

A Case of Aortic Dissection with Headache, Dizziness and Hypotension as the Initial Symptoms

Keyan Meng*

Caoxian People's Hospital, Heze, Shandong, China

**Corresponding Author*

Abstract: Aortic dissection (AD) often presents initially with symptoms such as "chest pain and hypertension," while atypical pain, neurological deficits, and hypotension as initial clinical symptoms are more subtle, making early diagnosis difficult and potentially delaying optimal treatment timing. This study retrospectively analyzes the diagnostic and treatment process of one case of aortic dissection with initial symptoms of headache, dizziness, and hypotension, combining it with relevant domestic and international literature to explore the pathogenesis and treatment strategies of early atypical pain accompanied by neurological deficits in aortic dissection, thereby enhancing recognition of occult aortic dissection. The study suggests that in clinical practice, patients presenting with headache and neurological deficits, or concomitant abnormal blood pressure, should raise high suspicion for acute aortic dissection, aiming to detect, diagnose, and treat as early as possible to reduce patient mortality.

Keywords: Aortic Dissection, Headache; Dizziness; Hypotension; Clinical Case

1. Introduction

Aortic dissection (AD) refers to a type of cardiovascular emergency caused by blood in the aortic lumen entering the middle layer of the aorta through the tear of the aortic intima, forming a dissecting hematoma with both the true lumen and the false lumen. The arterial intima is further extended and stripped through hemodynamic extension. A type of cardiovascular emergency with a high risk of sudden death. The typical symptoms of AD patients are mostly "tearing" or "knife-like" persistent severe pain in the chest and back, often accompanied by a sharp increase in blood pressure. Therefore, chest pain and hypertension are often considered to be one of the important

diagnostic symptoms. Although pain is the most common symptom in patients with acute aortic dissection [1], cases with headache and dizziness accompanied by critical point hypotension as the first symptom are relatively rare. Once the disease develops rapidly, it is easy to misdiagnose and miss diagnosis. This article reports a case of type A aortic dissection with sudden headache, dizziness and hypotension as the first symptom. Its atypical symptoms can easily be misdiagnosed as cerebrovascular disease, pulmonary embolism, and acute cardiac infarction, delaying the optimal treatment opportunity

2. Clinical Data

The patient, female, 78 years old, was admitted to the hospital on April 30, 2026 due to "headache, dizziness accompanied by nausea for 1.5 hours". The patient suddenly experienced headache, dizziness, accompanied by visual darkness and instability while standing after riding a bicycle 1.5 hours ago. The duration lasted for about 10 minutes and improved. Later, she still had headache, dizziness, nausea many times, limbs were weak, and no vomiting. She was urgently brought to our emergency department, where a head CT was conducted before being admitted to the ward. She had a previous history of hypertension with a maximum systolic blood pressure of 170mmHg. She was treated regularly with oral medication, but her blood pressure was unknown; she had a history of "post-coronary stent implantation". Physical examination: Body temperature 36.5°C, pulse 45 beats/min, respiration 20 beats/min, left upper limb blood pressure 109/57mmHg, right upper limb blood pressure could not be measured. Respiratory sounds in both lungs were normal, no dry and wet rales were heard, heart rate was 45 beats/min, rhythm was regular, and no obvious pathological murmurs were heard in each lobe sound area. The abdomen is flat and soft, without tenderness or rebound pain. The

patient was conscious, energetic, and fluent in speech. Her bilateral pupils were of equal size and round size, about 3mm in diameter, and she had sensitive light reflection. The muscle tone of the limbs is normal, and the muscle strength of the limbs is grade 5. Bilateral Babinski sign (-). Soft neck, Kernig sign (-), Brudzinski sign (-). Auxiliary examinations: Emergency electrocardiogram (Figure 1): sinus bradycardia, atrial premature beat, atrial escape rhythm, atrioventricular junction escape rhythm, ST segment depression, QT interval prolongation, abnormal electrocardiogram. Blood routine test: neutrophil percentage was 82.2%, neutrophil count was $6.72 \times 10^9/L$, C-reactive protein was 17.43 mg/L, and serum amyloid protein was 15.1 mg/L. There were no abnormalities in three myocardial infarction and BNP. Coagulation test: D-dimer $3.51 \mu g/ml$. Biochemical routine: Albumin 29.5 g/L, glucose 6.51 mmol/L. Imaging examination: Emergency head CT: lacunar foci in bilateral basal ganglia and coronal radiation region. Ultrasound examination of carotid artery, vertebral artery, and subclavian artery: bilateral carotid arteries were hardened with multiple plaque formation, and strips of strong echoes were found in the right common carotid lumen. Carotid artery dissection was not ruled out. Further examination was recommended, indicating that the right external carotid artery was occluded. Cardiac color ultrasound + cardiac function measurement ultrasound examination: the ascending aorta was dilated, the left atrium was enlarged, the mitral valve was mild, the tricuspid valve was mild, and the aortic valve was mild. Head and neck CT angiography (CTA) examination (Figure 2): aortic dissection, right common carotid artery dissection, patent ductus arteriosus. CT angiography (CTA) examination of thoraco-abdominal aorta (Figure 2): aortic dissecting aneurysm (DeBakey type II), patent ductus arteriosus, Atheros* plaque and penetrating ulcer in the abdominal aorta, and severe stenosis in the proximal inferior mesenteric artery.

