Case report

Aortic dissection presenting as stroke with focal neurologic deficits: A case report

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A B S T R A C T

Aortic dissection is a relatively uncommon and potentially misdiagnosed disease. Early and accurate diagnosis and appropriate treatment are imperative for patient survival. In this case, we present a 55-year-old male who presented to the Emergency Department with severe abdominal pain and acute neurological deficits who was triaged for stroke protocol. After unexpected findings on physical examination, other diagnostic hypotheses were evaluated, culminating in the diagnosis of aortic dissection. The purpose of this article is to exemplify a patient who presents with noteworthy neurologic clinical features who ultimately was diagnosed with Type B aortic dissection, to help benefit the rapid diagnosis and subsequent treatment for future patients with similar presentations.

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Case report

A 52-year-old Hispanic gentleman with a past medical history significant for hypertension and hyperlipidemia presented to the Emergency Department (ED) with a chief complaint of fecal incontinence associated with right lower extremity numbness and tingling and tongue biting. Before the patient’s arrival, he was driving home on a highway when he developed numbness spanning from the tip of his toes radiating to his lateral thigh in his right lower extremity with associated burning pain, followed by significant abdominal pain rated 8/10 in severity as well as mild lower back pain rated 2/10 in severity. Following the onset of pain, the patient pulled over and called his family member. During the phone call, the patient had an episode of fecal incontinence and was instructed by his family to call 911. The patient’s family members confirmed the patient was alert on the phone with no evidence of loss of consciousness during this episode.

In the ED, his vitals were significant for hypertension with a blood pressure of 158/86 mm Hg, decreased heart rate of 50 beats per minute, and he was afebrile with a temperature of 36.4 degrees Celsius. Physical exam was notable for right lower extremity paralysis with reduced sensation to light palpation and reduced range of motion in all planes on the hip, knee, and ankle joints on the right side. The calculated National Institutes of Health Stroke Score was 6. Initial laboratory studies were significant for leukocytosis with a white blood cell...
count of $13.6 \times 10^3$/mm$^3$, hypokalemia with a potassium level of 3.0 mEq/L, and hyperglycemia with a blood glucose level of 127 mg/dL. Due to the patient’s clinical presentation, a stroke code was called. The patient received intravenous Morphine 4 mg and intravenous Labetalol 20 mg. A computed tomography (CT) Brain Stroke Code without contrast was significant for mild central volume loss with ventricular and sulcal dilatation with an absence of mass effect, midline shift, intracranial hemorrhage, or acute territorial infarct (Fig. 1). Additionally, a CT Angiogram Stroke Code Perfusion was significant for small ischemic penumbra within the right cerebellar hemisphere in the posterior inferior cerebellar artery territory with no major vessel occlusion or hemodynamically significant stenosis. The patient was admitted to the Neurology floor for further workup of possible stroke in the setting of fecal incontinence and new-onset paresthesia.

Two hours later, the patient developed worsening abdominal pain rated 6/10 in severity, prompting the team to obtain a CT of the abdomen and pelvis without contrast, which was significant for enteritis. At this time, the patient’s numbness and weakness of the right lower extremity had completely resolved. The patient’s anti-hypertensive medications (Norvasc 10 mg oral daily, Lisinopril 40 mg oral daily) were held for permissive hypertension in the setting of suspected stroke.

Ten hours later, the patient continued to complain of severe, diffuse abdominal pain unrelieved with pain medications. A CT Angiogram of the Chest, Abdomen, and Pelvis was obtained, significant for type 1 dissection extending from the aortic arch down to the abdominal aorta and bilateral common and external iliac arteries and then into the right proximal superficial femoral artery and left common femoral artery, also extending into the right renal artery with mild to moderate luminal narrowing. Subsequently, Vascular Surgery reviewed the images and interpreted the findings as type 2 aortic dissection (Fig. 2). Immediately, Cardiology and Cardiothoracic Surgery were consulted, and the patient was transferred to the critical care unit, initiated on Cardene drip, and given intravenous Morphine as needed for pain. Surgery was held until the patient’s systolic blood pressure was less than 160 mm Hg. The patient required trials of various medications to effectively lower his blood pressure so he would be optimized for surgery, including Amlodipine, Hydralazine, Labetalol, Esmolol, and Clonidine.

