Acute onset of chronic aortic dissection presenting as abdominal pain

Ból w jamie brzusznej jako objaw ostrego rozwarstwienia aorty brzusznej

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Abstract

A 54-year-old male patient developed acute onset of chronic aortic dissection manifesting as primarily abdominal pain. A prompt diagnosis was made and urgent surgery was carried out successfully under profound hypothermic circulatory arrest. Prompt surgery is mandatory for such patients in order to prevent abrupt rupture. The awareness of possible aortic dissection is the key point leading to an early diagnosis in patients with atypical presentations.

Key words: aortic dissection, abdominal pain, aortic surgery, computed tomographic imaging, hypothermic circulatory arrest

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Introduction

Patients with an aortic dissection commonly have atypical symptoms, which makes the diagnosis difficult [1]. Seldom do such patients manifest primarily with abdominal pain at the time of onset [2]. This report is to document abdominal pain as a primary symptom of an aortic dissection so as to alert physicians to a high suspicion for such a diagnosis in those patients with atypical presentations.

Case report

A 54-year-old male patient, suspected of an aortic dissection, was transferred to our hospital for urgent surgery. He had sudden onset of a severe upper abdominal pain radiating to the back for two days, accompanied by anxiety and sweating. The abdominal pain was dull and steady, and focused in the left upper quadrant. There were no other associated conditions, such as nausea, vomiting, diarrhoea, or neurological symptoms. In the local hospital, a diagnosis of an aortic dissection was highly suspected in view of the chest X-ray and computed tomography. A transthoracic echocardiography revealed normal left ventricular dimensions and good left ventricular function, marked ascending aortic dilation, and mild aortic valve regurgitation. Laboratory findings were within normal limits except for urea – 57 mg/dl (normal 18-45 mg/dl). His past medical history was significant for hypertension, but negative for strenuous excise or collagen vascular disorders, such as Ehlers-Danlos or Marfan's syndrome. Two years earlier, he had a fever and chest discomfort while he was abroad. He was diagnosed with an aortic aneurysm in the local hospital there, and he was subsequently under regular anti-hypertensive treatment. On current consultation, physical examination showed his blood pressure was 110/65 mmHg, pulse was 71/min, body temperature was 37°C, and SaO2 was 92%. No heart murmur or pulmonary râle was audible. There was neither abdominal muscle tension, nor abdominal pain under palpation, nor a palpable abdominal mass. Both radial and femoral pulses were symmetrical. An electrocardiogram showed normal sinus rhythm. Transthoracic echocardiography illustrated a severely dilated ascending aorta with mild aortic regurgitation. Computed tomographic scan showed severely enlarged ascending and descending aorta. From the axial view, both the dissection flap and the cobweb sign were visualised (Figure 1). From the sagittal view, an intramural thrombus could be noted at the aortic root, with a dilated aortic arch, which compressed the trachea posteriorly. Calcification was present at the posterior wall along the ascending aorta. From the coronal view, a dissection flap

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was seen extending from the abdominal aorta to the common iliac artery and even to its branches (Figure 2).

The patient underwent urgent surgery. Right subclavian arterial cannulation was inserted prior to sternotomy. By inspection, the ascending aorta was remarkably enlarged and hardened, extending 8 cm in diameter. The aortic arch was dilated as well, whereas its three branches arising from the aortic arch were merely mildly dilated, free from dissection. The ascending aortic aneurysm occupied the right half of the pericardial space, severely adhesive to the adjacent tissues and organs including the pericardium, pulmonary artery, atria, and the right-sided pleural membrane. The thickened pericardium was tensely stretched rightwards. The atria, beneath the aortic root, were compressed downwards to a limited space at the right inferior corner of the mediastinum.

The ascending aorta was dissected off its surrounding tissues and organs carefully. The right atrium was freed, and a right atrial venous cannulation was placed. Cardiopulmonary bypass was established and core cooling was achieved. Under total circulatory arrest at 23°C, the ascending aorta was longitudinally opened, and was meticulously inspected. Intraoperatively, an aortic intimal entry tear was visualised in the proximal ascending aorta, extending from the aortic root to the proximity of the aortic arch. Fresh intramural thrombus was noted in the dissected false lumen. From the sectional view, the anterior and right lateral wall of the false lumen at the aortic root became organised and calcified. The aortic valve was mildly regurgitant, free from dissection. A limited dissection was found above the left and non-coronary commissure. It was repaired by being overlapped and fixed with continuous sutures. The aortic root together with the dissected ascending aorta was removed 1 cm above the aortic annulus (Figure 3). The aortic arch was severed at its bottom, while the three branches along the top of the aortic arch were left

