

## SHORT REPORT

## Confirmation of Intimal Tear in Thrombosed-Type Acute Aortic Dissection by Virtual Angioscopy

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**Introduction:** Therapeutic strategies for intramural hematoma (IMH) involving the ascending aorta remain controversial.

**Report:** The patient was a 72 year old woman with a history of chest pain. Multidetector computed tomography (MDCT) showed an IMH involving the ascending aorta. Because virtual angioscopy revealed a punctate intimal tear in the ascending aorta, acute aortic dissection with an intimal tear and not IMH was diagnosed, and emergency surgery was performed. The post-operative course was uneventful.

**Discussion:** Virtual angioscopy allows the vascular lumen to be examined minimally invasively on the basis of images reconstructed from MDCT data. Even if MDCT does not clearly show an intimal tear associated with aortic dissection in a general view, virtual angioscopy can show the exact location and size of the tear before surgery. Virtual angioscopy is very useful for distinguishing thrombosed-type acute aortic dissection without clear ulcer like projections from an IMH, which may facilitate therapeutic planning.

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### CASE REPORT

A 72 year old woman experienced chest pain. Acute coronary syndrome was suspected, and she was transferred to hospital. On presentation, her blood pressure was 110/60 mmHg and stable without chest discomfort. There was no abdominal pain and the radial and dorsalis pedis arteries were equal bilaterally. There were also no clear symptoms of a malperfusion syndrome. Mild aortic insufficiency had been diagnosed in a previous hospital. There was no exacerbation of aortic insufficiency on echocardiography at initial presentation, which indicated mild aortic insufficiency with pericardial effusion within the physiological range.

Multidetector computed tomography (MDCT) showed evidence suggesting an intramural hematoma (IMH) involving the ascending aorta which is however, difficult to differentiate from thrombosed-type acute aortic dissection without ulcer like projections. The maximum diameter of the ascending aorta was 40 mm, and the thrombosed area was 7 mm thick (Fig. 1A and B). The dissection was DeBakey

type 2. Computed tomography showed a small pericardial effusion but no pleural effusion. A cardiac surgeon interpreted the MDCT initially and diagnosed an IMH without an intimal tear because the images showed a narrow thrombosed area with no clear entry. It remains controversial whether conservative therapy or surgery is the treatment of choice for IMH involving the ascending aorta. Immediately thereafter, the MDCT data were analyzed at a workstation where it took one hour to reconstruct virtual angioscopy images. Because virtual angioscopy showed a punctate intimal tear in the ascending aorta (Fig. 2), acute aortic dissection with an intimal tear was diagnosed rather than IMH. In the patient, an IMH might have been converted into acute aortic dissection as described by Estrera et al.<sup>1</sup> Even if that had occurred, the diagnosis was type A acute aortic dissection, and emergency surgery was performed 4 hours after the examination. A bloody epicardial effusion was found. Consistent with the results of virtual angioscopy, an intimal tear was found in the anterior wall of the ascending aorta. Ascending aortic replacement with the use of antegrade selective cerebral perfusion was carried out. The post-operative course was uneventful. Post-operative contrast enhanced computed tomography showed no residual dissection (Fig. 3).

### DISCUSSION

Aortic intramural hematoma has been reported to be a variant of aortic dissection. IMH was originally defined as