One day before planned surgery for left carotid to subclavian bypass, CT Angiogram of chest, abdomen, and pelvis re-demonstrated the extensive thoracoabdominal aortic dissection with an increased size of the aneurysmal dilatation of the distal aortic arch from 4.7 to 5.9 cm and there was a dissection flap in the left subclavian artery as well as a mural based thrombus in the left axillary artery. The patient underwent left common carotid artery to subclavian artery bypass and was monitored in the surgical intensive care unit with Nicardipine drip.

One day following the operation, the patient endorsed numbness in his left 2nd to 4th hand digits, and his hand was cool to touch with poor capillary refill and absent palpable radial pulse. Emergent arterial ultrasound of the left upper extremity revealed a thrombus in the left subclavian and axillary artery with no flow noted in the radial artery. CT angiogram (CTA) of the left upper extremity revealed complete acute occlusion of the left axillary artery and proximal left brachial artery. Due to these findings, the patient returned to the operating room for brachial artery exploration with endarterectomy, patch angioplasty, and stent-
ing. Postoperatively, he had improvement in his left radial pulse.

On the thirty-seventh day of his admission, the patient was taken to the operating room for thoracic endovascular aortic repair and repair of type B aortic dissection with the use of an Endostent. Multiple stents and endografts were placed in his left subclavian artery, thoracic and abdominal aorta, as well as the right common femoral artery. Unfortunately, during the operation the patient became hypotensive, and a transesophageal echocardiogram revealed new ascending aortic dissection (conversion to Type A dissection) with occlusion of the left anterior descending artery. The patient developed cardiac arrest, cardiothoracic surgery decided to discontinue efforts to repair the dissection, and the patient expired.

Fig. 2 – A 52-year-old male with type 2 aortic dissection. FINDINGS: CT angiogram of the chest, abdomen, and pelvis significant for type 1 dissection extending from the aortic arch down to the abdominal aorta and bilateral common and external iliac arteries and then into the right proximal superficial femoral artery and left common femoral artery, also extending into the right renal artery with mild-moderate luminal narrowing. Later reviewed by Vascular Surgery with final interpretation of radiographic findings as a type 2 aortic dissection. TECHNIQUE: CT angiogram of the chest abdomen and pelvis was performed following administration of intravenous contrast. 2D and 3D MIPS images were obtained on a separate workstation. Radiation dose was reduced using automated exposure control or by adjusting mA/kV according to patient size. Comparison is made to previous CT scan of abdomen and pelvis without intravenous contrast from earlier on the same day.

Discussion

Aortic dissection is a serious diagnosis where a patient experiences a tear in the intima of their aorta. This diagnosis has an incidence of approximately 3 cases per 100,000 patients [1]. In a study investigating over 380 patients with Type B aortic dissection, the majority of patients were male (71%), and the average age of the patients was 65 years old, with 42% of patients with ages greater than 70 years old. Major risk factors identified in this study included hypertension (80%) and atherosclerosis (38%) [1]. Our patient was found to be younger than the average age of patients in this study; however, he represented the majority of patients in this study in the fact that he was male and had a history of uncontrolled hypertension. This patient presented with a small stroke as well as an aortic dissection, however, his uncontrolled hypertension could
have led to both manifestations. Both diagnoses were important to make; however, the ability to prioritize management of his aortic dissection over his stroke might have helped save his life in this case.

It is beneficial to utilize risk factors and age groups to stratify patients when considering severe cardiovascular complications; however, our patients may not always fit the exact picture. In our case, our patient was considered for stroke, and the ultimate management of his aortic dissection was delayed due to his unusual initial clinical presentation. An estimated 10% of patients who are diagnosed with aortic dissection do not have a chief complaint of chest pain and do not present with deficits in their pulses [2]. In a retrospective study of over 1000 patients with aortic dissection, 85% complained of chest or back pain, 90% experienced an abrupt onset of their pain, 49% presented with hypertension measuring systolic blood pressure of equal or above 150 mm Hg, 30% presented with abdominal pain, and 12% presented with focal neurologic deficits [2]. Severe pain is 90% pooled sensitive and 84% specific for patients with thoracic aortic dissection [3]. Our patient presented with hypertension with a systolic pressure greater than 150 mm Hg, focal neurological deficits such as lower extremity paralysis and fecal incontinence, as well as later onset abdominal pain that was abrupt.