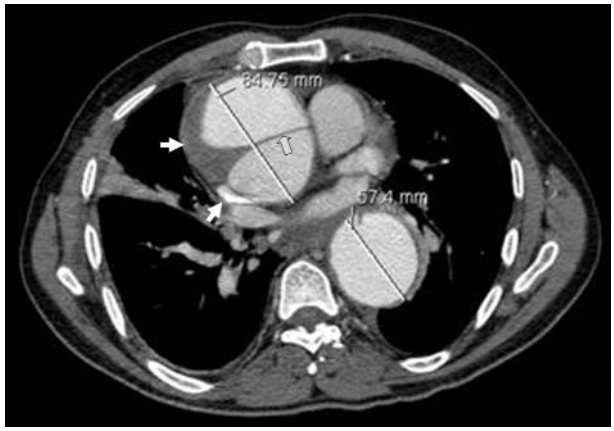

Figure 1. Computed tomography of the aorta. Axial view showing that the ascending and descending aorta became remarkably dilated, measuring 81.25 mm, and 71.82 mm, respectively. The dissection flap and the cobweb sign (open arrow), and the intramural thrombus (arrow) could be noted

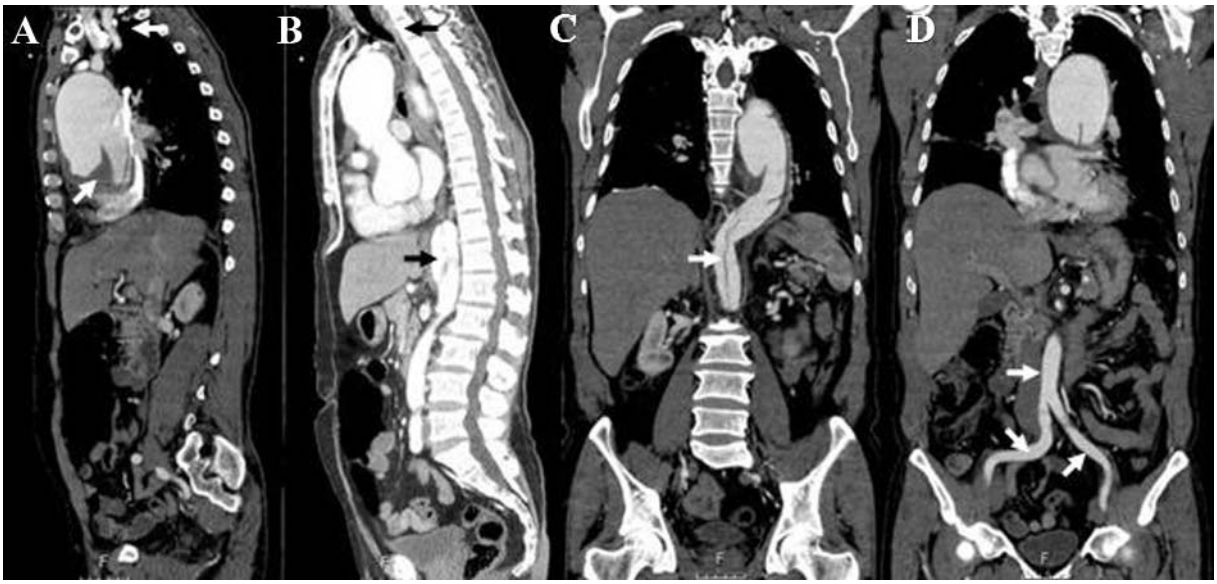

Figure 2. Computed tomography of the dissected aorta. (**A**) A sagittal view showing that the ascending aorta became remarkably dilated. Intramural thrombus in the false lumen at the aortic root (oblique arrow), and calcification at the posterior wall of the ascending aorta (horizontal arrow) could be seen; (**B**) a sagittal view showing an abdominal aortic dissection flap (rightward arrow). The aortic arch compressed the trachea posteriorly, causing a tracheal stenosis (leftward arrow); (**C**) a coronal view showing an abdominal aortic dissection flap (arrow); and (**D**) a coronal view showing a dissection flap extended into the common iliac artery and its two branches (arrows)