3. Treatment and Outcome

After admission, the patient's blood pressure was monitored and continued to be low, about 90-109/57mmHg. He was told to rest in bed, oxygen inhalation, ECG, finger pulse oxygen monitoring, intravenous saline and "hydroxyethyl" fluid infusion treatment. The

patient developed pain in the right neck, showing electrocute-like pain. The patient's neck color ultrasound results reported that dissection was possible, so emergency CTA of the head, neck, thoracic and abdominal aorta was performed to confirm the diagnosis of type A aortic dissection. The comprehensive interventional department was urgently requested for consultation and recommended that further surgical treatment be performed after being transferred to the ICU. After consultation, the patient's ABCDEF family refused to be transferred to the ICU and to improve the surgical treatment. Combined with the consultation opinions of the Comprehensive Interventional Department, considering that the patient's heart rate and blood pressure have always been low, and head and neck pain have been relieved than before, no treatment with blood pressure, heart rate reduction and sedation and analgesic drugs have been given. In addition, the current anticoagulant treatment for dissection is still evidence-based medical advice. Anticoagulant treatment should be given under comprehensive clinical conditions such as bed rest, high D-dimer and high risk of VTE. Eight days after admission, the patient's family requested to be discharged. At the time of discharge, the patient was conscious and spoke clearly. He still had mild posterior occipital and neck pain, and the muscle strength of his limbs was normal. It is recommended to continue to recuperate at home and continue to monitor heart rate and blood pressure after discharge. One month after discharge, the patient was followed up by phone and found no complaints of discomfort. His heart rate and blood pressure were stable, and his posterior occipital and neck pain completely improved.

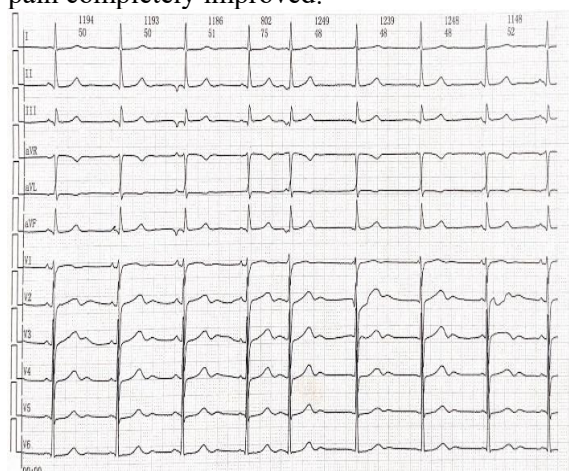


Figure 1. Emergency Electrocardiogram

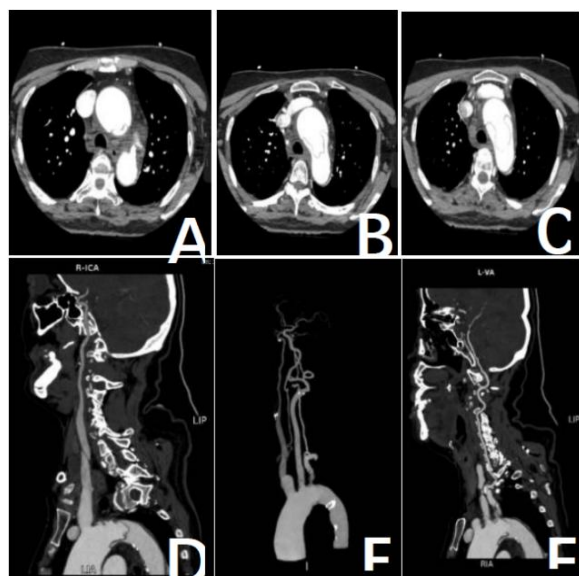


Figure 2. Cranio-Cervical and Thoracic Aorta CTA A - C (Cross-section) D (Sagittal Plane): Stratification of the Lumina of the Ascending Aorta and Aortic Arch. E, F: The Brachiocephalic Trunk Originates from the True Lumen, with the Left Common Carotid Artery and the left Subclavian Artery Straddling the True and False Lumens, and Severe Stenosis at the Proximal End of the Left Subclavian Artery.