In one study, the absence of abrupt pain lowered the likelihood of dissection with a negative likelihood ratio of 0.3, with a 95% confidence interval of 0.2-0.5. However, this same study was found to have an increased likelihood of dissection in patients with neurological deficits with positive likelihood ratios of 6.6-33.0 [3]. Although our patient had a decreased likelihood of aortic dissection due to his initial absence of pain, the combination of his focal deficits and then subsequent abdominal pain increased his probability of having a dissection. Due to our patient’s primary complaint of neurological deficits, stroke management was prioritized for this patient initially. The patient endorsed pain as his chief complaint hours following the initial presentation, which ultimately redirected his medical care.

Using Stanford Classification, Type A and B aortic dissections differ by whether the ascending aorta is impacted, and this classification can steer management towards urgent surgery or medical management to lower the patient’s blood pressure. Type A dissections involve the ascending aorta. With Type B aortic dissections, due to the location of the dissection, there can be poor perfusion to the patient’s liver, spinal cord, bowels, kidneys, and legs [2]. This correlates well with our patient who briefly developed lower extremity paresthesia and fecal incontinence secondary to poor perfusion to his spinal cord, intestinal tract, and lower extremities.

Imaging can be useful in determining whether the patient has an aortic dissection and can further classify the type of dissection [4]. Imaging techniques such as a transesophageal echocardiogram, computed tomography angiography, and magnetic resonance arteriograms have been shown to have roughly equivalent sensitivity and specificity rates, approximately 98%-100% and 95%-98% respectively [5]. In our patient’s case, once the appropriate diagnostic imaging of CTA of chest, abdomen, and pelvis was obtained, we were able to identify Type B aortic dissection and localize the intimal tears to help navigate future therapy.

Once diagnosed with an acute aortic dissection, patients are managed with appropriate pain regimens as well as cardioprotective therapy. Morphine represents a preferred pain medication as it helps to decrease sympathetic stimulation [6]. Maintaining a lower heart rate and blood pressure can lessen the tension within the aorta and therefore prevent worsening dissection [6]. Due to long-standing poorly controlled hypertension, our patient required multiple trials of medical therapy to control his blood pressure for surgical optimization. This highlights how poorly controlled his blood pressure might have been before this admission, ultimately representing one of the greatest risk factors for aortic dissection.

Aortic dissection is a critical diagnosis to make, as urgent therapy and or surgery may be required to prevent life-threatening complications such as cardiac tamponade. When evaluating patients with acute aortic dissections, it is important to note the common patient characteristics and risk factors; however, when reviewing the literature, patients can present diversely. In our patient’s case, he was initially managed for a stroke and permissive hypertension was allowed in the setting of increased blood flow to the brain. Our patient advocated for himself and was upfront about his changing of symptoms from the time of entry into the Emergency Department, to when the night team evaluated him, to his presentation the following morning. The patient’s ability to communicate well with the hospital staff promoted the clinicians to order further diagnostic testing and discover his dissection. Overall, this case was written to present a patient with an atypical clinical presentation of type B aortic dissection. The goal of this report is to complete a literature review of neurologic signs and symptoms in this patient population and to improve upon the diagnosis of this serious cardiovascular phenomenon. More information on the presentation of this disease process and further research studies may contribute to earlier and more accurate clinical diagnosis of aortic dissection.

**Teaching point**

Aortic dissection can present in a non-specific manner, and therefore should be considered when there is high clinical suspicion.

**Author contributions**

Dr. Kania and Dr. Koj developed an initial draft of the case report. The co-authors provided insightful suggestions towards strengthening the article and ultimately helped in improving the case report. Dr. Kania organized the creation of the case report and proceeded with the publication process with the assistance of Dr. Mekheal.

**Patient consent**

Written informed consent was not obtained from the patient; however, verbal informed consent for publication was obtained from the patient.
Declaration of Competing Interest

None

Acknowledgments

We would like to acknowledge the patient described in this case report, as he was an advocate for his health and his clinical presentation will aid in future learning of this rare manifestation.

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