

Case Report

A case of circumferential type A aortic dissection with intimal intussusception diagnosed using repeat transthoracic echocardiography examination

Toshinobu Yamagishi, Masahiro Kashiura,  Kazuya Nakata, Kazuki Miyazaki, Takahiro Yukawa, Takahiro Tanabe, Kazuhiro Sugiyama, Akiko Akashi, and Yuichi Hamabe

Tertiary Emergency Medical Center, Tokyo Metropolitan Bokutoh Hospital, Sumida-ku, Tokyo, Japan

Case: Sometimes it is difficult to diagnose circumferential aortic dissection with enhanced computed tomography alone. A 58-year-old woman presented with sudden-onset chest discomfort and loss of consciousness. Transthoracic echocardiogram showed mild aortic regurgitation. Enhanced computed tomography scans showed no obvious intimal tear or flap at the proximal ascending aorta, but an intimal flap was observed from the aortic arch to both common iliac arteries. Stanford type B dissection was tentatively diagnosed. Repeat detailed transthoracic echocardiography examination showed an intimal tear and flap at the ascending aorta; prolapsed into the left ventricle caused severe aortic regurgitation. Type A aortic dissection was definitively diagnosed; emergent operation showed a circumferential intimal tear originating from the ascending aorta.

Outcome: The ascending aorta was replaced; aortic regurgitation disappeared. The patient was discharged in a good condition 58 days postoperatively.

Conclusion: Dynamic evaluations with transthoracic echocardiography should be carried out to diagnose circumferential aortic dissection.

Key words: Aortic diseases, aortic valve insufficiency, echocardiography, multidetector computed tomography, sensitivity and specificity

INTRODUCTION

ACUTE TYPE A aortic dissection is associated with a mortality rate of 50% within the first 48 h if not surgically treated,¹ so early diagnosis and surgical treatment are important. If the type A dissection is circumferential, earlier repair is needed, because severe complications (e.g., massive aortic regurgitation [AR] and coronary ostial occlusion) can occur.

Generally, computed tomography (CT) is essential for making a diagnosis of acute aortic dissection because of its high diagnostic accuracy. We describe a case of circumferential type A aortic dissection that was diagnosed using

repeat transthoracic echocardiography (TTE) examination, not enhanced CT.

CASE

A 58-YEAR-OLD WOMAN with a medical history of untreated hypertension presented with sudden-onset chest discomfort and loss of consciousness. On arrival, she had persistent chest and back pain. The Glasgow Coma Scale score was 8 (eye 1, verbal 3, motor 4); both pupils were approximately 3 mm in diameter and reactive. Her blood pressures were 158/63 mmHg in the right arm and 60/42 mmHg in the left arm. Her heart rate was 72 b.p.m. She did not have paralysis; however, her consciousness was unstable with remission and exacerbation. She had intermittent right conjugate deviation. Electrocardiogram findings were normal. Laboratory test results were as follows: leukocyte count, 9,700 cells/ μ L; red blood cell count, 338×10^4 cells/ μ L; hemoglobin level, 9.9 g/dL; platelet count, 18.5×10^4 cells/ μ L; aspartate aminotransferase level, 19 IU/L; alanine aminotransferase level, 12 IU/L; lactate

Corresponding: Toshinobu Yamagishi, MD, 4-23-15 Kotobashi, Sumida-ku, Tokyo 130-8575, Japan. E-mail: t_yamagishi0211@yahoo.co.jp.

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dehydrogenase level, 273 IU/L; creatine kinase level, 78 U/L; creatine kinase MB level, 15 U/L; D-dimer level, 59.6 $\mu\text{g}/\text{mL}$; and fibrin degradation product level, 192.1 $\mu\text{g}/\text{mL}$.

