Acute aortic occlusion

Akutna aortalna okluzija

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Abstract. ***Aim:*** Aim of this article is to present acute aortic occlusion as an emergent vascular event, often called "vascular catastrophe" because of its poor prognosis. It is a diagnostic challenge because it requires early recognition and urgent intervention. We will present two cases of acute aortic occlusion. ***Case report:*** In both cases, patients referred to the Emergency Department of the Clinical Hospital Dubrava. Both patients were female, from 55 to 65 years, who presented pain in both legs as deterioration in their condition. One patient had weakness in both legs and neurological symptoms, and the other one had only signs of arterial insufficiency (cold extremities and absence of pulse). In the first case we started with duplex doppler examination, which showed low flow velocities in both superficial femoral arteries with peak systolic velocity lower than 5cm/sec and changed spectra indicating proximal pathology. Multi-slice computerized tomography (MSCT) angiography of abdominal aorta showed thrombosis in infrarenal part of the abdominal aorta which completely filled the lumen. Thrombectomy of the infrarenal aorta was performed. In the second case, we immediately performed MSCT angiography of abdominal aorta by standard protocol in emergency department, which showed complete occlusion of the aorta above the bifurcation and occlusion of both common iliac arteries. Fogarty embolectomy was performed. ***Discussion and conclusion:*** Acute aortic occlusion is a rare condition which is easy to overlook, but has a characteristic presentation. A proper indication for imaging methods is of crucial importance for diagnosis of this condition which is treated with surgical methods and has a high mortality.

Key words: aorta, color doppler, MSCT angiography, occlusion, radiology, thrombosis

Sažetak. ***Cilj:*** Cilj ovog rada je prikazati akutnu aortalnu okluziju, stanje hitnoće, često nazivano i „vaskularnom katastrofom" zbog toga što nosi lošu prognozu. To je stanje dijagnostički izazov jer zahtijeva rano prepoznavanje i hitno liječenje. Prikazat ćemo dva slučaja akutne aortalne okluzije. ***Prikaz slučaja:*** U oba slučaja bolesnici su se javili u hitnu službu Kliničke bolnice Dubrava; radilo se o ženama između 55 i 65 godina, kojima se nakon prethodne bolesti pogoršalo stanje u smislu bola u obje noge. Jedna je bolesnica imala i osjećaj slabosti u obje noge te neurološke ispade na prijemu, dok su se kod druge bolesnice našli samo znaci arterijske insuficijencije (hladni ekstremiteti i odsutnost pulsa). U prvom slučaju učinili smo pregled doplerom dupleksom koji je pokazao niske brzine protoka u obje arterije *femoralis superficialis* s PSV-om (engl. *peak systolic velocity*) manjim od 5 cm/sek te izmijenjene spektre, što u prvom redu upućuje na proksimalnu patologiju. Višeslojna kompjutorizirana tomografija (engl. *multi-slice computerised tomography*; MSCT) angiografija abdominalne aorte pokazala je trombotske mase abdominalne aorte u infrarenalnom dijelu, koje u potpunosti ispunjavaju lumen. Učinjena je trombektomija infrarenalne aorte. U drugom slučaju odmah smo pristupili MSCT angiografiji abdominalne aorte prema standardnom protokolu u hitnoj službi, koji pokaže potpunu okluziju aorte iznad bifurkacije uz prisutnu okluziju obje ilijačne arterije. Učinjena je Fogartyjeva embolektomija. ***Rasprava i zaključak:*** Radi se o rijetkom stanju koje je lako previdjeti, premda se karakteristično očituje. Pravilno postavljena indikacija za slikovne metode i njihovo izvođenje od krucijalne je važnosti za dijagnozu stanja koje se liječi kirurški te nosi visok mortalitet.

Ključne riječi: aorta, dopler u boji, MSCT angiografija, okluzija, radiologija, tromboza

INTRODUCTION

Acute aortic occlusion is a rare and emergent vascular event[1] and the prognosis remains poor[2]. It requires early recognition and intervention[3].

