



Review

Update in acute aortic syndrome: Intramural hematoma and incomplete dissection as new disease entities



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ABSTRACT

Acute aortic syndrome is a relatively recent clinical entity. Non-invasive imaging methods, such as computed tomography and transesophageal echocardiography, have contributed significantly to the diagnosis of variant forms of classic aortic dissection, which have become important disease entities in acute aortic syndrome. Imaging findings may result in risk stratification and application of different treatment options, providing a rational approach to achieve a better outcome of this syndrome. This review will focus on the imaging characteristics of two important variant forms of classic aortic dissection, intramural hematoma and incomplete dissection, and the role of imaging methods in the evaluation of differences in the hemodynamic status of false lumens that contributes to patient prognosis.

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Introduction

The successful clinical introduction of various non-invasive imaging modalities has contributed to the establishment of 'acute aortic syndrome', a relatively recent clinical syndrome incorporating several disease entities with similar clinical features (at the time of clinical presentation) [1]. Aortic dissection (AD) with

intimal flap and two aortic channels (true and false lumens) is the most important disease entity in acute aortic syndrome. The clinical characteristics of AD have been established, with standardized treatment strategies depending on the affected site of the aorta. For the past several decades, variant forms of classic AD, including aortic intramural hematoma (IMH) and incomplete dissection have been increasingly diagnosed in routine clinical practice worldwide, and imaging findings characteristic of these variant forms have been established for their differential diagnosis. As imaging findings, rather than clinical features, are critical for the differential diagnosis of acute aortic syndrome [1–4], careful interpretation of imaging results is necessary for accurate diagnosis and better clinical decision making, thus improving

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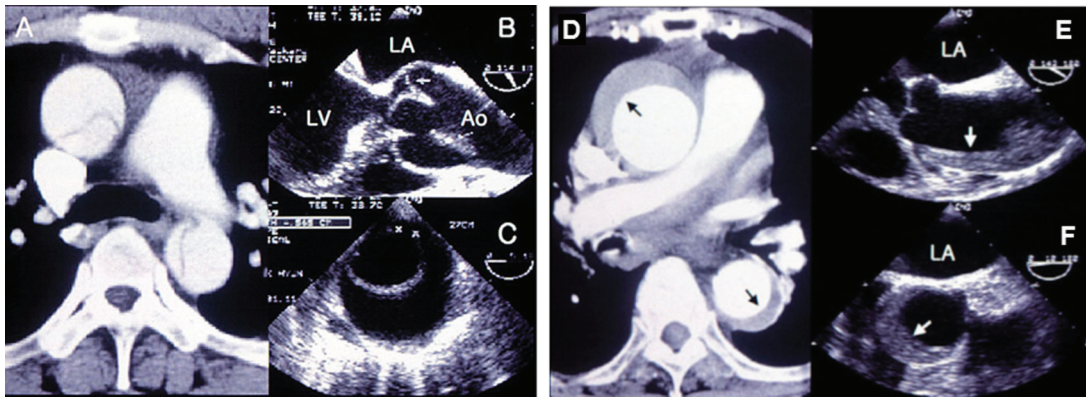


Fig. 1. Representative computed tomography and transesophageal echocardiography images of classic aortic dissection (A–C) and intramural hematoma (D–F). Reproduced from Ref. [2] with permission.

patient outcomes. IMH is probably the most important variant form of classic AD and has been the source of intense controversy regarding its pathogenesis and optimal treatment options. Clinical reports regarding outcomes of patients with IMH from different centers have shown conflicting results, and risk stratification based on imaging findings remains a challenging clinical issue.

Aortic intramural hematoma

Issues regarding characteristic imaging findings

Classic AD is characterized by flow communication through a demonstrable primary intimal tear creating a “double channel aorta” with a true and a false lumen. In IMH, a variant form of AD, blood is believed to accumulate within the aortic wall in the absence of initial intimal disruption. As demonstrable intimal tear

resulting in flow communication from the true lumen is absent in IMH, conventional aortography has failed to diagnose this potentially fatal disease entity [5]. The successful clinical introduction of various non-invasive imaging modalities to assess aortic pathology, such as contrast-enhanced X-ray computed tomography (CT), magnetic resonance imaging, and transesophageal echocardiography (TEE), has made possible the antemortem diagnosis of IMH. Crescentic or circular aortic wall thickening without an intimal flap or tear is a hallmark for the diagnosis of IMH (Fig. 1). However, several characteristic findings need to be re-emphasized.