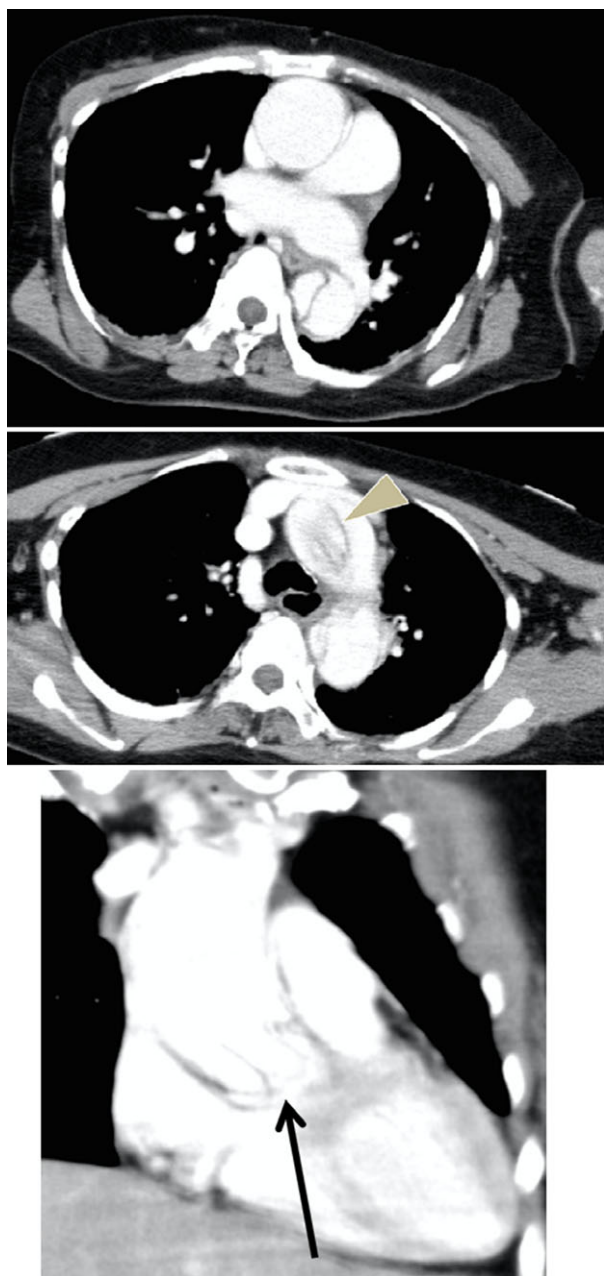


Fig. 1. Enhanced computed tomography scans of a 58-year-old woman with sudden-onset chest discomfort and loss of consciousness, showing no obvious intimal flap at the proximal ascending aorta but some linear artefacts at the aortic root (arrow). Additionally, the intimal flap was observed from the aortic arch (arrowhead), and it extended to both common iliac arteries.

The troponin T test was negative. Emergent TTE examination showed mild AR during the diastole phase and normal ventricular contraction without left ventricular asynergy, pericardial effusion, and intimal tear or flap. Enhanced CT results showed no obvious intimal tear or flap at the proximal ascending aorta, but some linear artefacts were observed at the aortic root; however, an intimal flap that extended to both common iliac arteries was observed from the aortic arch (Fig. 1). As we considered mild AR as an independent disease, it was almost reasonable to exclude type A aortic dissection using emergent TTE and enhanced CT. The patient was admitted for observation based on a tentative diagnosis of Stanford type B dissection.

Her respiratory status suddenly worsened. Findings from repeat TTE examination showed an intimal tear and flap at the ascending aorta; prolapse into the left ventricle caused severe AR (Fig. 2). A definitive diagnosis of type A aortic dissection was made, and an emergent operation was performed. Intraoperatively, a circumferential intimal tear originating approximately 15 mm distal from the sinotubular junction was found. The intimal tear did not reach the coronary ostia, and the valve leaflets and coronary artery appeared normal. The ascending aorta was replaced, and the dilated aortic annulus was repaired; subsequently, AR disappeared. Postoperatively, the patient developed nosocomial pneumonia and required antimicrobial therapy. She was discharged in a good condition 58 days postoperatively.

DISCUSSION

THIS CASE HAD two important clinical findings. One, severe AR caused by intimal flap prolapse into the left ventricle could rapidly worsen congestive heart failure. Second, TTE was useful for diagnosing circumferential type A aortic dissection, which could not be diagnosed with enhanced CT.

Circumferential type A aortic dissection is rare with an occurrence rate of approximately 2%,² and the severity is higher than that for other types of aortic dissection because the following main complications tend to occur. First, the cylinder-shaped intimal flap, which falls into the left ventricle and interferes with aortic valve function, causes severe AR.³ Second, diastolic intimal intussusception of the tubular flap causes blood flow obstruction to the coronary ostia and subsequent myocardial malperfusion.⁴ Finally, antegrade intimal intussusception may partly or completely occlude the arch vessels and cause neurologic symptoms.⁵ We assume that the left subclavian artery was occluded by the distal intimal flap of the circumferential type A aortic dissection, which caused the differential in the blood pressure, and acute congestive heart failure was worsened by intimal flap

