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 CHADS2-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

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 acetylsalicylic 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 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 ri-
ght kidney, caused by acute thrombosis of renal artery
branches (Figures 2,3). The patient was admitted in ho-
spital. 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 (acen-
ocumarol 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 treat-
ment with statin, beta-blockers, angiotensin-conver-
ting enzyme inhibitor. Invasive treatment of renal in-
farction 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 ar-
tery disease), female sex and older age (more than 65
years) raise the thrombogenic risk\(^1\). Atrial fibrillation
increases the relative risk of peripheral arterial throm-
boembolism 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 fibrillati-
on compared with embolic stroke\(^4\). In a meta-analysis
nonvalvular atrial fibrillation is responsible for nonce-
rebral thromboembolism and related deaths in 20% of
the reported cases\(^5\).

Kidney infarction is a rare disease and thromboem-
bolism is the most important cause. The incidence of
kidney infarction was reported up to 1.4%\(^6\). The risk of
renal artery thromboembolism without embolic stroke
is relatively low\(^3\). 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 re-
nal 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 em-
bolism by patent foramen ovale\(^6\).

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\(^6\).

Renal ischemia is characterized by leukocytosis and
high values of serum lactate dehydrogenase, usually
more than 400 U/dL\(^3\). Another lab tests possible
changed in the course of disease are: microhematuria,
proteinuria, altered renal function, high levels of tran-
saminases or troponin, positive D-dimer\(^4\).

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\(^5\). 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 ultrasono-
graphy 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\(^8\). ECG holter
monitoring and echocardiography could be necessary
for detecting paroxysmal atrial fibrillation in crypto-
genic 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 de-
pends on availability in a particular hospital\(^14\). Antico-
agulation therapy is mandatory 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 experi-
ments 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 obta-
ined from all the patients included in the study.
References


