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Cases Report of Atypical Aortic Dissection

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Abstract

Background: Aortic dissection (AD) is one of the common causes of fatal chest pain in emergency medicine. The main and most common clinical manifestation is pain, with about 90% of patients experiencing sudden persistent, tearing or cutting-like pain in the chest or back. However, there have also been reports of myocardial infarction, heart failure, renal failure, syncope, shock, stroke, paraplegia and other cases. Clinical misdiagnosis is common. **Aim:** Alert clinicians to aortic dissection with shock and chest tightness as the main clinical presentations. **Case Presentation:** Report on two cases of aortic dissection with syncope and shock as the main manifestations. **Conclusion:** Aortic dissection is a highly dangerous cardiovascular emergency with a high mortality rate. In clinical practice, awareness of the clinical manifestations of aortic dissection should be increased. Careful inquiry about medical history, attention to atypical clinical presentations of aortic dissection, thorough physical examination, and comprehensive diagnostic evaluation can improve the success rate of diagnosing aortic dissection.

Keywords

Aortic Dissection, Syncope, Shock, Chest Distress

1. Introduction

Aortic dissection (AD) may be uncommon but complications occur often and early, and the outcome is frequently fatal. Since dissection is a dynamic process that may occur anywhere within the aorta, the clinical spectrum of presentation is broad. Symptoms may mimic more common disorders such as myocardial ischemia or stroke, and physical findings may be absent or suggestive of a diverse range of other conditions mimic more common disorders such as myocardial ischemia or stroke, and physical findings may be absent or suggestive of a diverse range of other conditions. Therefore, dissection is often difficult to di-

agnose, and a high clinical index of suspicion is mandatory [1].

This article reports two cases of aortic dissection treated at the Xiangzhou District People's Hospital in Xiangyang City. The aim is to deepen the understanding of AD, recognize potentially dangerous but atypical AD cases in the complex clinical setting, improve the success rate of aortic dissection diagnosis, and avoid the serious consequences of misdiagnosis or missed diagnosis, while ensuring the safety of medical work while serving patient health.

2. Clinical Data

Case 1: Aortic Dissection Presenting with Syncope

Patient XX, a 67-year-old male, was admitted to the emergency department due to "transient syncope for one week." Major medical history: One week ago, the patient experienced sudden dizziness while playing chess, followed by syncope. At that time, consciousness was lost, and the patient fell to the ground. There were no profuse sweating, limb convulsions, upward gaze deviation, frothing at the mouth. After approximately 10 minutes, the patient regained consciousness spontaneously and was subsequently hospitalized for treatment. Comprehensive examinations were performed, including complete blood count, electrolytes, renal function and cardiac enzymes which did not show any significant abnormalities. Blood lipid levels showed elevated triglycerides of 2.62 mmol/L. Cranial MRI findings: 1) Old lacunar infarction in the right basal ganglia region. 2) Small bleeding focus in the right basal ganglia region pending further evaluation (subacute phase), recommended for follow-up. 3) Brain atrophy. 4) Cranial MRA: Atherosclerosis of cerebral arteries, with localized to moderate stenosis in the proximal segment of the right middle cerebral artery (M2 segment), recommended for CTA examination. Chest X-ray findings: 1) Fibrotic opacities in both lungs. 2) Thickening of both pleurae with a small amount of pleural effusion, further evaluation recommended with CT. 3) Cardiomegaly Carotid Ultrasound: Bilateral carotid arteries, extracranial segments of the internal carotid arteries, and external carotid arteries show atherosclerosis. No significant abnormalities are observed in bilateral internal jugular veins or vertebral arteries. The right carotid artery shows linear intimal echoes and low echoes inside the lumen, suggesting carotid artery dissection and thrombus formation. Echocardiogram: Echocardiography indicated dilation of the ascending aorta, regurgitation of aorta, and left ventricular diastolic dysfunction. Other imaging evaluations should be considered. At the time of diagnosis, the following possibilities were considered: 1) Investigation of syncope (likely of cerebral origin); 2) Carotid artery dissection with thrombus; 3) Localized to moderate stenosis in the proximal segment of the right middle cerebral artery (M2 segment); 4) Old lacunar infarction; 5) Frequent atrial premature beats, occasional ventricular premature beats, accelerated junctional escape rhythm; 6) Grade 1 hypertension (moderate-risk group). After admission, the patient underwent CT scan of the head, head and neck, and CT angiography of the aorta. The results showed: 1)

