# Acute Aortic and Carotid Dissection Presenting with a Headache, a Case Report

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## Abstract

**Background:** Aortic dissection is an uncommon medical emergency with an incidence rate of approximately three per 100,000 people; the diagnosis of aortic dissection is often missed in the absence of chest pain in approximately 6% of cases.

**Case Presentation:** There was a 53-year-old man with a history of migraines and high blood pressure who woke up in the morning with a severe headache and was diagnosed with carotid dissection and thoracic aortic dissection involving the ascending aorta and descending aorta.

**Conclusion:** Aortic dissections rarely present with severe headaches as their initial symptom, but aortic dissections with carotid artery dissections are typically accompanied by headache; it is important to keep in mind that the sudden onset of a frontal headache may necessitate sonography of the carotid arteries and echocardiography.

**Keywords:** Aortic Dissection, Carotid Dissection, Headache

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## Introduction

Aortic dissection is a relatively rare condition that can cause severe chest pain and hemodynamic disorders, and it is a medical emergency with a high mortality rate [1].

In most cases, aortic dissection is associated with chest pain. However, it can also present with other symptoms, such as pain in the neck, throat, abdomen, back, syncope, paralysis, and shortness of breath. This leads to a delay in diagnosis and a subsequent delay in treatment [2].

Aortic dissection is predisposed by high blood pressure and connective tissue diseases (such as Marfan syndrome), which destroy the walls of the aorta. Atherosclerosis, bicuspid or surgically replaced aortic valves, cocaine use disorder, and Turner syndrome are also associated with this disease; immediate treatment is crucial and typically involves blood pressure control and surgical repair of the aorta. However, the prognosis remains poor, with a high mortality rate, significantly if the diagnosis is delayed [3-4].

We present a rare case of aortic and carotid dissection with headache, a condition that has not been previously documented in the medical literature. This case has the potential to significantly contribute to our understanding of aortic dissection and its atypical presentations, offering hope for improved diagnosis and treatment in the future.

## Case Presentation

A 53-year-old man with a history of migraines, high blood pressure, and smoking (30 packs per year) woke up in the morning with a severe headache. Initially, the patient self-medicated at home with indomethacin 75 mg tablets, which was ineffective. The patient went to the fast-track emergency department of Khatam Al-Anbia Hospital, Zahedan, at 10:00 a.m. An emergency medicine specialist examined and evaluated the patient in the fast-track emergency department. His headache was currently rated as 10 out of 10. The patient also complained of vague chest pains. His usual symptoms of migraine recurrence on the right side of the head were headaches, but this

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time, he experienced headaches on the left side, as well as generalized weakness and mild dizziness. The patient did not report any issues, such as head trauma or neurological deficits, which include symptoms like numbness, immobility, speech disorders, and blurred vision.

On admission to the fast-track unit, the patient's blood pressure was 200/105 mmHg, his heart rate was 110 bpm, and his ECG showed no ST-T changes. To treat a patient diagnosed with migraine headaches and uncontrolled blood pressure, 25 mg of oral Metoprolol and 30 mg of intravenous Ketorolac were prescribed. After one hour, the patient's headache remained at a severity of 10 out of 10, with no change in pain observed. The blood pressure had decreased to 190/100 mmHg, and the heart rate had been reduced to 95 beats per minute.

The patient was admitted to the emergency department for severe headaches and was unresponsive to treatment. A repeat ECG in the acute emergency unit revealed no differences from the initial ECG in the fast-track unit. Tests for kidney and liver function, cardiac enzymes, and blood coagulation were ordered. We ordered 30 mg of injectable Ketorolac, 5 mg of morphine sulfate for headache control, and 20 mg of labetalol for blood pressure management to be administered again. In light of the altered headache pattern and generalized weakness, a CT scan of the brain was requested. Following an hour of preliminary tests that revealed no abnormal changes, a brain CT scan was conducted and likewise showed no definitive signs of cerebral ischemia or hemorrhage. The patient's blood pressure had slightly decreased to 180/100 mmHg, and the heart rate had lowered to 90 bpm. The headache had slightly reduced. However, the patient reported an increase in chest pain that extended to the neck; an ECG was retaken, and it did not reveal any positive findings. Due to the patient's complaints of chest and neck pain, the patient underwent echocardiography at the bedside of an emergency medicine specialist. In echocardiography from transthoracic (TTE), an increase in size could be seen at the beginning of the aortic root just after the aortic valve, and a hyper-