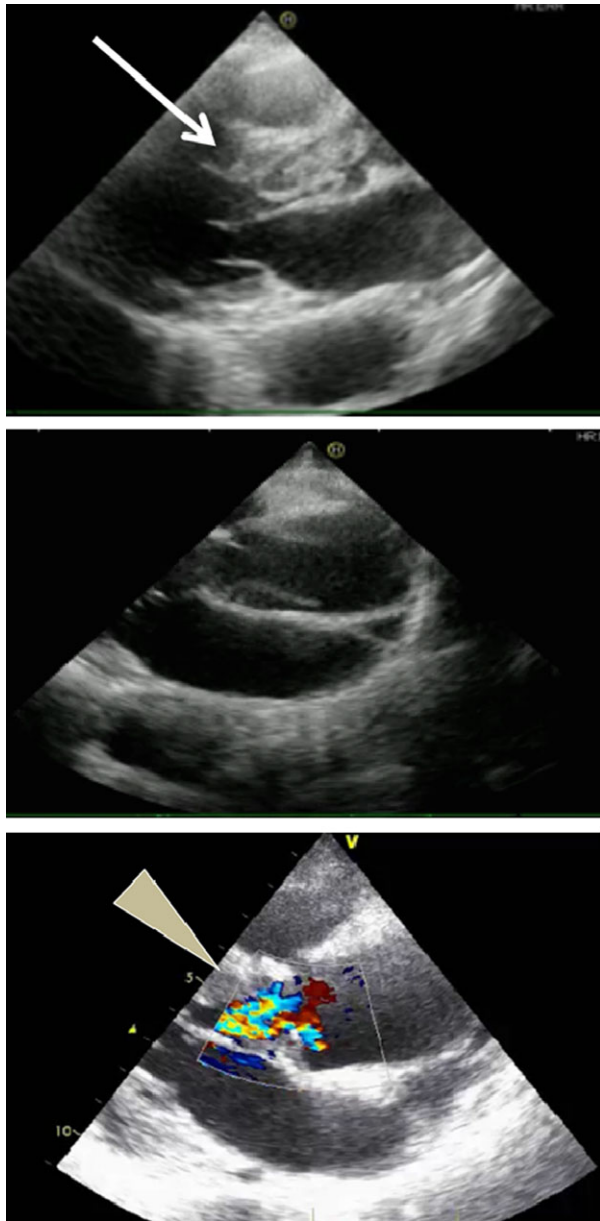


Fig. 2. Echocardiograms of a 58-year-old woman with sudden-onset chest discomfort and loss of consciousness, showing an intimal tear at the ascending aorta and prolapse into the left ventricle (arrow), which caused severe aortic regurgitation during the diastole phase (arrowhead).

prolapse into the left ventricle, which caused severe AR in our case.

Computed tomography has been a widely used imaging technique for diagnosing aortic dissection, as the diagnostic accuracy was excellent (pooled sensitivity, 100%; pooled specificity, 98%).⁶ Sometimes an intimal flap or tear at the

proximal ascending aorta is not shown on enhanced CT, as in our case.³ Thus, it is difficult to distinguish a real flap and tear from an artefact.⁷ Electrocardiographically gated CT angiography is recommended to reduce aortic pulsation artefacts.⁷ Transthoracic echocardiography and transesophageal echocardiography (TEE) should be used to screen for aortic dissection even if type B aortic dissection is diagnosed with CT.⁷

We found TTE useful for diagnosing circumferential type A aortic dissection. The sensitivity and specificity of TTE for diagnosing this condition are 82.2% and 89.2%, respectively, and those of TEE are 95.6% and 96.4%, respectively.⁸ Although TEE has a higher accuracy, it can only be carried out by an experienced cardiologist. Additionally, it may worsen the disease state, because it can cause nausea and vomiting, which increase systemic pressure.⁹ Transthoracic echocardiography may be used as the initial imaging method in the emergency room when aortic dissection is clinically suggested to assess dilation of the aortic root, intimal flap, AR, and pericardial effusion, as these findings are suggestive of acute aortic dissection.⁹ In our case, the initial emergent TTE examination showed mild AR and no prolapsed flap into the left ventricle, so circumferential aortic dissection may not have occurred at that time. When the patient's respiratory status worsened, repeat TTE examination showed the prolapsed flap into the left ventricle and severe AR; subsequently, we strongly suspected circumferential aortic dissection. When TTE is initially carried out, the aortic root should be assessed carefully so as not to miss an intimal flap or tear at the proximal ascending aorta. If the patient's condition worsens rapidly, repeat TTE examinations should be undertaken as often as necessary.

CONCLUSIONS

CIRCUMFERENTIAL TYPE A aortic dissection could worsen rapidly into a life-threatening condition and it is difficult to diagnose using only enhanced CT. Dynamic evaluations with TTE should be used to definitively diagnosis this condition.

CONFLICT OF INTEREST

NONE DECLARED.

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