Two primary causes were identified: embolism (65%) and thrombosis (35%). Heart disease and female gender were risk factors for embolism, while smoking and diabetes were risk factors for thrombosis[4]. Pre-existing atherosclerosis combined with a low flow state because of poor cardiac performance is a relatively frequent cause of acute aortic occlusion[5]. It often happens after major operative procedures[6]. In the rest, a hypercoagulabile state may precipitate thrombosis of an abdominal aortic aneurysm and lead to aortic occlusion[7]. One case of an acute infrarenal aortic occlusion caused by embolization of a left atrial myxoma[8] was reported. The median age is 58 years (40-70 years). Hypertension is the most common underlying medical illness[9].

The clinical presentation may vary from acute limb ischemia, neurological symptoms of the lower extremities, abdominal symptoms and acute hypertension[5]. Clinicians must have a high index of suspicion in patients who present painful paresis or paraplegia. Clinical examination of peripheral pulses in these patients is mandatory[9]. It is described that acute lung injury resulting from distal aortic occlusion starts during ischemia[10].

Initial failure to diagnose aortic occlusion, with an intermediate delay from presentation to diagnosis of 24 hours, is mainly responsible for bad prognosis. Even after diagnosis had been established, the need for urgent revascularization was not always recognized, the time from diagnosis to revascularization being 13 hours. Unnecessary aortography contributed to this delay in four patients. The single patient, from Meagher et al. study, who made an uncomplicated recovery, had the shortest delay from presentation to revascularization of only 2 1/4 hours[11].

However, the diagnosis may evade detection since collateral vasculature can maintain a basal perfusion and prevent the expression of acute ischemic phenomena for a long time.

Efstratiadis et al. described a case of a 69-year-old man with chronic severe aortal-iliac atherosclerotic occlusive disease, who referred to institution late, only after complete suprarenal aortic occlusion had caused acute anuria. Ultrasonography (US), computed tomography (CT) and aortography showed complete occlusion of the aorta from below the celiac artery down to the femoral arteries[7].

We will present two cases of acute aortic occlusion.

Acute aortic occlusion is a rare condition which is easy to overlook, but has a characteristic presentation. The clinical presentation of acute aortic occlusion may vary from acute limb ischemia, neurological symptoms of the lower extremities, abdominal symptoms and acute hypertension. Initial failure to diagnose aortic occlusion, with a mean delay from presentation to diagnosis of 24 hours, is mainly responsible for bad prognosis.

CASE REPORT

In our first case, patient was female, 65 years old who presented one hour after onset of symptoms. Symptoms were: abrupt onset of weakness in both legs following defecation and severe pain projecting to both legs. Her previous illnesses were: myocardial infarction and two iliofemoral phlebothrombotic incidents in the last 2 years. Flaccid paraparesis, absent plantar reflexes, anesthesia at the level of the second lumbal vertebra, bilateral lower limb circulatory impairment, hypotension with continence were found on examination. Laboratory findings: elevated – d-dimers. US doppler examination showed low flow velocities in both superficial femoral arteries with peak systolic velocity (PSV) lower than 5 cm/s and changed spectra which suggests proximal pathology (Figure 1). Thrombotic masses were found in the lumen of the abdominal aorta. Multi-slice CT angiography (MSCTA) of the aorta showed thrombotic masses in the infrarenal part of the vessel which fulfilled the lumen in the length of 4cm and filling the distal segment of the aorta right before bifurcation via collateral vessels (Figure 2).

