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# AORTIC DISSECTION: OFTEN NEGLECTED DIFFERENTIAL DIAGNOSIS IN EMERGENCY AMBULANCE SERVICES

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## Abstract

**Introduction:** Aortic dissection is a rupture of the aortal medial layer produced by intramural hemorrhage that leads in a separation of the aortic wall layers, forming a false and true lumen with or without communication and is highly lethal. It causes a variety of symptoms, which can be discrete and subacute, or chronic, and is frequently misdiagnosed.

**Aim:** This case report aims to present a case of a rare, subtle manifestation of transient ischemic attack caused by an aortic dissection.

**Case report**: A 76-year-old man came to the Emergency Medical Service complaining of recent back and left shoulder pain accompanied by discomfort, as well as left-sided tingling of the face, arm, and leg, along with left hand weakness, that had occurred multiple times in the previous five days and lasted three to four minutes. On admission, he was clinically stable and had normal vital signs, without any neurological deficit. The ECG examination revealed RBBB without ST segment abnormalities. The anamnestic and hetero-anamnestic data were completely consistent with a cerebrovascular transient ischemic attack that occurred three days prior. After reevaluating the patient clinical status that was unchanged, he experienced temporary weakness, sweating, and dizziness revealed by shifting from supine to straight position, which was instantly relieved by kneeling down on the floor. The patient was immediately referred to secondary care. While a CT of the brain revealed normal findings, the CT angiography of the aorta showed an infrarenal

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aneurismatic dilatation with a 4cm wide flap indicative of impending aortal dissection. The patient was promptly referred to a tertiary care for further examination and medical care.

**Conclusion:** Aortal dissection can easily go undetected in the Emergency Medical Services due to its pleomorphic clinical presentation, which oscillates between acute hemodynamic shocks to subtle, often undetectable symptomatology. Awareness of aortic dissection as differential diagnosis should be promptly lifted to a higher order thinking.

**Keywords:** Aortic dissection, Transient ischemic attack, acute aortic syndrome

## 1. Introduction

Aortic dissection is a rupture of the aortal medial layer provoked by intramural bleeding, resulting in separation of the aortic wall layers forming a false and a true lumen with or without communication. The intramural hematoma that forms within the media might reach the adventitia when a fatal aortal rupture happens or may propagate through the wall, re-entering into the aortic lumen through a second intimal tear. This false lumen might distend ante or retrograde from the entrance point of dissection forming various dissected lengths of the aortal trunk. According to the position and the length of the dissection, these are classified by Stanford classification or DeBakey classification (1).

This is an emergency state presenting with various type of symptoms which sometimes may be discrete and subacute or chronic manifestation and can be easily misdiagnosed especially in the fast triage situations, as in an Emergency Ambulance Services. A thorough anamnesis and physical examination is a paramount once again in the clinical practice as a key tool of right diagnosis.

In the first 14 days it is referred as acute dissection. The prevalence is 3 to 6 on 100 000 persons per year. It is more frequent in men, average age of 63 years. The risk factors include uncontrolled high blood pressure, smoking, family history of aortal disease, medical history of cardiac surgery, direct blunt trauma, use of intravenous drugs as cocaine and amphetamine, the third trimester of pregnancy and the postpartum, copper deficiency and some genetic conditions as Ehlers –Danlos (type 4), Loeys-Dietz or Marfan syndrome, bicuspid aortal valve etc.(1,2).

