Use of Electrocardiographic Gating in Computed Tomography Angiography of the Ascending Thoracic Aorta

We congratulate Hendel et al. (1) on their detailed documentation of appropriateness criteria for cardiac computed tomography (CT) and cardiac magnetic resonance imaging, which they published in the October 3, 2006, issue of the Journal. We are, however, concerned regarding the apparent recommendation for use of non–electrocardiographic (ECG)-gated CT angiography in the evaluation of potential aortic dissection (Tables 8 and 10 in Hendel et al. [1]).

The aortic root and ascending thoracic aorta move in concert with the left ventricle and have the greatest motion during systole. It is well documented that motion artifacts from aortic wall motion can simulate the appearance of a dissection flap, particularly in the aortic root and ascending thoracic aorta, leading to an erroneous diagnosis of ascending aortic dissection (2–4). The prevalence of this finding is described as being as high as 57% in non–ECG-gated CT angiographic studies (5).

The use of ECG gating (either prospective or retrospective gating) has been shown to effectively “freeze” cardiac pulsation and aortic wall motion and to reduce motion artifacts when compared to results of non–ECG-gated studies (6,7). Furthermore, the application of ECG gating by adequately trained technologists has no impact on the workflow of the CT examination (7). In our own practice, we prefer the use of prospective ECG gating to minimize radiation exposure to our patients.

Therefore, we believe that ECG gating should be mandatory for thoracic aortic CT angiograms performed to detect potential aortic dissection. We hope that the investigators agree and will promptly make this critical and appropriate correction.

REFERENCES


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Reply

We thank Drs. Cheong and Flamm for their concern about the use of nonelectrocardiographic (ECG)-gated computed tomographic angiography (CTA) in the evaluation of potential aortic dissection in the latest Appropriateness Criteria document (1). The American College of Cardiology Foundation Appropriateness Criteria Working Group has reviewed their letter, which was forwarded by the editor of JACC for our consideration.

Drs. Cheong and Flamm certainly raise an important point. To clarify, the listing of the indications and the technology used is not a “recommendation” for the use of non–ECG-gated CTA in the evaluation of potential aortic dissection. Instead, the expert panel rated the use of this technology as “appropriate” for the evaluation of aortic dissection. We certainly agree that, in many situations, the use of ECG gating would also be “appropriate” and likely would provide better image quality for assessing the relationship of an intimal flap with the structures of the aortic root, including the coronary arterial ostia. Depending on the method of ECG gating (retrospective vs. prospective), this may come at the cost of increased radiation exposure to the patient. The indications and specific imaging techniques as listed were not meant to be exhaustive, and the use of ECG gating was not purposefully excluded.

REFERENCES


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We will be certain that the issue Drs. Cheong and Flamm raised is brought to the attention of future Indication Writing Groups and Technical Panels responsible for updating this document. We also expect other documents and efforts within the American College of Cardiology will focus on the issue Drs. Cheong and Flamm raise in their letter and will be available for reference in future versions of the CT criteria.

We again thank him for bringing this issue to our attention and will use it along with the comments of others as we refine the Appropriateness Criteria process and documents going forward.

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