Crescentic aortic wall thickening on CT suggesting the development of IMH usually appears as *high attenuation area* prior to contrast injection, which is not enhanced after the injection of contrast medium (Fig. 2A and B). This finding appears to represent the accumulation of blood or bleeding into the aortic

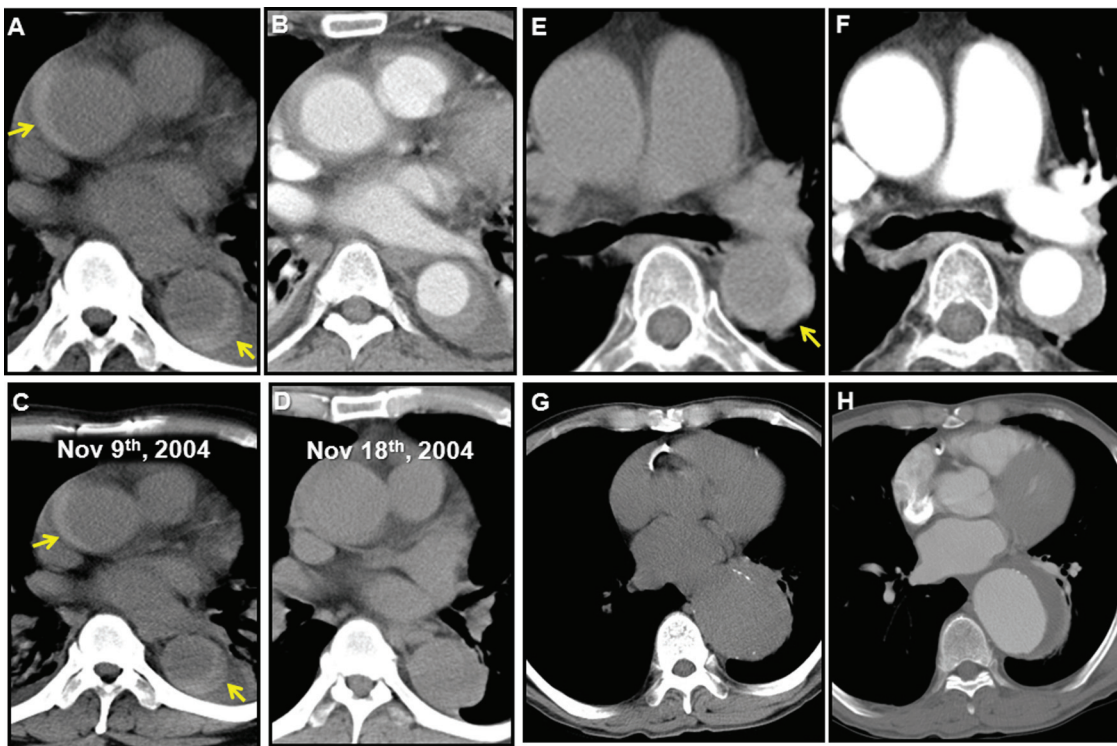


Fig. 2. Representative computed tomography (CT) images showing characteristic ‘high attenuation’ in aortic intramural hematoma before contrast injection. On pre-contrast CT (A), high attenuation areas along the aortic wall (yellow arrow) represent intramural hematoma. These areas did not show any contrast enhancement after injection of contrast medium (B) and disappeared within 2 weeks after symptom onset (C and D). Attenuation before contrast injection is helpful for the differential diagnosis of eccentric aortic wall thickening, as this phenomenon occurs in a patient with intramural hematoma (E and F), not in a patient with dilated aorta and crescentic mural thrombus (G and H).

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