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Transition from Classic Aortic Dissection to Aortic Intramural Hemorrhage

A Case Report

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ABSTRACT

A 64-year-old man was hospitalized with chief complaints of chest and back pain. A diagnosis of Stanford type A aortic dissection with a false lumen extending from the ascending to the descending aorta was made based on the results of computed tomography (CT). A CT obtained the following day showed resolution of the false lumen and increased brightness of the aortic wall, typical of aortic dissection with intramural hemorrhage. Although previous studies have described a gradual transition from aortic intramural hemorrhage to aortic dissection with a false lumen, there are no reports of the transition from an aortic dissection with a false lumen to the intramural hemorrhage type of aortic dissection. This patient is of interest when considering the pathogenesis of aortic dissection with intramural hemorrhage and the relationship between the intramural hemorrhage and false-lumen types of aortic dissection.

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Introduction

It has recently become apparent that there are subtypes of aortic dissection, one of which is aortic dissection without a false lumen. This has been referred to as aortic intramural hemorrhage,[1-6] aortic dissection without intimal rupture,[1,2] and early thrombosed-type aortic dissection.[7,8] Much remains unknown about the mechanism of the onset of this type of aortic dissection. Furthermore, there is no uniform term to describe it. The natural history of aortic dissection without a false lumen appears to differ from that of aortic dissection with a false lumen.[6] Aortic dissection with a false lumen and aortic intramural hemorrhage are presently treated as different types of aortic dissection.

There have been recent reports of transition to the false-lumen type of aortic dissection in patients with aortic intramural hemorrhage.[9,10] We treated a patient in whom the reverse occurred. Upon admission, the patient was diagnosed as having aortic dissection with a false lumen; but, a short time after onset, the false lumen resolved, and the findings on computed tomography (CT) closely resembled those of intramural hemorrhage. This patient is of interest when considering the pathogenesis of aortic intramural hemorrhage and the relationship between aortic dissection with a false lumen and aortic intramural hemorrhage.

Case Report

A 64-year-old man presented with chest and back pain. He had been hospitalized for paroxysmal atrial fibrillation 1 year earlier but had no history of hypertension. On the day of admission, the patient experienced a sharp pain in his back immediately after walking up a flight of stairs in his home. The back pain could not be controlled, and he was brought by ambulance to the emergency department of our hospital. Acute aortic dissection was diagnosed after CT of the chest and abdomen demonstrated a circumferential false lumen extending from the ascending aorta to the celiac artery origin. On examination, the patient was 172 cm tall and weighed 68 kg. He had a temperature of 36.6°C, a regular pulse rate of 60 per minute, and blood pressures of 150/80 mm Hg in the right arm, 148/76 mm Hg in the left arm, 152/82 mm Hg in the right leg, and 150/80 mm Hg in the left leg. Examination of the palpebral conjunctiva showed no evidence of anemia, and the bulbus conjunctiva was not yellow. No cardiopulmonary abnormalities were detected on auscultation. The abdomen was flat and soft, and no palpable mass was evident. No edema was observed in the lower limbs, and the neurologic findings were normal.

Hematologic and blood chemical examination on admission showed a slightly elevated white blood cell count ($10.5 \times 103/\mu L$) and creatine phosphokinase activity (611 IU/L). Emergency contrast CT showed narrowing of the true lumen and the formation of a false lumen in the ascending and descending aorta (Figure 1, left). The diagnosis of a Stanford type A aortic dissection with a false lumen was made. The following day, noncontrast CT revealed increased brightness of the aortic wall. Contrast CT showed resolution of the false lumen centered around the ascending aorta (Figure 1, right). The CT findings were typical of aortic intramural hemorrhage. Although the initial diagnosis on admission was that of a Stanford type A aortic dissection, the false lumen soon became occluded. The patient's blood pressure stabilized, his back pain resolved, and no other organs were damaged by the dissection. We therefore decided to manage the patient medically, with treatment aimed principally at reducing the blood pressure.

Follow-up CT on the 27th day of hospitalization (Figure 2, left) revealed narrowing of the true lumen and thickening of the aortic wall accompanied by thrombotic occlusion of the false lumen in the descending aorta. There was no dilatation of the ascending aorta or enhancement of the false lumen. Oral antihypertensives were started, and rehabilitation was initiated. The patient made good progress and was discharged 45 days after admission. Five months after presentation, CT showed resolution of the narrowing of the true lumen and thrombotic occlusion (Figure 2, right).