Aortic dissection, De Bakey type I, with generalized dilation of the aorta. The dissection extends from the aortic sinuses to the left iliac artery, brachiocephalic trunk, bilateral subclavian arteries, bilateral carotid arteries, and abdominal aorta, with widespread intimal tear causing the formation of true and false lumens. The true lumen is smaller and located internally, while the false lumen is larger and located externally, containing a large amount of low-density thrombus. Calcium deposits in the intima are seen in multiple areas. The aortic tear is located above the sinus, and the left renal artery arises from the false lumen, resulting in poor perfusion to the left kidney. 2) Left dominant vertebral artery with sclerosis in the extracranial segment of the left internal carotid artery. 3) No abnormalities are observed in the head CT angiography. The doctor suggested that the patient further undergo surgical treatment in the department of cardiothoracic surgery, but the patient and his family refused and requested discharge. Follow-up later showed that the patient had suffered a sudden chest pain and was diagnosed with ruptured aortic dissection in another hospital. After unsuccessful rescue efforts, the patient died.

Case 2: Aortic Dissection with Shock as the Initial Presentation

Patient Huang XX, 67 years old, female, experienced loss of consciousness for over an hour. The patient's family reported that she had suddenly collapsed without any apparent cause, accompanied by dizziness, chest tightness, general weakness, upper abdominal pain, but no impairment of consciousness, no chills or fever, no headache, no visual rotation, no choking while drinking water, no limb paralysis, no limb numbness, no palpitations, no difficulty breathing, no nausea or vomiting, and no other discomfort. The patient was then brought to our hospital by calling emergency services. The patient had a history of coronary atherosclerosis, myocardial bridge (LAD moderate), hypertension grade 3 (very high risk group). Physical examination: T 36.0˚C, HR 59 bpm, SBP 80/43 mmHg, R 17 bpm. The patient was conscious, but had poor mental status and an acute appearance. The limbs were cold, and the breath sounds in both lungs were slightly coarse without hearing any dry or wet rales. The heart rate was 59 bpm, with regular rhythm, and no murmurs were heard in any valve auscultation area. The abdomen was soft, and there was tenderness in the upper abdomen without rebound tenderness. No tenderness or rebound tenderness was observed in the rest of the abdomen. Murphy's sign (−), McBurney's point (−), no percussion tenderness in the liver or kidney areas, and bowel sounds were 4 times per minute. No edema was observed in the lower extremities. Neurological examination: Pupils were equal in size, approximately 3 mm in diameter, with sluggish pupillary light reflex. Physiological reflexes were present, and no pathological signs were elicited.

After admission, the possibility of shock was considered, with suspected ruptured aortic dissection. Immediate measures were taken, including bed rest, maintaining quietness, ensuring airway patency, oxygen therapy, monitoring with electrocardiogram and pulse oximetry, establishing two peripheral intravenous lines,

providing written notification of critical illness, and providing symptomatic treatment to maintain vital signs. Further investigations were conducted, including complete blood count, coagulation profile, cardiac enzymes, troponin T, three cardiac markers for myocardial infarction, blood gas analysis, electrolytes + renal function, liver function, electrocardiogram, CT scans of the head, chest, abdomen, and pelvis, and CT angiography of the aorta. The result of the aortic CT angiography showed intramural hematoma in the aortic wall with rupture into the pericardium. After communicating the condition to the patient's family, they requested transfer to another hospital for treatment. The patient underwent emergency endovascular repair of the ascending aorta, total arch replacement, and elephant trunk technique at the external hospital. The patient's condition stabilized.

3. Discussion

3.1. Disease Overview

Aortic dissection refers to a pathological change in which blood within the aortic lumen enters the media through a tear in the intima and extends along the longitudinal axis of the aorta, resulting in the separation of the true and false lumens of the aorta. Due to the commonly associated aneurysmal changes, it is also referred to as aortic dissection aneurysm. The annual incidence of this disease in the United States is (25 - 30) per million, and there has been a noticeable increase in clinical cases in recent years in China. Aortic dissection has a rapid onset, usually presenting as an acute onset. If not diagnosed and treated promptly, the mortality rate within 48 hours can be as high as 50%, making it one of the most critical and life-threatening cardiovascular emergencies. The clinical manifestations vary, such as sudden severe pain, shock, or symptoms of organ ischemia due to compression of the corresponding branches of the aorta [2]. It is prone to misdiagnosis and mistreatment, and it has a high mortality rate, so it requires high attention from clinicians.