4. Analyzed and Discussed

Acute aortic dissection has an acute onset, rapid progression of the disease, and a high risk of sudden death. Research has found that if acute aortic dissection is not diagnosed early and quickly and treatment measures are not standardized in time, the mortality rate increases at a rate of 1% to 2%/h within the first 48 hours after the onset [2]. In recent years, as clinicians' awareness of AD has improved, the first-time physician can often make an accurate diagnosis in a timely manner for cases of typical pain accompanied by elevated blood pressure. However, AD cases with atypical symptoms are easily ignored in clinical practice, leading to misdiagnosis. 17%-40% of patients with aortic dissection experience transient or permanent neurological symptoms [3]. They can distract people and even conceal potentially life-threatening conditions.

This patient only presented with headache, dizziness, critical point hypotension and bilateral blood pressure asymmetry on admission, lacking typical pain characteristics and neurological deficits. Due to the asymmetry of blood pressure in both upper limbs of the patient, the neck color

ultrasound was further improved to consider aortic dissection, and the diagnosis was finally confirmed through CTA of the head, neck, thoracic and abdominal aorta. A relevant retrospective study counted [4] patients diagnosed with aortic dissection over the past 13 years and found that the proportion of patients with DeBakey II dissection with central nervous system symptoms (44%) was higher than that of patients without central nervous system symptoms (16%). Among them, 17% of the cases with CNS symptoms had AD involving the carotid artery, indicating that carotid artery involvement is significantly related to CNS symptoms. Therefore, when a patient suddenly experiences severe headache accompanied by neurological impairment (slight dizziness, nausea, loss of consciousness, etc.), or accompanied by a large bilateral blood pressure and pulse pressure difference or unmeasurable blood pressure in one limb, aortic dissection should be highly suspected clinically.

Headache as the initial clinical manifestation of aortic dissection may be due to expansion of the vessel wall, ischemia of the carotid plexus, or reduced cerebral perfusion due to subclavian artery steal. It is also the principle of dizziness and hypotension in one limb. In addition, interruption of sympathetic projection may also cause pain because mechanical stimulation or occlusion of the vascular and nerve tracts of the cardiac plexus, first cervical ganglion, and internal carotid nerve affects the ciliary and pterygopalatine ganglia [5].

Regarding the treatment of acute aortic dissection, surgery or endovascular intervention is the cornerstone of treatment. Previous research reports have also proved this fact [6]. However, elderly patients often prefer conservative treatment [7], so their mortality rate is high. Therefore, in the conservative treatment of acute aortic dissection, how to reduce their mortality rate is particularly important. Medical treatment plays a decisive role in stabilizing patients, preventing the spread of dissection and reducing end organ damage. The key to medical treatment is to "reduce shear stress in the aorta, maintain adequate perfusion, control severe pain and sympathetic nerve activation, and solve poor perfusion syndrome [8]." Mainly in the following aspects: 1. Reduce blood pressure and heart rate: The main hemodynamic determinant of dissection tearing is aortic wall shear stress, which is proportional to the increase in systolic