Discussion

On the second day of hospitalization, CT showed findings characteristic of aortic intramural hemorrhage. If the false lumen had not been seen on

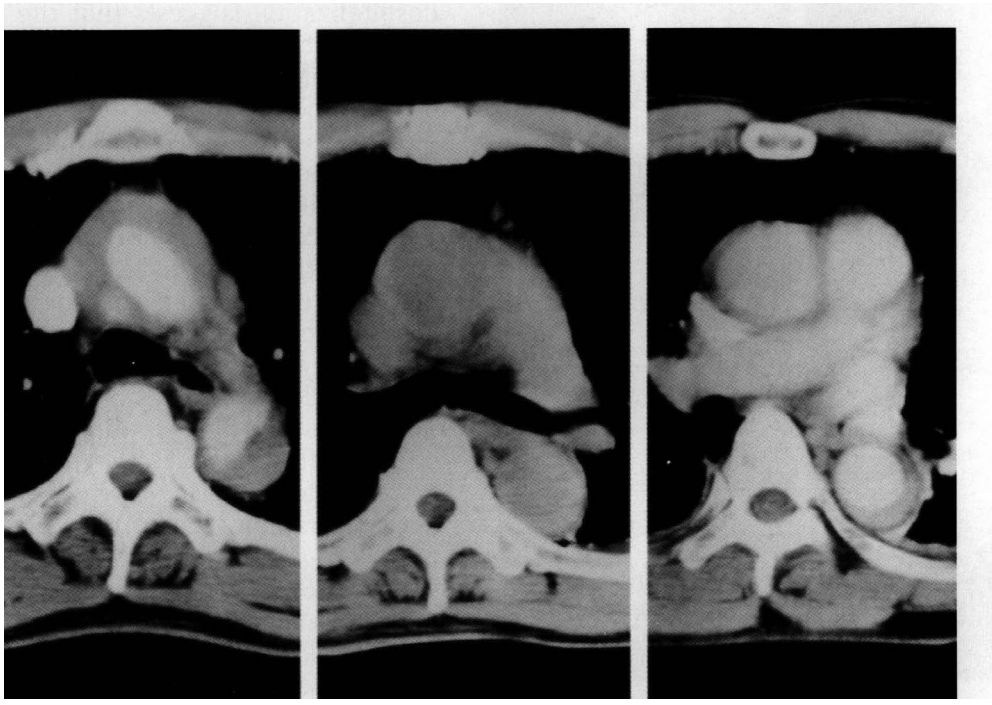

Figure 1. Computed tomography (CT) in a patient with chest and back pain. Left, emergency contrast CT obtained on admission, showing narrowing of the true lumen and formation of a false lumen in the ascending and descending aorta. A diagnosis of Stanford type A aortic dissection with a false lumen was made. Middle and right, noncontrast CT obtained on the second day of hospitalization showing increased brightness of the aortic wall and resolution of the false lumen in the ascending aorta.

the day of admission, a diagnosis of aortic intramural hemorrhage would probably have been made. Aortic intramural hemorrhage is characterized on noncontrast CT by increased brightness extending the full circumference of the vessel wall. The aortic wall is either of normal thickness or exhibits slight asymmetric thickening. The absence of an appreciable false lumen on contrast CT is critical to the diagnosis.

Recent literature contains a number of reports of transition from aortic intramural hemorrhage to aortic dissection with a false lumen during follow-up.[9,10] However, these presentations are now considered to be different types of aortic dissection, with different prognoses and natural histories. In our patient, the false lumen resolved, and CT findings closely resembled those of aortic intramural hemorrhage. This has not been reported previously. Thrombosis and occlusion of the false lumen often occur as part of the healing process of the false-lumen type of aortic dissection. The early thrombosed type of aortic dissection is associated with an asymmetric thickening of the aortic wall that is suggestive of thrombosis of the false lumen.[7,8] However, the increased brightness of the wall of the ascending aorta, seen in our patient on noncontrast CT on the second day of hospitalization, was more consistent with aortic intramural hemorrhage than with false lumen thrombosis since the wall thickness was uniform and close to normal. This was not consistent with an early thrombosed type of aortic dissection. The findings were also clearly different from the thrombosis of the false lumen observed during the healing of the aortic dissection with a false lumen. It has become apparent

27th day 5 months

Figure 2. Follow-up computed tomography (CT). Left, CT obtained on the 27th day of illness showing narrowing of the true lumen and thickening of the wall accompanied by thrombotic occlusion in the descending aorta. Dilatation of the ascending aorta and enhancement of the dissecting lumen are not evident. Right, CT obtained 5 months after onset showing resolution of the narrowing of the true lumen and thrombotic occlusion.

that some patients with aortic dissection with a false lumen exhibit CT findings typical of aortic intramural hemorrhage because of the rapid resolution of the false lumen. Although aortic intramural hemorrhage and aortic dissection with a false lumen are classified as different disease entities according to diagnostic imaging criteria, it is possible that in some patients with CT findings suggestive of aortic intramural hemorrhage, the pathogenesis is the same as that of aortic dissection with a false lumen.

