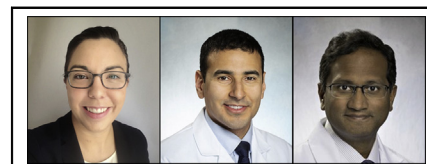


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## Commentary: Magnetic resonance imaging for diagnosing vascular pathology

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### CENTRAL MESSAGE

Imaging is essential for diagnosing vascular pathology, including bronchial artery aneurysms and acute aortic syndromes. Advanced modalities such as MRI may be necessary for definitive diagnosis.

Bronchial artery aneurysms (BAAs) are rare, detected in fewer than 1% of selective bronchial angiograms, although their rupture can be catastrophic.<sup>1</sup> Although often asymptomatic, patients may present with hoarseness, dysphagia, hemoptysis, and chest pain. Presentations similar to aortic dissection have been described.<sup>2</sup> As Ishida and colleagues<sup>3</sup> highlight in this issue of the *Journal*, BAAs can be difficult to diagnose. In particular, juxta-aortic BAAs may be mistaken for aortic pathology. Given the distinct treatment options for these etiologies, accurate diagnosis is paramount.

In their case report, Ishida colleagues<sup>3</sup> describe the workup of a mediastinal BAA in a patient presenting with transient chest pain. This BAA was difficult to distinguish from an aortic arch aneurysm versus intramural blood pool associated with aortic dissection on multiple computed tomography (CT) scans. Ultimately, magnetic resonance imaging (MRI) demonstrated an adventitial plane between the aortic lumen and the BAA, establishing the diagnosis. Conscientious workup by the authors in a nonemergent clinical scenario allowed them to plan and perform successful coil embolization, which was well tolerated.

The diagnostic dilemma raised by Ishida colleagues<sup>3</sup> highlights the utility of and our increasing reliance on imaging modalities for the diagnosis of vascular pathology.

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Although contrast-enhanced CT or CT angiography is often an appropriate initial study for diagnosing a BAA and excluding acute aortic syndromes,<sup>4</sup> MRI provides enhanced tissue characterization.<sup>5</sup> The use of MRI is common for evaluation of the aorta, although generally in nonacute settings. MRI and magnetic resonance angiography can demonstrate complicated 3-dimensional relationships in wide, multiplanar views without the large dose of iodinated contrast required for CT angiography or conventional angiography.<sup>6</sup> For patients with renal failure in whom both iodinated- and gadolinium-based contrast agents are contraindicated, MRI with steady-state free precession sequences can be indispensable, as they provide detailed diagnostic information without the need for contrast agents.<sup>7,8</sup> Pairing positron emission tomography techniques with CT or MRI can reveal inflammatory processes such as large-vessel vasculitides.<sup>9</sup> Four-dimensional flow MRI provides high-resolution velocity data about flow patterns within the aorta and heart. Both positron emission tomography–CT and 4-dimensional flow MRI are under investigation for use in characterizing impending rupture of thoracic aortic aneurysms.<sup>10</sup> Thus, there is likely an imaging modality available for resolving diagnostic quandary, as was the case for Ishida and colleagues.

Advances in diagnostic imaging have yielded a battery of studies for establishing, characterizing, and surveilling vascular pathology. Transfer to institutions with the capability to perform these studies and the staff skilled in their interpretation may be necessary for optimal patient care. At most institutions, CT remains the favored study in urgent

situations, given its speed and availability. In urgent clinical scenarios in which imaging findings remain ambiguous, on-table angiography in a hybrid operating room may be necessary to confirm the diagnosis while expediting treatment. Overall, clinical judgment remains paramount. As surgeons, it is imperative that we maintain a command of available modern imaging techniques to further enhance our ability to establish an accurate vascular diagnosis and to guide optimal care.

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