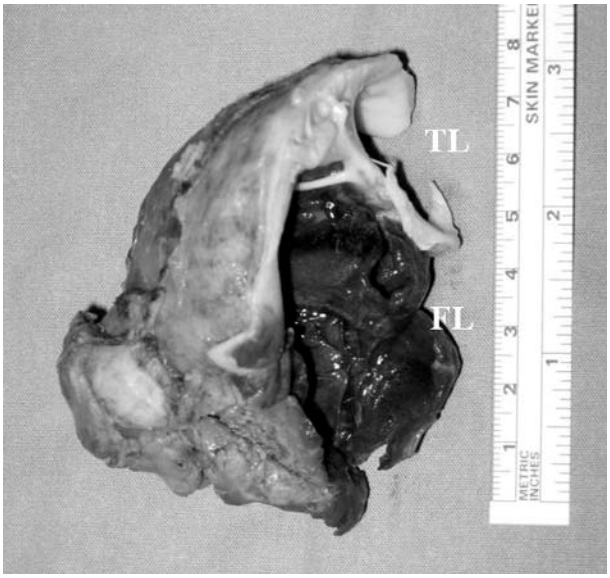

Figure 3. Operative sample of the dissected aorta. The aortic root became obviously enlarged, extending 8 cm in diameter. The false lumen was located at the left side with fresh thrombus inside, measuring 5.5 cm, and the anterior wall and the right lateral wall of the false lumen were organised and calcified

FL – false lumen, TL – true lumen

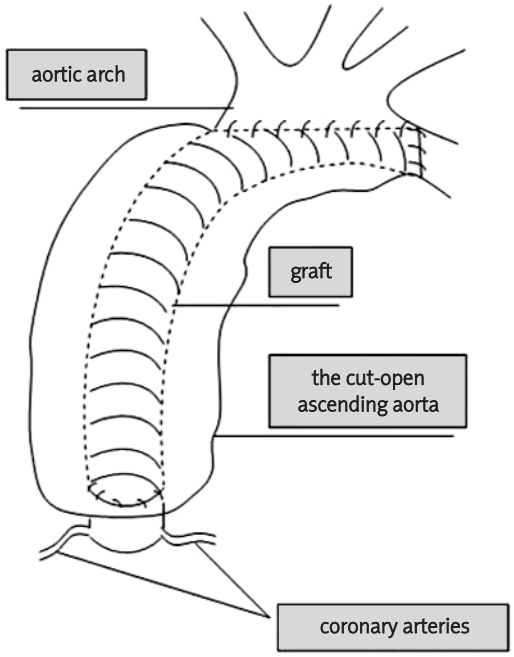

Figure 4. A vascular prosthesis was anastomosed to the aortic root above the aortic annulus proximally, and to the aortic arch distally after the distal end of the graft was trimmed to match the shape of the arch section

in situ. A vascular prosthesis was anastomosed to the aortic root above the aortic annulus proximally, and to the aortic arch distally after the distal end of the graft was trimmed to match the shape of the remaining top of the arch (Figure 4). The ascending aorta was eventually sutured together to wrap and protect the graft. After rewarming, his rhythm recovered to a sinus rhythm after single defibrillation. He was weaned from cardiopulmonary bypass without difficulty. The total bypass time was 104 min, and circulatory arrest time was 21 min. He had an uncomplicated postoperative course. He was extubated 10 hours after the operation, and his intensive care unit stay was 57 hours. After the operation, his symptoms were relieved, and he was discharged on the fifth postoperative day. One year later, he developed type B dissection located at the proximal descending aorta, for which frozen elephant trunk implantation and total aortic arch replacement with 'Evita' stent graft were performed. He was well then.

Discussion

Aortic dissection is characterised by haemorrhagic intramural separation of the medial layer of the aortic wall [3]. The incidence of aortic dissection is 2.9 per 100,000 per year [4]. Pain alone is the most common symptom of aortic dissection, and the most frequent site of pain is the precordium [5]. However, the correct diagnosis of aortic dissection is missed at the time of onset in more than half of patients [4]. The clinical presentation is often nonspecific because of all the possibilities of involvement of aortic branches. It has a wide range of manifestations, and classic findings are often absent [6]. In spite of the deceptive presentations, aortic dissection can be proven by imaging methods, such as computed tomography, magnetic resonance imaging, and transoesophageal echocardiography [4].

Aortic dissection rarely manifests as a primary abdominal pain. McCloy et al. [7] analysed 50 patients with aortic dissection; 11 of 50 patients had abdominal pain as a primary or an accompanying symptom, and only 13% gave a history of strenuous exercise such as lifting, changing tyre chains or playing tennis. Slater and DeSanctis [8] studied the symptomology on the basis of a series of patients with aortic dissection. They found that abdominal pain as a main symptom occurred in 6.38% (3/47) of patients with types I and II, and in 2.90% (2/69) of type III dissection. Ismil and Hussien [9] described an isolated abdominal pain in the epigastric area as an initiating symptom of aortic dissection.

It is well known that the predisposing factors for an aortic dissection are hypertension, Marfan's syndrome, cystic medial necrosis, and atherosclerotic aorta [8]. Schlatmann and Becker [10] considered the pathogenesis of aortic dissection to be injury and repair within the aortic

wall occurring in the aging aorta, subsequent to local haemodynamic forces.

