CASE REPORT

Renal Artery Thromboembolism in Paroxysmal Nonvalvular Atrial Fibrillation

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Abstract

Renal colic could mimic multiple pathologies as nephrolithiasis, pyelonephritis, sub-occlusive intestinal syndrome, ruptured abdominal aortic aneurysm. Renal thromboembolism is a rare, but severe condition in paroxysmal atrial fibrillation, that could remain underdiagnosed. 76 years old female presented to the emergency department for acute onset of severe back pain, mimicking renal colic. She had a history of percutaneous transluminal coronary angioplasty, and paroxysmal atrial fibrillation. The $CHADS_2$-VASC score 6 led to suspicion of abdominal arterial embolism. Contrast-enhanced abdominal CT showed acute thrombosis of renal artery branches. High levels of lactic dehydrogenase and creatine phosphokinase were characteristic.

Keywords: renal embolism, paroxysmal atrial fibrillation, non-cerebral embolism

Rezumat

Colica renală poate mima diverse patologii, precum litiaza renală, pielonefrita, sindromul subocluziv, anevrismul de aortă abdominală rupt. Tromboembolismul renal este rar întâlnit, dar reprezintă o condiție severă în fibrilația atrială paroxistică, ce poate rămâne nediagnosticată. Raportăm cazul unei paciente în vârstă de 76 de ani, ce s-a prezentat la unitatea de primiri urgențe cu lumbago acut, ce a mimat colica renală. Din antecedentele medicale menționăm angioplastia coronariană și fibrilația atrială paroxistică. Scorul $CHAD_S2$-VASC 6 a ridicat suspiciunea de embolism arterial. Tomografia computerizată cu substanță de contrast a arătat tromboză acută de ramuri arteriale. Nivelele crescute ale lactic dehidrogenazei și creatinfosfokinazei au fost și ele caracteristice.

Cuvinte-cheie: embolism renal, fibrilație atrială paroxistică, embolism non-cerebral

INTRODUCTION

Renal thromboembolism is a rare, but severe condition in non-valvular paroxysmal atrial fibrillation, that could remain underdiagnosed. Due to atrial fibrillation the embolus is organized in left atrium and auricle then reach the renal artery with subsequently ischemia. Renal colic could mimic multiple pathologies as nephrolithiasis, pyelonephritis, kidney ischemia, diverticulitis, sub-occlusive intestinal syndrome, ruptured abdominal aortic aneurysm.

CASE PRESENTATION

76 years old female presented to the emergency department for acute onset of severe back pain with radiation to the right flank. She had a history of percutaneous transluminal coronary angioplasty in the last years

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(with bare metal stenting of the left descending coronary artery 2 years ago), paroxysmal atrial fibrillation, hypertension and hypercholesterolemia. The patient used antiplatelet drug (100 mg/day acetylsalycilic acid), statin, beta-blockers, angiotensin-converting enzyme inhibitor before presentation. Clinical examination revealed blood pressure 160/90 mmHg, 112 bpm irregular pulse, dyspnea, orthopnea, right back pain worsened by deep breath, abdominal distension. The patient

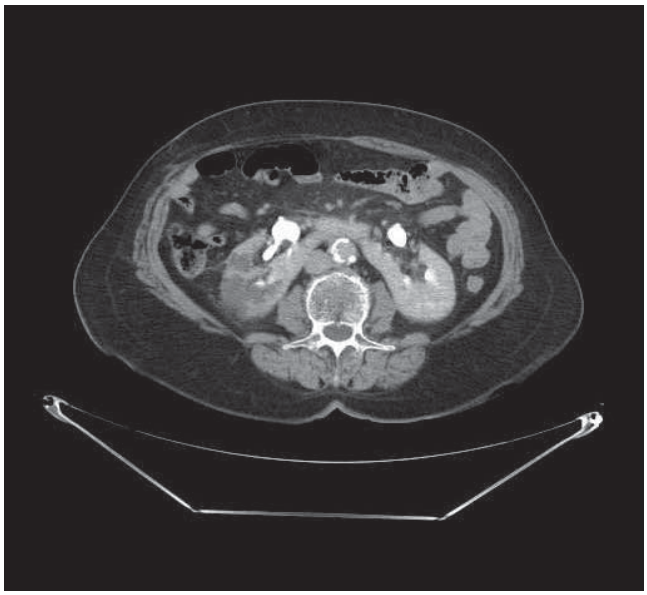

Figure 1. Contrast-enhanced abdominal CT (axial vue): horseshoe kidney with median fusion at the lower pole.