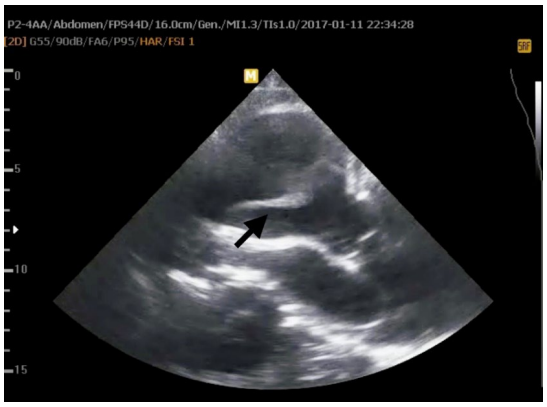



**Fig. 1.** Transthoracic Echocardiography (TTE), an increased size in the aortic root, and a hyper-echo flap is visible inside it (vascular flap)

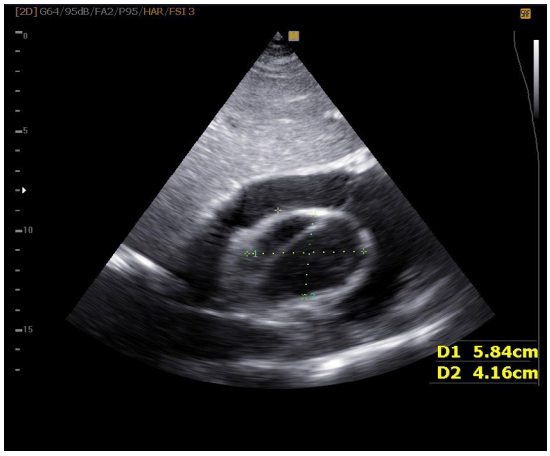



**Fig. 2.** Subcostal Echocardiographic view, an increase in the diameter of the aorta with vascular flap.

echo flap was visible inside it, which was probably a vascular flap (Figure 1).

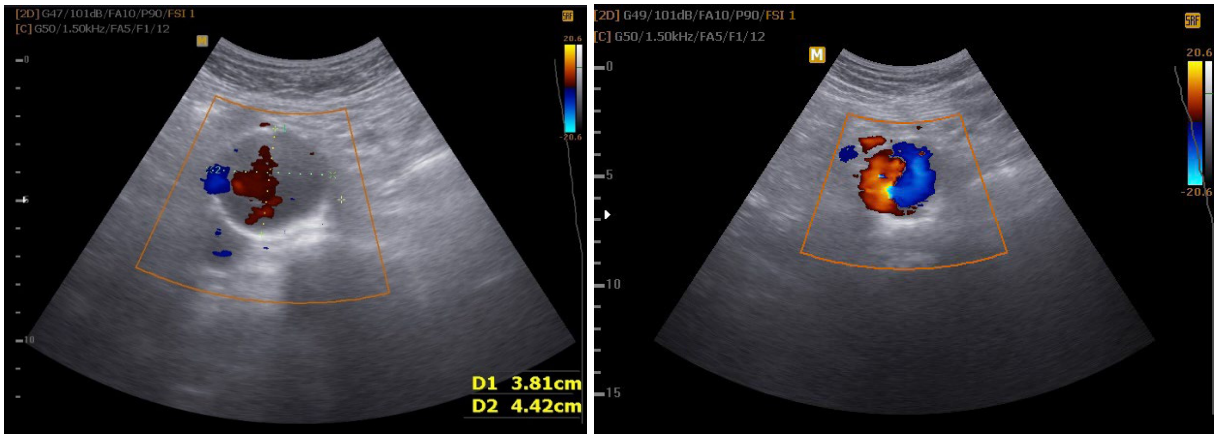
Further, by changing the echocardiographic view from the subcostal, an increase in the diameter of the aorta and the vascular flap was observed (Figure 2).

Subsequently, an abdominal aorta ultrasound was performed, revealing evidence of dissection and a flap extending to the bifurcation of the abdominal aorta. Additionally, the Yin-Yang sign was observed in the color ultrasound imaging of the abdominal aorta (Figures 3-4).

Following the ultrasound and the strong suspicion of a type A aortic dissection, an additional five milligrams of morphine sulfate were administered to alleviate the pain. Furthermore, 20 milligrams of injectable labetalol and 25 milligrams of oral metoprolol were given to lower the heart rate and blood pressure. Subsequently, a CT angiography of the neck and chest vessels was performed, and the patient was promptly transferred to the CT unit for the procedure. The patient's CT angiography of the neck vessels revealed evidence of a dissection in the left common carotid artery (Figure 5).

The CT angiography of the thoracic vessels revealed an aortic dissection beginning at the aortic root, just behind the aortic valve, extending through the aortic arch, and continuing into the left common carotid artery, thoracic aorta, and abdominal aorta (Figure 6).