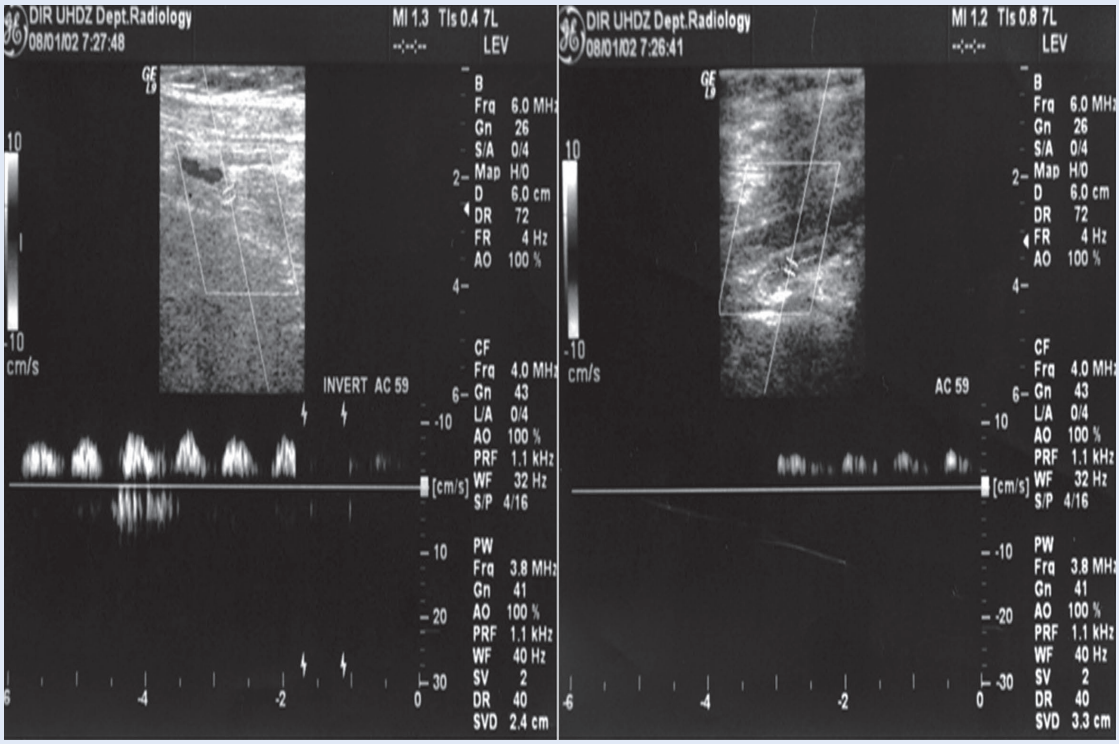

Figure 1 Ultrasonography duplex doppler examination: low flow velocities in both superficial femoral arteries with peak systolic velocity lower than 5 cm/s and changed spectra.