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## 2. Case report

A 76-year-old man came to the Emergency Medical Service complaining of recent back and left shoulder pain and discomfort, as well as left-sided tingling of the face, arm, and leg, along with left hand weakness, that had occurred multiple times in the previous five days and lasted three to four minutes, for which the patient did not seek medical help. On admission, he was completely clinically stable with normal arterial pressure of 110/80, normal heart rate sinus rhythm of 78/min and RBBB without ST segment abnormalities. Neurological exam revealed normal physical and sensitive status with no signs of lateralization. The anamnestic information gathered from the patient and the family member were all consistent with cerebrovascular transient ischemic attack which had happened three days prior. The patient was admitted to the ambulatory care room for monitoring and treatment. An isotonic physiologic solution was applied accompanied with 25% mannitol and he was kept in the room for observation. Regular measurements of the vital parameters were obtained every 15 minutes without any deterioration of his condition. There was no alternation in his condition after completing the therapy i.e., the blood pressure measurement in supine position was 110/70 mm/Hg, without any change in his neurological and cardiological status. Suddenly he experienced a new episode of transient weakness, sweating, and dizziness revealed by shifting his position from supine to straight, which was immediately relieved by kneeling down on the floor. Due to the suspicious anamnestic and hetero-anamnestic information we obtained, the patient was referred to the Neurological and Cardiological departments of the Clinical Hospital Stip via an ambulance. While a CT of the brain revealed normal findings, the CT angiography of the aorta showed an infrarenal aneurismatic dilatation with a flap 4cm long indicative of impending aortal dissection (Figure 1). The patient was immediately referred to the University Clinic of Cardiology and the University Clinic for State Cardiac Surgery for further examination and medical care.

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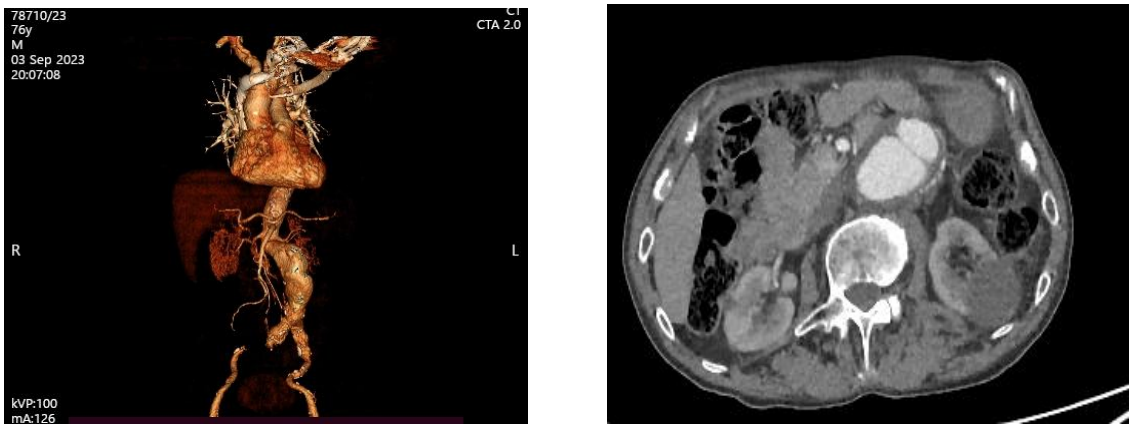


Figure 1. CT angiography showed an infrarenal aortal aneurismatic dilatation with a flap

A full blood count indicated anemia with HGB 58 g/L; Hct 0,20 rv; WBC 6,5 10^9/L; PLT 337 10^9/L; creatinine 70 umol/L; urea 7,9 mmol/L; glucose 6,5 mmol/L; Troponin I 4,75 ng/L; albumins 32g/L; proteins 63 g/L; CRP 0,7 mg/L; AST 22 U/L; ALT 13 U/L, alpha amylase 142 U/L; LDH 192 U/L; K 4,39 mmol/L; Na 133 mmol/L; CK-MB 21,46 U/L; CK 229 U/L. After an abdominal ultrasound examination and gastroscopy revealed normal results, the patient was referred to the University Clinic of Haematology, where antianemic agents and vitamins were recommended. The patient was returned to the University Clinic for State Cardiac Surgery. Throughout the admission, his medical condition remained the same. Another CT angiography was performed, this time revealing an aneurismatic dilatation of the infrarenal aorta along with a 5cm in length mural eccentric thrombus, following which medication-based treatment was recommended and a regular follow-up was scheduled.