Although CT showed the presence of a false lumen on the first day of hospitalization, the inflow of contrast medium was delayed and blood flow in the false lumen was appreciably lower than in the true lumen. The complete resolution of the false lumen on CT on the second day of hospitalization suggests that the reentry point probably acted as a check valve and that the blood was completely expelled from the false lumen owing to occlusion of the entry point and the internal pressure of the true lumen. Although this explanation is based purely on conjecture, we believe that it accounts for the data in this case.

The prognosis for aortic intramural hemorrhage, particularly when it occurs in the descending aorta, is better than that for aortic dissection with a false lumen.[4] Our experience also suggests that aortic intramural hemorrhage in the ascending aorta does not necessarily have a poor prognosis, provided that cardiac tamponade is absent.[11] Evaluation of a large number of cases will be needed to determine whether patients with aortic intramural hemorrhage after transition from aortic dissection with a false lumen have as good a prognosis as patients with conventional aortic intramural hemorrhage or whether they are at high risk, as are patients with aortic dissection with a false lumen. Since Stanford type B aortic dissection with a false lumen is generally associated with a good prognosis if the false lumen is occluded by thrombosis,[12] transition from aortic dissection with a false lumen to aortic intramural hemorrhage may be desirable.

Conclusion

Aortic intramural hemorrhage and aortic dissection with a false lumen are considered to be different types of aortic dissection with different prognoses and natural histories. Transition from aortic dissection with a false lumen to aortic intramural hemorrhage, which has not been described previously, may be associated with a better prognosis. At this time, there is no established pathogenesis or standard treatment for intramural hemorrhage. Further study of this condition is required.

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References

1. Yamada T, Tada S, Harada J: Aortic dissection without intimal rupture: Diagnosis with MR imaging and CT. Radiology 168:347-352, 1988.
2. Lui RC, Menkis AH, McKenzie FN: Aortic dissection without intimal rupture: Diagnosis and management. Ann Thorac Surg 53:886-888, 1992.
3. Nienaber CA, von Kodolitsch Y, Petersen B, et al: Intramural hemorrhage of the thoracic aorta: Diagnostic and therapeutic implications. Circulation 92:1465-1472, 1995.
4. Robbins RC, McManus RP, Mitchell RS, et al: Management of patients with intramural hematoma of the thoracic aorta. Circulation 88(suppl):II-1–II-10, 1993.
5. Zotz RJ, Erbel R, Meyer J: Noncommunicating intramural hematoma: An indication of developing aortic dissection? J Am Soc Echocardiogr 4:636-638, 1991.
6. Vilacosta I, San Roman JA, Ferreiros J, et al: Natural history and serial morphology of aortic intramural hematoma: A novel variant of aortic dissection. Am Heart J 134:495-507, 1997.
7. Kaminaga T, Yamada N, Takamiya M, et al: Sequential MR signal change of the thrombus in the false lumen of thrombosed aortic dissection. Magn Reson Imag 13:773-779, 1995.
8. Nishino M, Tanouchi J, Tanaka K, et al: Transesophageal echocardiographic diagnosis of thoracic aortic dissection with the completely thrombosed false lumen: Differentiation from true aortic aneurysm with mural thrombus. J Am Soc Echocardiogr 9:79-85, 1996.
9. Moriyama Y, Shiota K, Hisatomi K, et al: Acute type A aortic dissection following intramural hematoma of the aorta. Angiology 48:839-841, 1997.
10. Prat A, Saez De Ibarra J, Beregi JP, et al: Intramural hematoma of the thoracic aorta: Precursor sign to thoracic aortic dissection. Eur J Cardiothoracic Surg 12:510-512, 1997.
11. Shimizu H, Yoshino H, Udagawa H, et al: Prognosis of aortic intramural hemorrhage compared to classic aortic dissection. Am J Cardiol 85:792-795, 2000.
12. Alfonso F, Goicolea J, Aragoncillo P, et al: Diagnosis of aortic intramural hematoma by intravascular ultrasound imaging. Am J Cardiol 76:735-738, 1995.