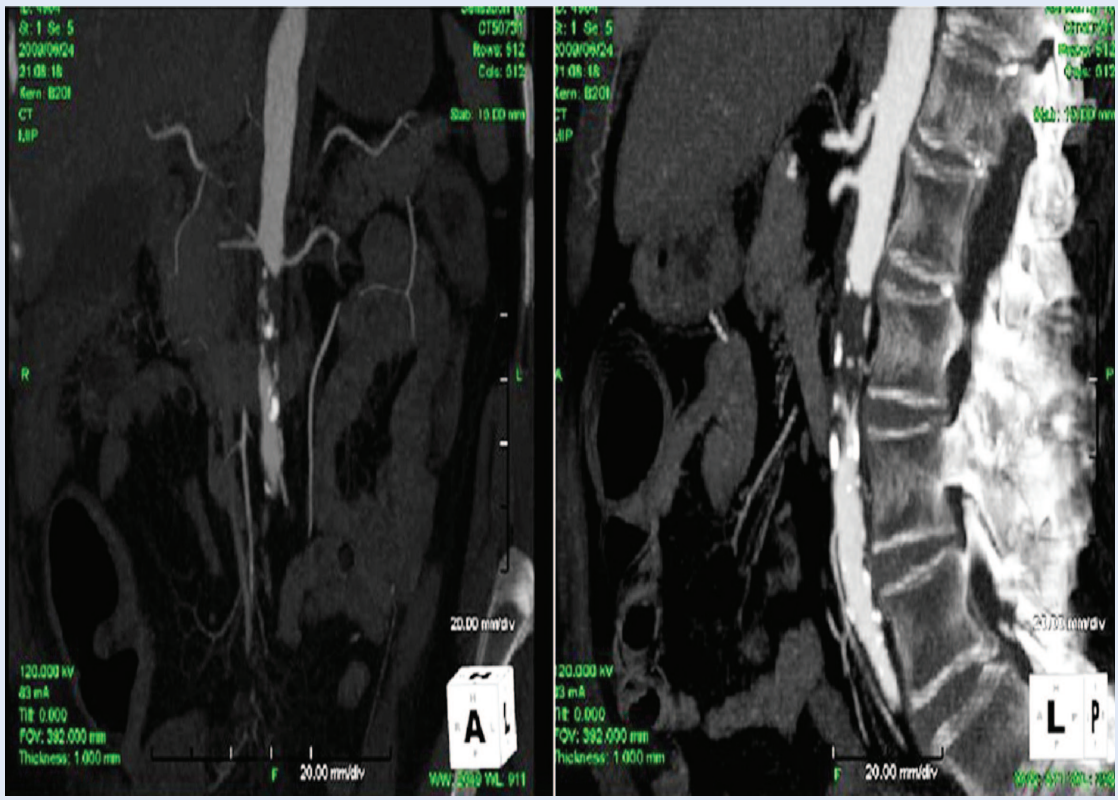

Figure 2 Multi-slice CT of the aorta (coronal and sagittal plane): thrombotic masses in the infrarenal part of the vessel which fulfill the lumen in the length of 4cm and fill the distal segment of the aorta right before bifurcation via collateral vessels.

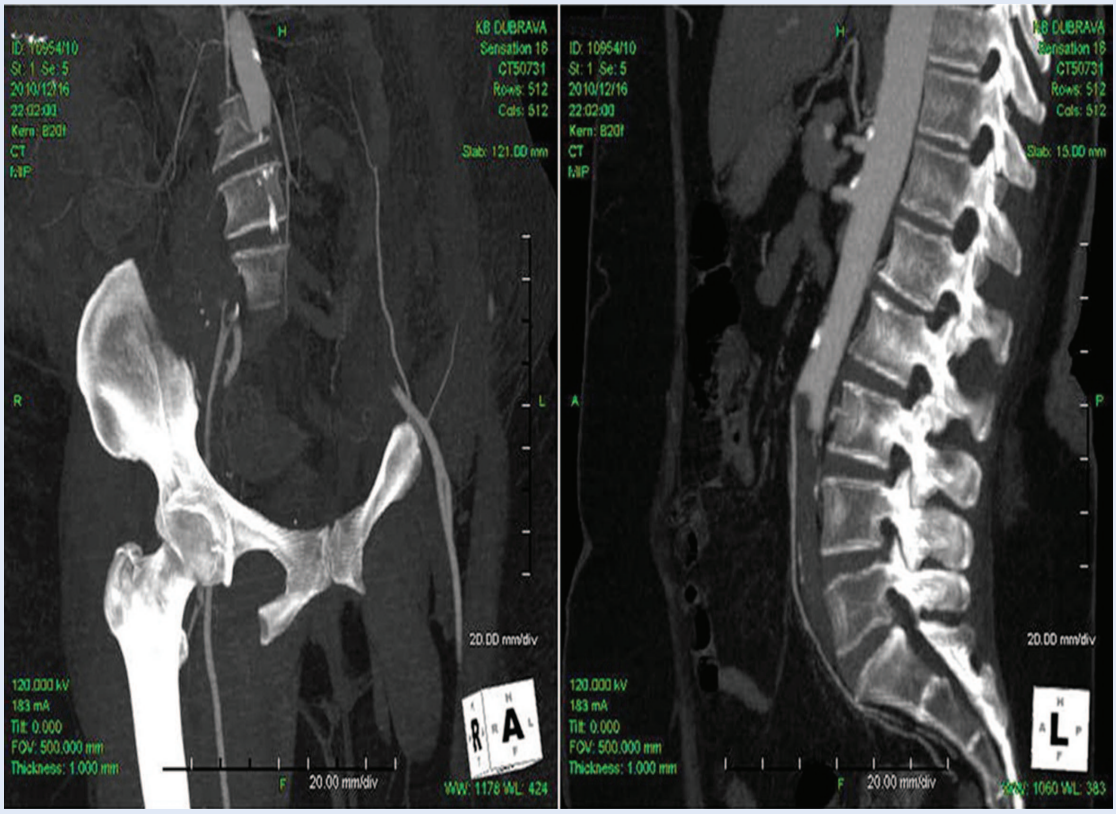

Figure 3 Multi-slice CT (coronal and sagittal plane): total occlusion of the infrarenal segment of the abdominal aorta with complete occlusion of both common iliac arteries, right profound femoral artery and right distal superficial femoral artery.