## 3. Discussion

An initial objective of this case report was to present a case of rare, subtle manifestation transient ischemic attack caused by an aortic dissection. Aortal dissection comprises 85-95% of acute aortic syndrome (2)**.** It is a highly lethal condition if not recognized and treated promptly. 20% of the patients die before reaching the hospital. Mortality is 25% for untreated dissection at 6 hours and 50% by 24 hours. Two thirds die within 1 week if left untreated. The mortality dynamics

is 1% per hour in the acute state. Stanford type A treated medically have a mortality of 58%, whereas mortality for surgical treatment of Stanford type A dissections is 26%. On the other hand, Stanford type B dissection is more benign with mortality rate of 10 to 12% for patent treated medically. Compared with ruptured aortal aneurysm, 75% of the patients will reach an emergency department alive, while for aortic dissection 40% die immediately (3).

Symptoms vary in intensity and manifestation according to the type and the length of the dissected aorta, regional and collateral circulation. Chest pain is the most common manifestation 80% in type A and 70% type B. Back pain 40% in type A 70% in type B, abrupt pain in 85% for both types, aortic regurgitation 40-75% in type A, cardiac tamponade 20%, myocardial ischemia or infarction 15% in type A and 10% in type B, heart failure 10% in type a and 5% in type B, pleural effusion 15% and 20% respectively, syncope 15% and 5%, major neurological deficit (coma/stroke) 10% and 5 %, spinal cord injury below 1 %, mesenteric ischemia 5%, acute renal failure 20% and 10% and lower limb ischemia 10% and 10% respectively ford type A and 70% Stanford type B, while <1% can manifest as spinal cord injury (1).

According to International Registry of Acute aortic Dissection (IRAD) the frequency of neurological symptoms in aortic dissection ranges from 15-40% and a half of the cases may be transient. IRAD described an incidence of major brain injury (i.e., coma and stroke) in less than 10% and ischemic spinal cord damage in 1,0%. Syncope as an initial symptom of aortic dissection occurs approximately in 15% of patients with Stanford type A aortic dissection and in less than 5% of those presenting with Stanford type B. Upper or lower limb ischemic neuropathy, caused by malperfusion syndrome of the subclavian or femoral territories, is observed in approximately 10% of cases (1).

For instance, the malperfusion syndrome affecting the spinal cord may be very discrete because of the collateral circulation and the susceptibility of the nervous tissue on oxygen demands. It is known that the grey matter of the nervous system needs more oxygen and damage can occur much faster than in case of the white matter and indeed the spinal cord blood supply can be occluded more than 30 minutes without causing any postoperative neurologic deficit. It explains the transit neurological symptoms in our patient i.e., the dissected part of the aorta is below the renal

arteries (4cm long at CT angiography) and the spinal cord is known for the small size and number of vessel (mid thoracic region). Because the process was self-contained, the diagnosis was very confusing and difficult to be made and easily misinterpreted, particularly in urgent situations. Morita et al suggested that patient who present with only neurological symptoms should be promptly examined as appropriate, including measurement of blood pressure in both arms, radiography and transthoracic echocardiography. Although, as these non-invasive procedures may yield the correct diagnosis in most cases of aortic dissection (4).

Many of the patients in acute presentation are also hypotensive which can be due to a pseudo hypertension if the left subclavian artery or the brachiocephalic trunk are affected in Stanford A dissection (1).

Another significant finding was that the patient had not been in pain. According to Imamura et al, painless acute aortic dissection may be more frequent than previously reported. Patients with painless aortic dissection often present with a disturbance of consciousness or a neurologic deficit. Suggesting that clinicians should remember this atypical presentation of acute aortic dissection, especially with symptoms of syncope, disturbance of consciousness, or a neurologic deficit (5).

## 4. Conclusion

Aortal dissection is a life-threatening emergency with a significant mortality rate if not diagnosed and treated promptly. Due to its pleomorphic clinical presentation, which oscillates between acute hemodynamic shocks to subtle, often undetectable symptomatology, it can easily go undetected particularly in circumstances of fast triage situations such as the emergency ambulance. Carefully taken anamnesis and extensive clinical exam (heart auscultation for murmurs, blood pressure measurement and pulse examination on both hands, ECG, and a chest x-ray) is a paramount of the diagnosis. Further investigations, such as Troponin I and D dimer elevations, may help rule out other potential causes. Awareness of aortic dissection as differential diagnosis should be promptly lifted to a higher order thinking. Prompt diagnosis is crucial in decision-making regarding the subsequent medical treatment and the outcome itself.

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