In addition to administering 20 mg of labetalol at five-minute intervals, the patient's systolic blood pressure decreased to 100 mm Hg, his heart rate decreased to 60 beats per minute, and his pain was relieved with morphine sulfate. In the meantime,




**Figs. 3-4.** An abdominal ultrasound shows an increase in the size of the abdominal aorta and the presence of a flap. The following Fig. shows the Yin-Yang sign with a color-doppler ultrasound.

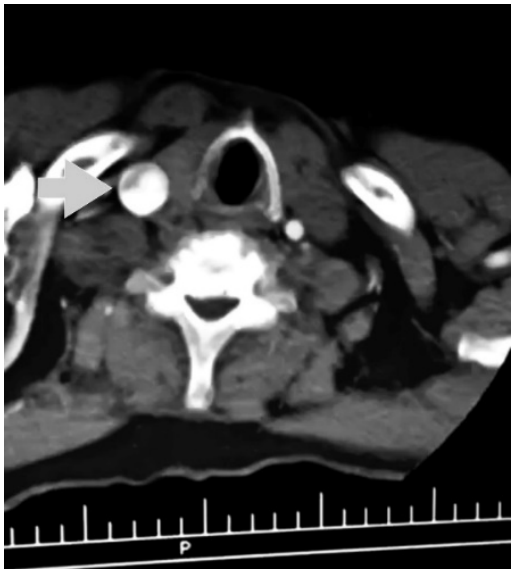


**Fig. 5.** CT angiography of the neck, Dissection in the left common carotid artery (Gray Arrowhead).

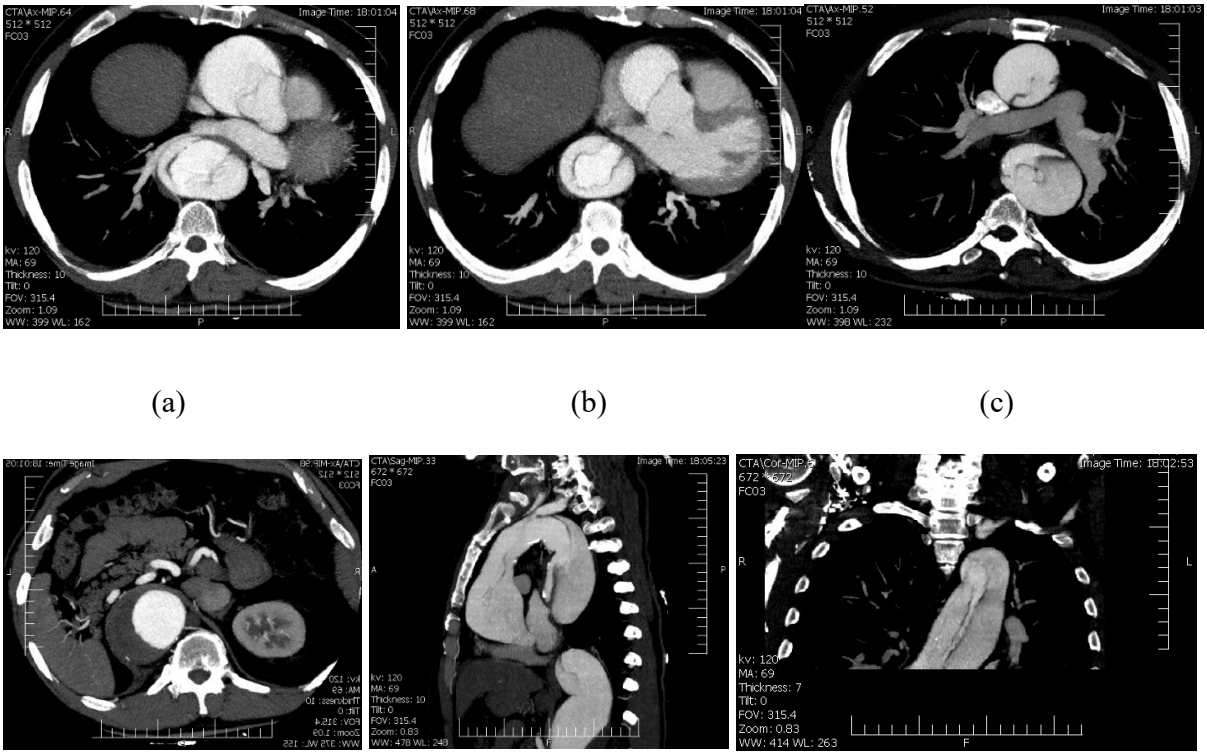



**Fig. 6.** CT angiography of the thoracic vessels showing a thoracic aortic dissection involving the ascending aorta and descending aorta, with an intramural hematoma in the descending aorta. (a)–(f) shows different levels of transverse, coronal, and sagittal sections.

we had an emergency consultation with a vascular surgeon.

After 24 hours, the patient was transferred to another well-equipped hospital in another city for surgery. Following the patient's family's follow-up, the vascular repair surgery was successfully completed without complications.