Thrombectomy of infrarenal aorta was performed. From onset of symptoms till the operation less than 24 hours passed. Atherosclerotic aortal wall was found, without significant stenosis and intraluminal mass was easily detachable. Pathology report confirmed coagulum. Intensive care unit treatment: antihypotensive therapy, vasoconstrictive and inotropic therapy, antimicrobial treatment. Follow-up color Doppler US showed right foot circulatory impairment. Her condition deteriorated and progressed to hypotension and anuria, lower limb ischemia with progression to right foot gangrene, somnolence, grand mal, asystolia and death on third day after surgery. Autopsy was declined by the relatives.

In our second case, patient was also female, 58 years old who had cerebrovascular insult in anamnesis and was treated two months ago for perforated gangrenous appendicitis and diffuse purulent peritonitis in other institution. Three days before she referred to us, necrectomy was performed. In the same time, patient felt sudden pain in both legs which didn't stop for three days. Examination revealed: pain in the right hemiabdomen on palpation, cold lower extremities without pulsations of peripheral arteries. This time we immediately approached to MSCTA examination of the abdominal aorta according to standard protocol in our emergency room. MSCTA showed total occlusion of the infrarenal segment of the abdominal aorta with complete occlusion of common iliac arteries, right profound femoral artery and right distal superficial femoral artery (Figure 3). Fogarty embolectomy of both common femoral arteries, both superficial and profound femoral arteries was performed. From the onset of symptoms till the operation four days passed. She developed a thrombosis of the great saphenous vein with engaging the commune femoral vein with thrombus. On the fourth postoperative day patient developed ischemic cerebrovascular insult, but her condition improved and she was dismissed to home care with some neurological

deficits. Informed consent was obtained from both our patients.

DISCUSSION

A simple, readily available and non-invasive approach to diagnosis is duplex scanning and sonography of the aorta, iliac and common femoral arteries. In severe occlusive disease, its sensitivity reaches 91% and its specificity 93%. It has been shown that duplex scanning can efficiently detect the occlusion and visualize collateral circulation, and is often used as the only preoperative method of visualizing the aortal-iliac segment.

Ultrasonography doppler examination showed low flow velocities in both superficial femoral arteries with peak systolic velocity (PSV) lower than 5 cm/s and changed spectra what suggests on proximal pathology. MSCT showed total occlusion of the infrarenal segment of the abdominal aorta.

A simple, readily available and non-invasive approach to diagnosis is duplex scanning and sonography of the aorta. MSCT is the imaging test of choice for this condition.

Aortic aneurysm rupture, aortic dissection, acute aortic occlusion, traumatic aortic injury and aortic fistula represent acute abdominal aortic conditions. Because of its speed and proximity to the emergency department, MSCT is the imaging test of choice for these conditions[12].

In this era of MSCT, conventional angiography is used as a secondary diagnostic tool to clarify equivocal findings in cross-sectional imaging[12]. Aortography is commonly used when an aortic lesion is suspected as the cause of acute paraplegia[13]. Aortography proves to be important in determining renal artery involvement in patients[1].

Transesophageal echocardiography is becoming increasingly used for the evaluation of aorta, diagnosing aortic dissection promptly at the bedside, and is able to define the cause of the spinal cord ischemia[13].

Magnetic resonance angiography in these cases is a much safer procedure for the preservation of renal function. In urgent cases when MRI angiography is unavailable, as in our case, the use of one of the new generation of iodinated contrast materials for angiography is inevitable[7].

The method of treating these patients after arteriography should be to move quickly to the operating room. Patients with renal artery occlusion must be seriously considered for primary revascularization with either aortofemoral or aortoiliac reconstruction and thrombectomy or bypass of the occluded renal artery. If no renal artery involvement is revealed on arteriography, the initial operation should include an attempt to reestablish inflow by retrograde femoral thromboembolectomy under local anesthesia. If that fails, a decision must be made based on the patient's clinical status, whether a major vascular procedure would be tolerated. If so, primary revascularization or transabdominal thrombectomy should be attempted[1].

CONCLUSION

Acute aortic occlusion is a rare condition which is easy to overlook, but has a characteristic presentation. A proper indication for imaging methods is of crucial importance for diagnosis of this condition which is treated with surgical methods and has a high mortality. A simple, readily available and non-invasive approach to diagnosis is duplex scanning and sonography of the aorta. Because of its speed and proximity to the emergency department, MSCT is the imaging test of choice for this condition. Conventional angiography is used as a secondary diagnostic tool to clarify equivocal findings in cross-sectional imaging.

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