Discussion

This case is unique in that to our knowledge it the first reported case of a Stanford type B aortic dissection with associated pulmonary arterial complications, as well as the first case describing an aortic dissection propagating along the ductus arteriosus to then involve the pulmonary arterial system.

Pulmonary artery dissection is an exceedingly rare diagnosis that is typically lethal and is most often encountered in patients with history pulmonary hypertension, congenital heart disease, and/or prior pulmonary artery procedural intervention [1]. Less than 100 cases of pulmonary artery dissections have been reported in the literature, and the diagnosis is more often made postmortem as it can lead to pulmonary arterial rupture [1–3]. The main pulmonary artery is the most common location for pulmonary artery dissection, and is often involved in isolation [1].

Pulmonary arterial complications resulting from aortic dissection that have been reported previously include: compression of the pulmonary arteries by the aortic aneurysm sac, continuation of the aortic root dissection to the pulmonary arteries through a communicating intimomedial tear, and mediastinal hematoma dissecting along the pulmonary artery sheath [4–6]. To our knowledge, the currently available literature has only demonstrated pulmonary artery complications arising in cases of Stanford type A dissections, as opposed to our case of a Stanford type B aortic dissection.

Given that pulmonary artery dissections are so infrequently encountered in living patients, a defined treatment algorithm has yet to be established when this diagnosis is made. Previous treatments discussed in case reports have ranged from medical management of pulmonary hypertension, to repair of the site of dissection, to cardiac and lung transplantation [3,4]. The ultimate treatment decision for pulmonary artery dissection would likely be made on a case by case basis weighing factors such as the patient's current condition and comorbidities, as well as local clinical and surgical expertise.

Conclusion

Pulmonary artery dissection is rare, and therefore, not likely to be the top differential consideration in a patient with chest pain; however, this diagnosis should be considered if the patient has a history of pulmonary hypertension, congenital heart disease, or recent pulmonary arterial intervention. Given the rarity of pulmonary artery dissection, a defined treatment algorithm has yet to be established, and among available case reports treatments have ranged from medical management to simultaneous heart-lung transplantation.

Author contributions

Neither this work – which has been approved by all co-authors – nor any part of its essential substance, or figures have been published or submitted to another scientific journal during the submission and review process.

According to Authorship and Co-authorship Requirements for Manuscripts Submitted to Biomedical Journals of International Committee of Medical Journal Editors (ICMJE), all the authors have made substantial contributions to: conception and design, drafting the article or revising it critically for important intellectual content, and final approval of the version submitted to the Journal.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.radcr.2020.09.025.

REFERENCES

[1] Khattar RS, Fox DJ, Alty JE, Arora A. Pulmonary artery dissection: an emerging cardiovascular complication in surviving patients with chronic pulmonary hypertension. Heart 2005;91(2):142–5. doi:10.1136/hrt.2004.045799.

[2] Inayama Y, Nakatani Y, Kitamura H. Pulmonary artery dissection in patients without underlying pulmonary hypertension. Histopathology 2001;38(5):435–42. doi:10.1046/j.1365-2559.2001.01129.x.

[3] Florczyk M, Wieteska M, Kurzyna M, Gościniak P, Pepke-Żaba J, Biederman A, et al. Acute and chronic dissection of pulmonary artery: new challenges in pulmonary arterial hypertension? Pulm Circ 2018;8(2). doi:10.1177/2045893217749114.

[4] Khaja MS, Hallett RL. Pulmonary artery dissection complicating aortic dissection in a patient with bicuspid aortic valve and aortic coarctation. Radiol Case Rep 2017;12(3):472–4. doi:10.1016/j.radcr.2017.05.004.

[5] Kim DH, Ryu SW, Choi Y-S, Ahn B-H. Aortic dissection presenting with secondary pulmonary hypertension caused by compression of the pulmonary artery by dissecting hematoma: a case report. Korean J Radiol 2004;5(2):139–42. doi:10.3348/kjr.2004.5.2.139.

[6] Castañer E, Andreu M, Gallardo X, Mata JM, Cabezuelo MÁ, et al. CT in nontraumatic acute thoracic aortic disease: typical and atypical features and complications. Radiographics 2003;23(suppl_1):S93–S110. doi:10.1148/rg.23si035507.