A possible vascular aetiology in patients presenting with a primary abdominal pain might be a ruptured or symptomatic abdominal aortic aneurysm. Thoracic aortic dissections and abdominal aortic aneurysms are rarely found concurrently. Cambria et al. [11] observed that only 18 of 325 patients with spontaneous aortic dissection had concurrent degenerative aneurysmal disease. Slater and DeSanctis [8] stated that a pathognomonic separation of the aortic wall intimal calcification from the outer margin of the aorta comprised 14%. Another possible aetiology for abdominal pain of an acute aortic dissection might be malperfusion of the visceral branches of the abdominal aorta [12].

The main clinical feature of our patient was abdominal pain presenting as a primary symptom of aortic dissection. Large series studies showed that 11-46% of patients with aortic dissection developed neurological complications such as pain, parentheses, convulsions, unconsciousness, vertigo, reflex changes and facial weakness [13]. However, neurological complications did not occur in this patient, even though extensive ascending aortic, abdominal aortic, and even iliac arterial dissections, with severe calcification on the posterior wall of the ascending aorta, were present. Timely performed computed tomography as well as a 2-year history of aortic aneurysm facilitated a prompt diagnosis upon arrival, irrespective of his atypical symptoms and normal electrocardiogram. In comparison, many patients with an aortic dissection presenting with chest or back pain were unfortunately discharged home following normal electrocardiogram and troponin for a suspected coronary origin of pain [12]. Involvement of major aortic branches by the aortic dissection occurred at the level of 1% for the right, and 2% for the left renal artery, which often jeopardised the renal function, and even led to renal failure and death [14]. The renal artery involvement in our patient resulted only in increased urea level. Another feature of our patient was that the three branches arising from the arch were only mildly dilated, free of dissection. The surgical technique of the ascending aorta and proximal arch replacement was simplified by maintaining the three branches in situ, thereby avoiding unnecessary anastomoses and potential bleeding or kinking complications. Resection of the aortic dissection has relieved his symptoms. However, he developed type B dissection one year later and he had to undergo a staged operation.

In conclusion, abdominal pain is a rare primary presentation of an aortic dissection. Awareness of possible aortic dissection is the key point leading to an early diagnosis in patients with atypical presentation. Prompt surgery is mandatory for such patients in order to prevent abrupt rupture.

References

1. Gorospe L, Sendino A, Pacheco R, et al. Chronic aortic dissection as a cause of fever of unknown origin. *South Med J* 2002; 95: 1067-70.
2. Linett LM. Dissecting abdominal aortic aneurysm in a young man: an uncommon presentation of abdominal pain. *Am J Emerg Med* 2005; 23: 383-5.
3. Oliver MA, Greenbaum DM. Use of Doppler ultrasound in dissecting aortic aneurysm. *Crit Care Med* 1978; 6: 45-7.
4. Lorenzen HP, Kurowski V, Jain D, et al. Fever and inflammatory response as principal manifestation of chronic aortic type A dissection – a case report. *Angiology* 2004; 55: 85-8.
5. Copping GA, Szenas P. Dissecting aortic aneurysm. *Can Med Assoc J* 1959; 80: 336-9.
6. Alsatie M. Dissecting aortic aneurysm presenting with unconsciousness. *Am J Emerg Med* 2002; 20: 58.
7. McCloy RM, Spittell JA Jr, Mcgoon DC. The prognosis in aortic dissection (dissecting aortic hematoma or aneurysm). *Circulation* 1965; 31: 665-9.
8. Slater EE, DeSanctis RW. The clinical recognition of dissecting aortic aneurysm. *Am J Med* 1976; 60: 625-33.
9. Ismil ML, Hussien M. Unusual presentation of dissecting aortic aneurysm. *Int J Clin Pract* 1999; 53: 389-90.
10. Schlatmann TJ, Becker AE. Pathogenesis of dissecting aneurysm of aorta. Comparative histopathologic study of significance of medial changes. *Am J Cardiol* 1977; 39: 21-6.
11. Cambria RP, Brewster DC, Moncure AC, et al. Spontaneous aortic dissection in the presence of coexistent or previously repaired atherosclerotic aortic aneurysm. *Ann Surg* 1988; 208: 619-24.
12. Upchurch GR Jr, Nienaber C, Fattori R, et al. Acute aortic dissection presenting with primarily abdominal pain: a rare manifestation of a deadly disease. *Ann Vasc Surg* 2005; 19: 367-73.
13. Perry SM, Conley JW. Dissecting aortic aneurysm with bizarre neurologic and vascular aspects. *Calif Med* 1951; 74: 434-5.
14. Nakashima Y, Kurozumi T, Sueishi K, et al. Dissecting aneurysm: a clinicopathologic and histopathologic study of 111 autopsied cases. *Hum Pathol* 1990; 21: 291-6.