## Discussion

Aortic dissection is an uncommon medical emergency with an incidence rate of approximately three per 100,000 people [1]. It is important to diagnose acute aortic dissection as soon as possible due to the high mortality rate associated with untreated dissection within the first 24 hours and 70% within the first two weeks. The symptoms of aortic dissection are usually associated with sudden chest pain or back pain [5]. Despite recent advances in cardiothoracic surgery, it remains a lethal procedure with extremely variable case fatality rates. According to some reviews, the surgical mortality rate for acute aortic dissections ranges between 15 and 30%. The diagnosis of aortic dissection is often missed in the absence of chest pain in approximately 6% of cases [6]. Some patients, however, exhibit rare initial manifestations, such as dyspnea as a result of acute aortic insufficiency, transient ischemic attacks, stroke, syncope, paraplegia, loss of peripheral pulse without ischemia, Horner's syndrome, paralysis of the vocal cord, hoarseness, bronchospasm, hemoptysis, hematemesis, symptoms of mesenteric or renal infarction. In addition to any of these manifestations, chest pain may also be present [2]. Neurological deficits ranging from 18 to 30% are commonly seen in extracardiac dissections, as well as syncope ranging from 13% to 14% [7-8]. Typically, neurological manifestations of aortic dissection include stroke, spinal cord ischemia, hypoxic encephalopathy, and ischemic neuropathy. However, only isolated cases of vertigo, uniocular blindness, or headache have been reported as the presenting symptoms [9]. As an initial symptom, severe headaches are one of the most uncommon manifestations of acute aortic dissection. Carotid artery dissection was the cause of the patient's headache. 68-74% of patients suffering from carotid artery dissection experience this clinical manifestation [10]. It is possible to experience headaches in patients with

primary carotid artery dissections [11]. The cause of headache in these situations may be distension of the carotid artery, which, in turn, stimulates pain receptors [12]. Additionally, ischemia caused by a reduction in blood flow following an aortic dissection may stimulate the depolarizing sensory fibers in the pericarotid cavernous sinus plexus and cause headaches [13]. Aortic dissection extended to the left brachiocephalic trunk and left common carotid trunk, which may explain the cause of this patient's left-sided temporoparietal headache. We reviewed the medical literature extensively and found only a few cases of aortic dissection presenting as headaches. According to a report by Ko and Park, a patient who presented with bifrontal headache on further examination had a common carotid artery dissection and an aortic dissection [14]. There has been a report by Singh et al. of a patient who presented with a bifrontal headache and subsequently became hemodynamically unstable and was found to have a Stanford type A aortic dissection [13]. In our case, the patient presented with a headache and was hemodynamically stable prior to the diagnosis of the condition. He was subsequently diagnosed with an aortic and carotid dissection. There may be severe headaches caused by carotid dissection, such as in our patient, which are highly suggestive of subarachnoid bleeding [8]. An individual with a history of migraine is more likely to suffer headaches during internal carotid artery dissection than an individual without a history of migraine. It is hypothesized that a headache associated with carotid artery dissection is caused by distension of the artery, which stimulates pain-sensitive receptors within the arterial wall [7].

Upon suspicion of aortic dissection, a CT scan with angiography, echocardiography, or magnetic resonance imaging is performed. A further classification of patients is based on the results of the imaging studies. There are three types of DeBakey dissections: type I dissections originate in the ascending aorta and extend to at least the aortic arch; type II dissections involve only the ascending aorta; and type III dissections begin in the descending aorta, usually just distal to the left subclavian artery. There are two types of dissections according to the Stanford classification: type A dissections involve the ascending aorta, and type B dissections do not affect the ascending aorta. Every dissection of the ascending aorta (type A or I or II) must be surgically repaired. A dissection of the descending aorta (type B or III) is usually treated conservatively worldwide. However, a number of advanced centers have adopted endovascular treatment strategies for cases involving specific scenarios such as untreatable pains, malperfusion, and pseudocoarctation with arterial hypertension in the upper body [15-16].

## Conclusion

In this case, the patient presented to the emergency department suffering from a severe headache, leading to a more detailed investigation of his symptoms, which led to the diagnosis of an aortic dissection with echocardiography. An acute aortic dissection is a rare differential diagnosis for acute frontal headache, especially when associated with new chest pain. Aortic dissections rarely present with severe headaches as their initial symptom, but aortic dissections with carotid artery dissections are typically accompanied by headaches. It is important to keep in mind that the sudden onset of a frontal headache may necessitate sonography of the carotid arteries and echocardiography.

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## Disclosures

Human subjects: Consent was obtained by all participants in this study.

## Conflicts of interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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All authors have declared that no financial support was received from any organization for the submitted work.

## Financial relationships

All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work.

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