Aorto-caval fistula clinically presenting as left renal colic
Findings of multislice computed tomography

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Key words: abdominal aortic aneurysm; dissecting aneurysm; aorto-caval fistula; renal colic; multislice computed tomography.

Summary. Spontaneous aorto-caval fistula is a rare complication of abdominal aortic aneurysm. A definitive diagnosis is sometimes difficult, as the classic diagnostic signs (pulsatile abdominal mass with bruit, high-output hearth failure, and acute dyspnea) are present in about half of the patients. Diagnosis may be suspected from clinical symptoms, but sometimes atypical clinical features may obscure the actual situation. Computed tomography findings include early detection of contrast medium in the dilated inferior vena cava, which is isodense with the adjacent aorta, an associated aortic aneurysm, loss of normal anatomic space between aorta and vena cava, and rarely one can even visualize the abnormal communication between aorta and vena cava. Prompt radiological diagnosis is of key importance in the management of these patients. We describe findings of multislice computed tomography of the patient with dissecting aortic aneurysm and aortocaval fistula, clinically presenting as left renal colic. Multislice computed tomography is the imaging modality of choice for diagnosis of abdominal vascular pathology as it is noninvasive, fast and demonstrates a high diagnostic accuracy.

Introduction
Aorto-caval fistula (ACF) is a rare entity, complicating about 0.2–6.04% of all abdominal aortic aneurysms (1, 2).

Classical clinical signs of ACF are pain in the abdomen/flank, palpable aneurysm, and abdominal bruit (2), though the specific “triad” is not always present. Before wide implementation of spiral and multislice computed tomography (CT), some studies reported about 75% of preoperatively undiagnosed cases of ACF (1). Specific signs of ACF on CT enable the prompt and accurate diagnosis (2–5).

We report a unique to our knowledge case of combination of dissecting infrarenal aortic aneurysm with aorto-caval fistula and ischemic injury of the left kidney, clinically presenting as left renal colic, and detected by means of multislice CT.

Case report
A 62-year-old male was admitted to the hospital with acute abdominal and lumbar pain. At the initial examination, left renal colic was suspected, and the patient was admitted to the emergency department for ultrasound examination and deeper evaluation. Auscultation abnormalities or sensible pulsatile mass were not detected. Neither history of blunt abdominal trauma nor former iatrogenic impact was detected. There was no history of chronic abdominal aortic aneurysm, hypertension, signs of heart failure, as well. Laboratory findings of cholesterolemia and anemia were absent; serum creatinine and urea levels were in normal range. In the emergency department, the syndrome of ischemia of lower extremities developed, while abdominal and lumbar pain increased. Thus, the patient was referred to urgent abdominal CT scanning, without initial ultrasound examination.

Urgent contrast-enhanced single-injection dual-phase (arterial and venous) CT investigation was performed with a 4-row multislice CT unit (Siemens SOMATOM Volume Zoom, Siemens S.A.S., Saint-Denis, France); scan area extended from above the diaphragm to below symphysis pubis. Scan parameters were as follows: 4×2.5 mm collimation, pitch 1.5, rotation time 0.5 s, 120 kV, 180 eff. mAs.
A total of 120 mL of non-ionic contrast medium (300 mg I/mL; injection rate, 3.0 mL/s; scan delay, 18 s) was injected via an 18-G standard intravenous catheter into the antecubital vein of the patient. No oral contrast material was given.

Obtained data were reviewed on a workstation (Leonardo, Siemens AG), applying all available postprocessing techniques: multiplanar reformatting (MPR), maximum intensity projection (MIP), and volume rendering (VR).

CT demonstrated a large infrarenal aortic aneurysm with slightly calcified walls, involving both iliac arteries. Mural thrombus of about 2 cm in thickness was evident. Signs of intra-aneurismal dissection were apparent in the aneurismal sack (Figs. 1A, 1B). Fistula to inferior vena cava (IVC) arising from the pseudo-lumen and situated beneath the left renal vein was possible to identify (Figs. 1A, 1B). Slight infiltration of periaortic fat was observed at the level of fistula.

In the arterial phase of enhancement, vivid retrograde opacification in both renal veins (especially in the left one) was obvious (Figs. 2A–C), also contrast enhancement of dilated IVC (Figs. 1A–2C). Left renal vein was in retroaortic position (Figs. 2B, 2C), enlarged, and homogeneously enhanced with contrast medium. Infiltration of left perirenal space as well as altered contrast enhancement of the enlarged left kidney parenchyma was evident (Figs. 2A–2C, 3), suggesting venous hypertension, decreased arterial perfusion, and left renal ischemia (2). Right kidney looked intact on CT, with now signs of blood flow impairment. The insertion of right renal vein was above the fistula, hence not so heavily influenced by the retrograde blood flow. Thrombosis of IVC above the left renal vein insertion was suspected (Figs. 2C, 3).