blood pressure and heart rate. Studies have shown that the heart rate range needs to be controlled at 60-80 beats/minute, and systolic blood pressure requirements need to be individualized. Adjustment, usually need to be lower than 120mmHg. If there is poor perfusion of end organs, excessive blood pressure may aggravate real lumen collapse and ischemia, which can be controlled to 120-140mmHg in a timely manner. Beta-blockers are the first choice for drugs, such as esmolol, labetalol and metoprolol. If the target heart rate is met but blood pressure remains high, vasodilators (nicardipine, clevidipine and sodium nitroprusside, etc.) can be added. However, in long-term blood pressure control, angiotensin converting enzyme (ACE) inhibitors and angiotensin receptor blockers (ARBs) can reduce all-cause mortality [9]. 2. Analgesia: Pain can be either the cause or the result of an adverse hemodynamic response. Pain can cause an increase in heart rate and blood pressure, and also activates the sympathetic nerve, which further leads to tachycardia, increased blood pressure and increased shear stress in the aortic wall. Intravenous use of opioids is still front-line treatment and requires individualized adjustment of intravenous doses. 3. Pressure-boosting treatment of hypotension and shock: For some patients with hypotension, especially those suffering from cardiac tamponade, severe aortic dissection reflux, myocardial ischemia, etc., who appear to have symptoms of shock, priority should be given to fluid resuscitation. Adjust the fluid volume according to blood pressure, heart load, etc. For vasopressors, norepinephrine is preferred in most cases because of its balanced alpha- and beta-adrenergic effects that support vascular tone and cardiac output. 4. Antithrombotic therapy: There is no consensus on the need for antithrombotic therapy for acute aortic dissection. Recently, the American Heart Association scientific statement stated that [10] early antithrombotic therapy is essential to reduce the risk of further embolism or thrombosis, and treatment should be individualized and continued for at least 3-6 months. For patients at higher risk of ischemic stroke and lower risk of bleeding, anticoagulant therapy may be more preferred; while for patients at lower risk of stroke or higher risk of bleeding, antiplatelet therapy may be more appropriate. To sum up, this patient was given early anticoagulation treatment while stabilizing

heart rate and blood pressure, considering the risk of critical hypotension, cerebral hypoperfusion, and thrombosis.

5. Conclusion

Through the diagnosis and treatment process of this patient, although there are many diseases with the onset of "headache and dizziness" in clinical practice, when accompanied by neurological dysfunction or accompanied by large bilateral blood pressure and pulse pressure differences or unmeasurable blood pressure in one limb, it is necessary to be highly vigilant against the possibility of acute aortic dissection, provide reference for clinicians, and improve disease detection and diagnosis rates. Surgical treatment of acute aortic dissection is still the cornerstone of treatment at home and abroad, and there is no standard and unified treatment plan for medical treatment. For patients who choose conservative treatment based on multiple factors, or peri-operative medical treatment, this study can provide some clinical treatment ideas for the treatment of such patients. Reasonable, standardized and timely treatment can reduce the mortality rate of conservative treatment and improve the survival rate after dissection surgery. Greatly improve the prognosis of acute aortic dissection disease.

References

- [1] Yan X. The Clinical Characteristics and Image Features of 65 Patients Died of Acute Aortic Dissection . BACHU MEDICAL JOURNAL, 2020, 3(1): 9-14.
- [2] Murphy Michael. Aortic dissection during endurance cycling. BMJ Case Reports, 2023, 16(11). DOI:10.1136/bcr-2023-257207.
- [3] Gaul Charly, Dietrich Wenke, Erbguth Frank Joachim. Neurological symptoms in aortic dissection: a challenge for neurologists. Cerebrovascular diseases (Basel, Switzerland), 2008, 26(1):1-8. DOI:10.1159/000135646.
- [4] MacKerricher W, Klein R R, Winston D C. Association of Antemortem Central Nervous System Symptoms and Location of Aortic Dissections; A Retrospective Study from 2001-2014. Acad Forensic Pathol, 2016, 6(3): 517-523.
- [5] Ranjeevan M, Nielsen V, Stenager E, et al. Thunderclap headache as an initial manifestation of acute aortic dissection: a case report and review of literature. Front

- Cardiovasc Med, 2025, 12: 1598757.
- [6] Sherrah A G, Vallely M P, Grieve S M, et al. Clinical utility of magnetic resonance imaging in the follow-up of chronic aortic type B dissection. *Heart Lung Circ*, 2014, 23(7): e157-159.
- [7] Zhixin Z, Tao L, Yanmin Y, et al. Construction and Verification of a Risk Prediction Model for Death From Dissection Rupture in Patients With Acute Aortic Dissection During Emergency Treatment . *Chinese Circulation Journal*, 2024, 39(9): 903-909.
- [8] Spelde A E, Ibrahim M E, Augoustides J G T. Perioperative Medical Management of Aortic Dissection. *Cardiol Clin*, 2026, 44(3): 401-413.
- [9] Chen S W, Chan Y H, Lin C P, et al. Association of Long-term Use of Antihypertensive Medications with Late Outcomes Among Patients with Aortic Dissection. *JAMA Netw Open*, 2021, 4(3): e210469.
- [10] Yaghi S, Engelter S, Del Brutto V J, et al. Treatment and Outcomes of Cervical Artery Dissection in Adults: A Scientific Statement from the American Heart Association. *Stroke*, 2024, 55(3): e91-e106.