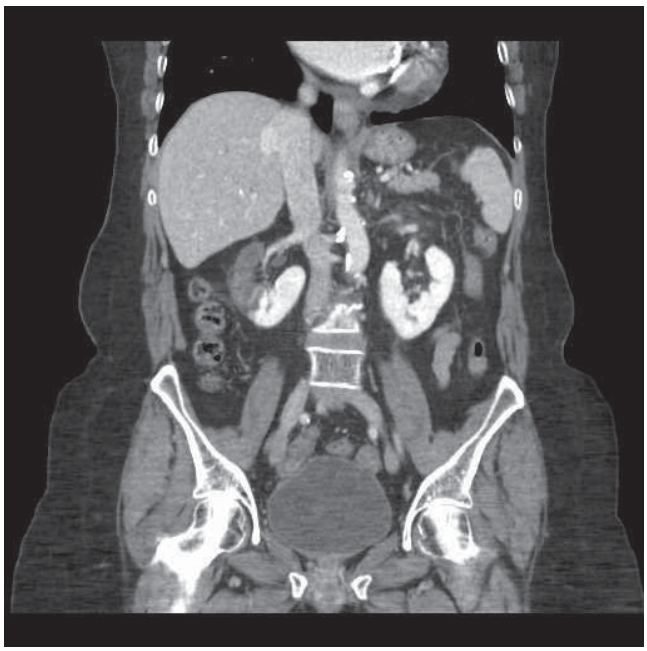

Figure 2. Contrast-enhanced abdominal CT (sagittal vue): several hypodense areas in the upper two thirds of the right kidney.

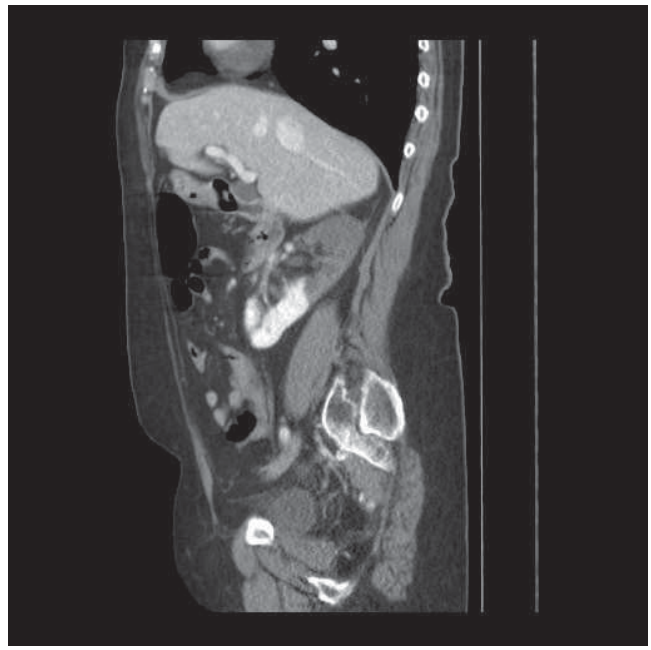

Figure 3. Contrast-enhanced abdominal CT (coronal vue): several hypodense areas in the upper two thirds of the right kidney.

had no crackles or rhonchis, grade II/VI aortic systolic murmur (who did not radiate to the carotid arteries), no abdominal pain with palpation. Lab tests: in normal limits except leukocytosis (19.50 x10^3/L), neutrophilia (17.90 x10^3/L), hyperglycemia (178 mg/dl), hepatic cytolysis syndrome (AST 146 U/L, ALT 166U/L). Serum creatinine was 0.87 mg/dL, GFR (calculated by MDRD study equation) was 63 mL/min/1.73 m^2. The patient had no hypercoagulable status: INR 0.91, prothrombine time 13.10 s, prothrombin activity 116%, fibrinogen 440 mg/dL. The urine analysis showed no red blood cells, no white blood cells, no bacteria. ECG: atrial fibrillation 180bpm. Chest x-ray: cardiomegaly. Abdominal x-ray and abdominal ultrasound: in normal limits. Transthoracic echocardiography: dilated left cavities without thrombosis, left ventricular wall hypertrophy (interventricular septum 14 mm, septal bulge, posterior wall 12 mm), left ventricular ejection fraction 45%. The initial diagnosis was: right renal colic, paroxysmal atrial fibrillation, NYHA class III heart failure, primary hypertension, hypertensive cardiomyopathy. The differential diagnosis was done with nephrolithiasis, acute pyelonephritis, high lumbar radiculitis, abdominal ischemia.