3.2. Clinical Features

1) Pain is the initial symptom in most patients with aortic dissection, often presenting as sudden tearing or stabbing pain in the anterior chest or back, which can radiate to the shoulders, chest, abdomen, and lower limbs. 2) Blood pressure changes: Over 95% of patients have hypertension, and there is a significant difference in blood pressure between the upper and lower limbs. If there is cardiac tamponade or impaired coronary artery blood supply leading to myocardial infarction, low blood pressure may occur. 3) Cardiovascular system: a) Aortic regurgitation: About half of the patients with Stanford type A aortic dissection have aortic valve insufficiency due to dilation of the aortic annulus, annular tear, and displacement of the valve leaflets, resulting in a diastolic blowing murmur in the precordial area, and even congestive heart failure. b) Myocardial infarction: When the right coronary sinus is involved, it is prone to misdiagnosis as inferior

wall or right ventricular infarction. 4) Organ or limb ischemia: Symptoms of neurological ischemia, such as dizziness, transient syncope, hemiplegia, consciousness disorders, mental abnormalities, and even cerebral infarction, can be caused by the involvement of the aortic arch branches, carotid artery, or brachiocephalic artery. Symptoms of limb ischemia can occur when the abdominal aorta or iliac arteries are affected, presenting as acute lower limb ischemia. Visceral ischemia can occur when the renal arteries, superior mesenteric arteries, or hepatic arteries are affected, leading to renal dysfunction, intestinal necrosis, jaundice, and elevated transaminases. 5) Rupture of the dissected aneurysm: Rupture of the aortic dissection aneurysm can cause hemoptysis, pleural effusion, shock, hematemesis, etc [3].

3.3. Auxiliary Examinations

1) Chest X-ray and electrocardiogram (ECG): Generally, they have no specific diagnostic value. Chest X-ray may show a widened aorta, and ECG may show nonspecific ST-T changes. When the coronary arteries are involved in aortic dissection, electrocardiographic manifestations of myocardial ischemia or even acute myocardial infarction may appear. 2) D-dimer: When the D-dimer level in patients rises rapidly, the possibility of aortic dissection increases. Within 24 hours of onset, when the D-dimer level is above 500 μg/L, the sensitivity for diagnosing acute aortic dissection is 100%, and the specificity is 67%. Therefore, it can be used as an exclusionary indicator for acute aortic dissection. 3) Echocardiography: Cardiac color Doppler ultrasound, especially bedside transesophageal echocardiography, can identify the true and false lumens and detect the prolapse of the intimal tear. However, it may miss cases where the dissection is limited to the aortic arch and the distal ascending aorta due to factors such as tracheal gas and obesity [4]. 4) CTA and MRA are imaging techniques that use reconstructed three-dimensional images to identify true and false lumens in aortic dissection and can also display the extent of aortic calcification. CTA has a sensitivity of 98% and is capable of clearly identifying the location of the dissection tear, the extent of the hematoma, and whether the branch vessels of the aorta are involved. It is considered the "gold standard" for diagnosing aortic dissection. On the other hand, digital subtraction angiography (DSA) has high sensitivity and specificity for diagnosing aortic dissection, but its ability to differentiate Type A (Stanford classification) aortic dissections is relatively poor.

3.4. Measures to Improve Diagnostic Accuracy

The initial diagnosis and treatment of aortic dissection directly affect patient prognosis. Clinicians should consider the possibility of aortic dissection in patients with a history of atherosclerosis or hypertension who present with the following conditions: 1) Typical symptoms: Persistent tearing or stabbing pain in the anterior chest or thoracic back, radiating to the shoulders, abdomen, and lower limbs, or chest tightness and pain inconsistent with dynamic changes in electrocardio-

gram and myocardial enzyme tests [5]. 2) Consideration of underlying conditions: Patients with Marfan syndrome, Ehlers-Danlos syndrome, a family history of aortic dissection, or a history of aortic aneurysm should be considered for aortic dissection. 3) Electrocardiogram indicating acute inferior wall or right ventricular myocardial infarction requires careful differential diagnosis, especially when a diastolic murmur can be heard in the aortic valve area or apex. 4) Significant differences in blood pressure between the left and right limbs or upper and lower limbs, with a difference in systolic blood pressure exceeding 20 mm Hg between the two upper limbs or inconsistent pulses, or the inability to measure blood pressure in one limb. 5) When presented with atypical symptoms, it is important to broaden the diagnostic approach and consider aortic dissection in the context of the patient's medical history, symptoms, and signs, especially when considering ischemic diseases. 6) Chest imaging showing obvious aortic enlargement or the formation of a false lumen, and cardiac color Doppler ultrasound revealing dilation of the aortic sinus, left ventricular enlargement, aortic regurgitation, and reflux, etc. For patients with the above conditions, further diagnostic tests such as D-dimer, computed tomography angiography (CTA), magnetic resonance angiography (MRA), and digital subtraction angiography (DSA) should be performed to further confirm the diagnosis [6].

4. Conclusion

Acute aortic dissection presents with a wide range of manifestations, and classic findings are often absent. A high clinical index of suspicion is necessary. Despite recent advances, in-hospital mortality rates remain high. We need to continue to improve the prevention, diagnosis, and treatment of acute aortic dissection.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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