

# Clinical Identification and Treatment of Aortic Dissection with Pericardial Effusion Before Intravenous Thrombolysis

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**Abstract:** To detect aortic dissection complicated with pericardial effusion in time before intravenous thrombolysis, to avoid iatrogenic damage and get the rescue time. Methods: The data of 2 patients with aortic dissection complicated by pericardial effusion who entered the stroke greenway in our hospital in 2022 were collected. The literature on the diagnosis and treatment of aortic dissection and cardiac tamponade were reviewed. Results: The clinical features of aortic dissection complicated with pericardial effusion were sudden onset, rapid progression, and high risk of death. The chest CT scan showed linear high-density shadows in the aorta, enlarged cardiac shadows, and pericardial effusion. Echocardiography supported the diagnosis. Conclusion: Neurological deficit is a common complication of aortic dissection, including disturbance of consciousness, and intravenous thrombolysis is not suitable. Chest CT scan and bedside color Doppler ultrasound are important methods to quickly identify aortic dissection and pericardial effusion. Reasonable emergency pericardiocentesis can obtain valuable time for surgical treatment.

**Keywords:** Aortic dissection, Pericardial effusion, Intravenous thrombolysis.

## 1. Introduction

Aortic dissection is the tearing and separation of the intima and media of the aorta, and the aortic lumen is divided into true lumen and false lumen after blood enters. The rupture of the dissection into the pericardium can cause pericardial effusion and cardiac tamponade, and the patient develops heart failure. The data of 2 patients with aortic dissection complicated by pericardial effusion in our hospital were reviewed. They were sent to the stroke green lane and received pre-intravenous thrombolysis screening.

## 2. Methods

### 2.1. Case data

The data of 2 patients with aortic dissection complicated by pericardial effusion who entered the stroke greenway in our hospital in 2022 were collected, including gender, age, past medical history, acute onset, condition changes, chest CT scan, cardiac Color Doppler ultrasound, clinical treatment and results.

### 2.2. Literature Review

The Literature included clinical features and imaging modalities of aortic dissection with cardiac tamponade, contraindications to intravenous thrombolysis, feasibility of pericardiocentesis, comprehensive understanding of aortic syndrome.

## 3. Results

### 3.1. Clinical Manifestations

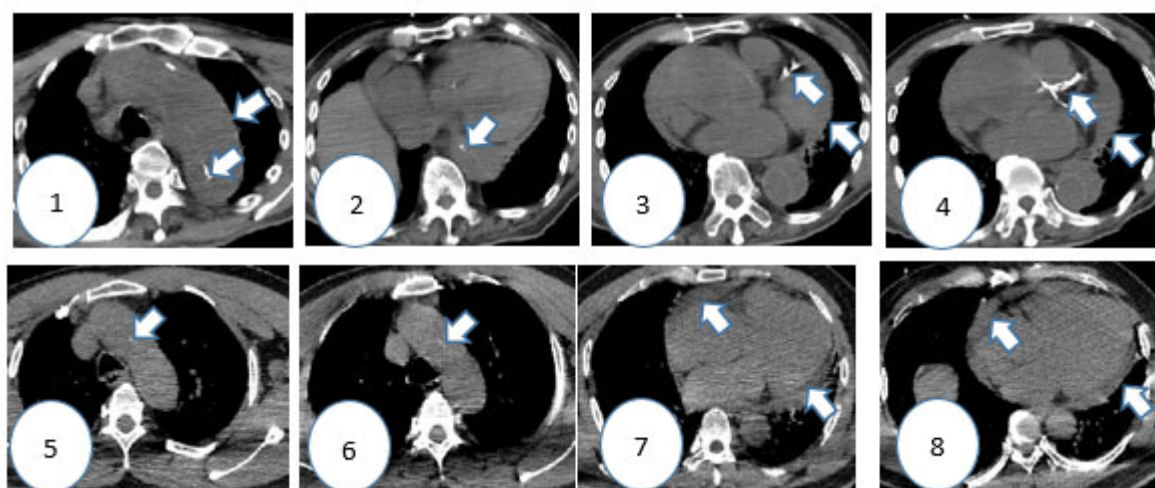
Both patients were male, with hypertension and sudden disturbance of consciousness, and were sent to the stroke green lane. Emergency head CT showed no intracranial hemorrhage, and ischemic stroke was considered. Half an hour after entering the green lane, the patient's condition changed rapidly. See the table below for details.