Medical history, paroxysmal atrial fibrillation, the acute onset, the estimated risk of thromboembolism, CHADS2-VASC score 6 (age >75 years-2 points, hypertension-1 point, left ventricular dysfunction-1 point, vascular disease- 1 point, female sex-1 point)

led to suspicion of abdominal arterial embolism[1]. For diagnostic in emergency, it was performed contrast-enhanced abdominal CT. Abdominal CT showed horseshoe kidney (Figure 1), acute ischemia of the right kidney, caused by acute thrombosis of renal artery branches (Figures 2,3). The patient was admitted in hospital. At admission high levels of lactic dehydrogenase (1194 U/L) and creatine phosphokinase (149.10 U/L) were also characteristic for renal infarction. The patient had a favorable evolution under continuous heparin infusion and subsequently oral anticoagulation (acenocumarol 2 mg/day) for an INR-ratio 2-3. Considering that the patient had paroxysmal atrial fibrillation with multiple recurrences under treatment with amiodarone, rate control was chosen. The patient continued treatment with statin, beta-blockers, angiotensin-converting enzyme inhibitor. Invasive treatment of renal infarction has not been considered an option, thrombosis being located in branches of the right kidney artery and not being an emergency method available.

DISCUSSIONS

Atrial fibrillation is a thrombogenic disease mainly by endothelial dysfunction[2]. Comorbidities (hypertension, diabetes, stroke, transient ischemic attack, coronary artery disease), female sex and older age (more than 65 years) raise the thrombogenic risk[1]. Atrial fibrillation increases the relative risk of peripheral arterial thromboembolism 4 times in males and 5.7 times in females[3]. Mesenteric, splenic, renal and limb embolic ischemia have a lower incidence in nonvalvular atrial fibrillation compared with embolic stroke[3-5]. In a meta-analysis nonvalvular atrial fibrillation is responsible for noncerebral thromboembolism and related deaths in 20% of the reported cases[5].

Kidney infarction is a rare disease and thromboembolism is the most important cause. The incidence of kidney infarction was reported up to 1.4%[6,7]. The risk of renal artery thromboembolism without embolic stroke is relatively low[3,6]. In atrial fibrillation, the incidence of renal artery thromboembolism was reported as 0.01% in a meta-analysis[4]. Various authors have reported atrial fibrillation as an etiologic factor in 47-61% of renal infarction cases[6]. Other reported etiologic factors of renal infarction were hypercoagulable status (up to 16% of renal infarction patients), bacterial endocarditis (up to 8% of renal infarction patients), valvular prostheses, aortic ateromatosis, aortic or renal artery aneurysm, nodular polyarteritis, cardiomyopathy, paradoxal embolism by patent foramen ovale[6,8].

Frequently the disease remained underdiagnosed. The clinical onset could mimic renal colic with flank or abdominal pain as the dominant symptom and variable other symptoms like fever or vomiting[6,8,9].

Renal ischemia is characterized by leukocytosis and high values of serum lactate dehydrogenase, usually more than 400 U/dL[3,6,9]. Another lab tests possible changed in the course of disease are: microhematuria, proteinuria, altered renal function, high levels of transaminases or troponin, positive D-dimer[3,6].

In a trial the diagnostic of acute renal embolism was made on admission in 40% of the cases in the first day, based on clinical presentation, medical history, and lab tests[7]. The diagnostic was confirmed by renal isotope scan in 97% of cases, by contrast-enhanced CT scan in 80% and by angiography in 100%, while ultrasonography was positive in only 11% of cases[7]. Contrast-enhanced CT scan seems to be the investigation of choice in emergency, for positive diagnostic of renal ischemia and also for differential diagnostic of renal colic or abdominal pain[7]. In the last years contrast enhanced ultrasonography is used as routine technique for diagnostic of renal arterial disease[10]. ECG holter monitoring and echocardiography could be necessary for detecting paroxysmal atrial fibrillation in cryptogenic embolism[11]. Sometimes the embolus reached the both renal arteries and was confirmed by transthoracic or transesophageal echocardiography[12,13]. While renal arteriography remains the gold standard for diagnosis of renal infarction, the imaging procedure chosen depends on availability in a particular hospital[14]. Anticoagulation therapy is mandatary in atrial fibrillation for prevention of cerebral or peripheral embolism[15].

CONCLUSION

Renal thromboembolism is a rare, but severe condition in atrial fibrillation, that could remain underdiagnosed. Clinical examination and estimated risk are the key of diagnostic and available imaging procedures give the certainty of the diagnosis.

Compliance with ethics requirements:

The authors declare no conflict of interest regarding this article.

The authors declare that all the procedures and experiments of this study respect the ethical standards in the Helsinki Declaration of 1975, as revised in 2008(5), as well as the national law. Informed consent was obtained from all the patients included in the study.

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