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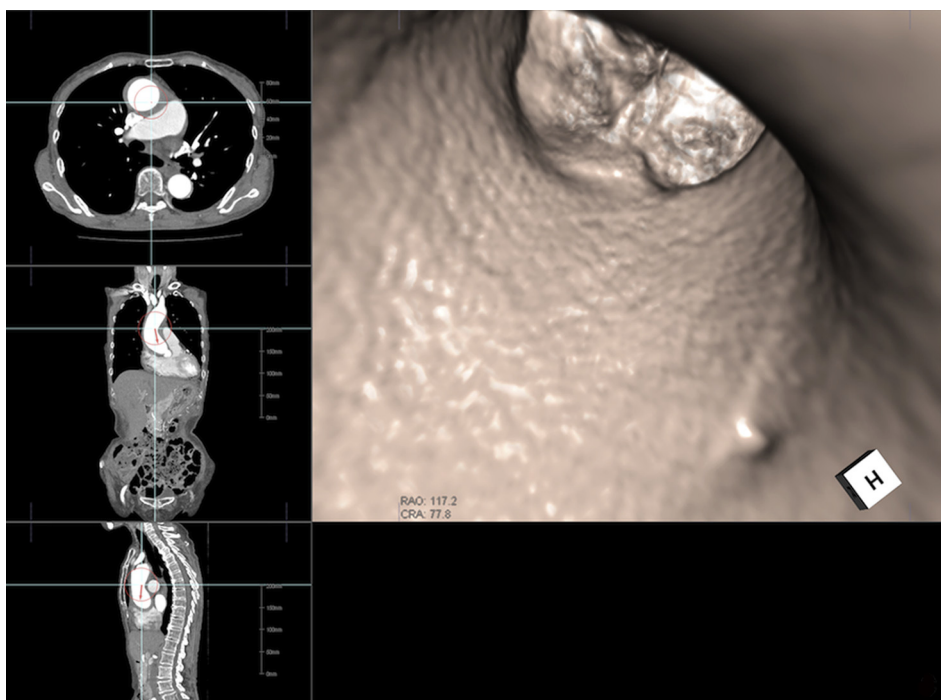
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**Figure 1.** (A) Axial and (B) sagittal views of the pre-operative computed tomographic angiograms, showing an aortic intramural hematoma involving the ascending aorta.

aortic dissection without an intimal tear and was attributed to rupture of the vasa vasorum. Therapeutic strategies for IMH involving the ascending aorta remain controversial. Recent reports have described cases of IMH that are inconsistent with the conventional definition. Reports from Western countries often recommend early operation, whereas Asian groups have obtained good clinical results with medical treatment.<sup>2</sup> IMH can lead to cardiac tamponade and shock, and might be accompanied by type A acute aortic dissection or exacerbation of symptoms. Therefore the differential diagnosis from type A acute aortic dissection with an intimal tear is very important. Uchida et al.<sup>3</sup> reported that most cases of IMH are acute aortic dissections with intimal tears without a re-entry site. Virtual angiography is a minimally invasive technique that enables the vascular lumen to be examined on the basis of images reconstructed from MDCT data. Maldjian and Partyka<sup>4</sup> reported that MDCT with virtual angiography can show the configuration of intimal tears in patients with thoracic aortic dissection, which may facilitate therapeutic planning. Roselli et al.<sup>5</sup> reported a good outcome of endovascular stent repair of the ascending aorta in patients with acute type A aortic dissection. Because virtual angiography can be used to visualize the positional relationship between the coronary and brachiocephalic vessels before surgery, it might be very useful for stent repair of the ascending aorta in acute type A aortic dissection. Even if MDCT does not clearly show an intimal tear associated with aortic dissection in a general view, virtual angiography can indicate the exact location and size of the tear before surgery. Virtual angiography is very useful for distinguishing thrombosed-type acute aorta dissection without the clear ulcer like projections from IMH, which may facilitate therapeutic planning.



**Figure 2.** Images obtained by virtual angiography, clearly showing a punctate intimal tear in the ascending aorta.



**Figure 3.** Post-operative computed tomographic images, showing no evidence of residual dissection.

Patient consent was obtained using a Case Report Patient Consent Form.

### CONCLUSION

Computed tomography devices are widely available in Japan, and enhanced computed tomography can be performed in most patients suspected of having acute aortic dissection. If a computer workstation is available, virtual angioscopy can be performed easily and quickly. It is an advantage that virtual angioscopy can be used to reconstruct images without worrying about the cost. Virtual angioscopy is a simple, easy, and useful technique for distinguishing acute aortic dissection from IMH.

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### CONFLICT OF INTEREST

None.

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