**Table 1.** Clinical Manifestations of 2 patients

	Case 1	Case 2
Age	85 years old	53 years old
Acute onset	Apathy, confused Left limb weakness	Confused, unable to speak Weak limbs, profuse sweating
Condition changes	Bilateral rigidity Eyes staring to the left Bilateral mydriasis Decreased blood pressure Slow breathing	Anxious Bilateral mydriasis Loss of light reflexes Decreased blood pressure Shortness of breath

### 3.2. Image Features

2 patients received chest CT scan, both of which were suggested aortic dissection and pericardial effusion. The images of the first patient were shown in Figures 1, The images of the second patient were shown in Figures 1.



**Figure 1.** Image Features of 2 patients

1 and 2, the aorta was dilated. In the lumen of the ascending aorta and the descending aorta, there were linear slightly high-density shadows, and calcifications moved inward. Figure 3 and Figure 4, the cardiac shadow was enlarged, arc-shaped isodensity shadow was seen in the pericardium, and calcification was seen in the aorta and coronary arteries.

5 and 6, In the aortic arch, the intima of the speckle calcification moved inward. Figure 7, Figure 8, the heart shadow was enlarged, and the annular low-density shadow was seen in the pericardium.

### 3.3. Clinical Outcomes

Both patients suffered from decreased blood pressure and cardiorespiratory arrest, and were treated with endotracheal intubation-assisted ventilator therapy. Color Doppler ultrasound showed aortic dissection, increased pericardial effusion, and cardiac tamponade. The final rescue was ineffective, and they died during transit.

## 4. Conclusion

### 4.1. Clinical Features

Aortic dissection can lead to disruption of the normal anatomy of the heart or restricted cardiac activity, and it can also lead to cerebral ischemic lesions. In patients with impaired consciousness, aortic dissection needs to be identified in the absence of a history of pain [1].

Changes in blood pressure can occur when aortic dissection affects the arterial blood supply. Differences in blood pressure of the extremities contribute to the diagnosis of aortic dissection. However, blood pressure measurement can only indicate arterial vascular disease, and cannot determine the specific location and extent of diseased arteries [2].

Aortic dissection can also involve the coronary arteries, resulting in myocardial ischemia. Changes in the ST segment and T wave can be seen on the ECG. Troponin and D-dimer can also be altered. Early diagnosis of aortic dissection and coronary heart disease is helpful to determine a treatment plan [3].

### 4.2. Image Features

When aortic dissection and pericardial effusion occur in patients, the onset is sudden, the progress is rapid, and the vital signs are unstable. Chest CT scan and bedside echocardiography can help detect pericardial effusion,

cardiac tamponade, aortic dilatation, intimal avulsion, cardiac changes, etc. [4].

When pericardial effusion exists without significant changes in the aorta, it is necessary to pay attention to the distribution characteristics and volume of effusion, but also to pay attention to hemodynamic changes and the etiology of effusion. Especially in acute pericardial effusion, when the effusion is produced rapidly, cardiac tamponade will occur. On the premise of no trauma and surgery, aortic dissection is first considered [5].

In addition to aortic dissection, the causes of pericardial effusion include systemic diseases, heart disease, infection, and tumors. The examination of pericardial effusion is helpful to identify the cause [6]. However, if the cause is aortic dissection, pericardiocentesis is risky [7].

### 4.3. First Aid

The patients suffered from sudden disturbance of consciousness, accompanied by unilateral limb weakness or speech disturbance, and were initially diagnosed as ischemic stroke. However, the cause of disturbance of consciousness is aortic dissection and pericardial effusion, and intravenous thrombolysis is not suitable, otherwise the condition will worsen and death will occur [8].

The patient's disease progressed rapidly and hemodynamic disturbances developed. On the way to an institution where surgery can be performed, the volume expansion and boosting therapy was ineffective and death occurred. Pericardiocentesis was considered risky in the past [7]. Recent studies have found that if controlled drainage of pericardiocentesis can be performed, blood pressure can be maintained, treatment time can be obtained, and death can be reduced [9].

In addition to aortic dissection, aortic syndrome also includes intramural hematoma and aortic penetrating ulcer, both of which can progress to aortic dissection. Both are not suitable for intravenous thrombolysis. Daily blood pressure control and long-term follow-up are required, and surgery is required when necessary [10].

## 5. Closing Remarks

Aortic dissection with pericardial effusion has a high mortality rate. If it is identified early, it will not only avoid intravenous thrombolysis, but also contact an institution with treatment conditions. Chest CT scan and bedside color

Doppler ultrasound are important methods to quickly identify aortic dissection and pericardial effusion. During the transfer, if a reasonable pericardiocentesis and drainage are performed, the rescue time will be obtained. In addition, intramural hematoma and aortic penetrating ulcers also require close attention, including long-term follow-up, blood pressure control, and surgical treatment if necessary.

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