On delayed venous phase scanning, the left kidney showed poor enhancement, as well (Fig. 3).

The patient was transferred to the Department of Surgery. During laparotomy, aorto-iliac synthetic graft was tailored into the aorta and iliac arteries, as well as suture of IVC was performed. Suspected thrombosis of IVC was not detected at surgery.

After the operation, the patient was moved to the intensive care unit. Unfortunately, the outcome was unfavorable. The patient developed hypovolemic shock, acute renal insufficiency, and pulmonary infection and died 14 hours after operation.

Discussion

Aorto-caval fistula uncommonly arises from ruptured atherosclerotic aortic aneurysm (6). It can also result from blunt abdominal trauma and iatrogenic injury (7). Rare causes include mycotic aneurysm, connective tissue disorders, such as Ehlers-Danlos syndrome and Marfan syndrome (6). Clinical symptoms are nonspecific; small aorto-caval fistulas may be with no symptoms present (5). In general, aorto-caval fistulas may manifest with increased pulse pressure, venous congestion, and congestive heart failure (7–9).
in the assessment of patients with abdominal aortic aneurysm (2–4). Spiral and especially multislice CT enables short acquisition time, thin collimation, and sufficient scan volume in addition to multiphase scanning, i.e., all that is of key importance in order to rule out all possible complications of abdominal aortic aneurysm (3, 4).

Typical findings of ACF on CT are as follows: early contrast enhancement of the dilated IVC (earlier than renal and hepatic parenchyma), which is isodense.
with the adjacent aorta, retrograde enhancement of dilated renal and/or iliac veins, an associated aortic aneurysm, loss of normal anatomic space between aorta and IVC (4, 5, 8). In some cases, it is possible to visualize the leak itself, though reports on direct fistula visualization are rather rare (2, 3, 9). In addition, sometimes it is possible to track delayed opacification of the renal cortex on CT, probably due to reduced renal perfusion, decreased arterial pressure associated with venous hypertension (2, 4, 9).

We present CT findings of a case that to our knowledge has never been described before – a combination of dissecting infrarenal aortic aneurysm with aorto-caval fistula arising from false lumen and left renal affection. One similar unilateral kidney affection on CT pattern has been reported by Koslin et al., but with no signs of concomitant aneurismal dissection (8). Mansour et al. reviewed 16 patients with aorto-left renal vein fistulas, who possessed nonfunctioning left kidney (11). Fifteen of these patients had retro-aortic left renal vein, as well. In this review, CT was performed in three patients only.

Knowing all the possible signs of ACF presentation on CT may help the radiologist to make a definite diagnosis when it is not suspected from clinical examination.

Pilvinës aortos-apatinës tuščiosios venos fistulë, pasireiškusi kaip kairiojo inksto kolika

Daugiausiai stebimų aspektų

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Raktąžodžiai: pilvinës aortos aneurizma, disekuojamojo aneurizmo, aortos-tuščiosios venos fistulë, inkstų kolika, daugiausiai stebimų aspektų, kompiuterinë tomografija.

Santrauka. Spontaninë aortos-tuščiosios venos fistulë yra reta pilvinës aortos aneurizmos komplikacija. Šiai diagnozëi nėra lengvai nustatoma, nes išprasti diagnostiniai požymiai (pulsuoantis pilvo skausmas ir ūžsyes, širdies nepakankamumas ir įtiminë dušulys) pasitaiko maždaug pusei pacientų. Kompiuterinës tomografijos vaizduose nustatoma, kad per ankstį pasirodo kontrastinë medžiaga išplëštoje apatinëje tuščiosioje venoje, vizualizuojamas pats aneurizmos maštis, taip pat išnyksta skiriamoji riba tarp pilvinës aortos ir apatinës tuščiosios venos. Retalai kompiuterinëse tomogramose galima pamatyti ir pačią patologinę jungtį tarp aortos ir apatinës tuščiosios venos. Šiuo atveju radiologinë diagnostika turi būti skubi. Mes aptariaime paciento, kuriam buvo nustatyta disekuojamosios pilvinës aortos aneurizmos ir apatinës tuščiosios venos fistulë, klinikinë pasireiškusi kairiojo inksto kolika, daugiausiai stebimų aspektų, kompiuterinë tomografija. Daugiausiai stebimų aspektų pilvinës aortos aneurizma, dysfunkcionaliasis vaga, reta pilvinës aortos aneurizmos komplikacija. čius.

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