

No Suspicion, No Disease! Renal Infarction: Case Series

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INTRODUCTION

Abdominal and flank pain with sudden onset is one of the most common patient presentations to emergency departments (ED). Renal infarction is a rare cause of abdominal and flank pain. Usually the symptoms of renal infarction are nonspecific, so the diagnosis is frequently missed or delayed.⁽¹⁾ Especially if a patient has a disease such as nephrolithiasis and pyelonephritis, the possibility of delay or a misdiagnosis will increase. This may lead to irreversible loss of renal function. Diagnosis requires high degree of suspicion.⁽²⁾ In other words, 'no suspicion, no disease'. Renal infarction was first described in 1940 by Hoxie and Kogan.⁽²⁾ Although it is uncommon, it is responsible for considerable morbidity and mortality.⁽³⁾

In this case series, we aim to increase awareness of this condition and decrease the delay and misdiagnosis of renal infarctions.

CASE REPORT

Case 1

A 47-year old male applied to the clinic with flank pain. His pain was localized in his right flank area and started a few hours prior to his arrival to ED. When the patient's medical history was obtained, it was found that he had been diagnosed with nephrolithiasis and cardiomyopathy. The patient's vital signs were as follows: body temperature of 36.7°C, blood pressure (BP) of 200/110 mmHg, heart rate (HR) of 75/min and respiratory (RR) of 17/min and his physical examination signs were all normal except for a costovertebral angle tenderness on the right side. The patient's laboratory values indicated white blood cell (WBC) count of 11,000/ μ L in his blood results, and in his urine analysis, protein + and red blood cells (RBC) +++ were present. Urine analysis and ultrasonography (USG) was performed, but no calculus was seen. Thus, contrast enhanced abdominal computed tomography (CT) scan was performed. There was no contrast infiltration in the right kidney. Then, renal Doppler USG was carried out, and it was found that there was no blood flow in the right kidney. After consulting with the cardiovascular surgeons, the patient was admitted for surgery. Total occlusion of the renal artery made the surgeons choose the surgical intervention. During the surgery, anatomic bypass surgery was done. The circulation was restored after the surgery. After a period of one month, the patient was admitted to the nephrology clinic. None of the complications of renal infarct were revealed.

Case 2

An 81-year old female was admitted to ED with abdominal pain. Her abdominal pain was severe, and it started suddenly 4 hours prior to her arrival to ED. Her medical history was significant for coronary arterial disease and atrial fibrillation. Besides, her surgical history indicated cholecystectomy. Physical examination showed the vital signs as follows: body temperature of 37.7°C, BP of 240/120 mmHg, HR of 85/min and RR of 16/min. Upon palpation, the abdomen was found to be tender in the upper right abdominal quadrant. The remainder of the examination was normal. The patient's laboratory values indicated WBC count of 11,000/ μ L in her blood results, and in her urine analysis, protein + and RBC +++ were present. Diclofenac sodium intramuscular injection was administered to the patient for pain management. After a 30 min waiting period, there was no regression in the pain, so contrast enhanced abdominal CT scan was performed. There was no contrast infiltration in the right kidney, so right renal infarction was diag-

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nosed. After consulting with the cardiovascular surgeons, the patient was admitted for surgery. Because of the total occlusion of the renal artery, the surgeons chose the surgical intervention. During the surgery, anatomic bypass surgery was performed. The circulation was restored after the surgery. After a period of two months, the patient was admitted to the nephrology clinic. None of the complications of renal infarct were revealed.

Case 3

A 48-year old male was presented with left flank pain. The patient's vital signs were all within normal limits, and his physical examination signs were also all normal except for a costovertebral angle tenderness on the left side. The patient's laboratory values indicated WBC count of 16,000/ μ L, hemoglobin (Hb) of 15.0 g/dL, hematocrit (Htc) of 44.8%, minimal protein was present in his urine analysis. Contrast enhanced abdominal CT scan was performed, and as a result, renal infarction on the left kidney was diagnosed. After consulting with the cardiovascular surgeons, the patient was admitted for thrombolytic medication. The patient received follow-ups by the nephrology clinic for a period of four months. No complication of renal infarction was identified.

Case 4

A 48-year old male was admitted to ED with right flank pain started 10 hours prior to his arrival to ED. There was no disease in the patient's past history. His vital signs were all normal, and his physical examination signs were also all normal except for a costovertebral angle tenderness on the right side. The patient's laboratory values indicated WBC count of 19,000/ μ L, Hb of 15.4g/dL, Htc of 45.2%, aspartate transaminase (AST) of 56.5 units/L alanine transaminase (ALT) of 75.9 units/L and minimal protein, minimal RBC were present in his urine analysis. Abdominal CT scan was performed, and renal infarction was diagnosed. After consulting with the cardiovascular surgeons, the patient was admitted for thrombolytic medication. The patient received follow-ups by the nephrology clinic for a period of four months. No complication of renal infarction was identified

Case 5

A 46 year old male came to ED with pain in the left flank area. There was no disease in his medical history. His vital signs were as follows: body temperature of 36.5°C, BP of 186/105 mmHg, HR of 92/min and rhythmic and RR of 18/min. On physical examination, left costover-

tebral angle tenderness was found. The patient was first diagnosed as renal colic. On laboratory examination, the results of the renal function tests, complete blood count and urine analysis were normal. Noncontrast abdominal CT scan result was normal. Patient's pain didn't respond to painkillers. Contrast-enhanced abdominal CT scan revealed renal infarction in the left kidney. Thrombus resources were evaluated, and hematological and cardiac pathology could not be detected. Idiopathic renal infarction was considered, and the patient was discharged with oral warfarin treatment to prevent further complications. The patient was followed up by the nephrology clinic for 2 months, and no complications were encountered.

DISCUSSION

Renal infarction is emerged when an embolus from a distant origin, suddenly ceases the renal blood flow. It has been reported that the postmortem incidence of renal infarction is 1.4% and its clinically significant incidence is in the order of 0.007% of hospitalized patients.⁽⁴⁾

Renal infarction is typically seen in patients with atrial fibrillation, ischemic heart disease, cardiomyopathy and cardiac valve diseases. Ischemic events are not rare in these patients.⁽⁵⁾ But they are rarely seen in trauma patients, patients with polyarthritis nodosa, cocaine abuse, lupus erythematosus or it may be idiopathic.⁽⁶⁻¹⁰⁾ According to the literature reviews, the age of the patients can vary but the average age is sixth decade, and clinically, they are presented with abdominal, flank and back pain. In laboratory tests, leukocytosis is usually present. Serum creatinine may be elevated, but it is unclear if it is a direct result of the renal infarction or not. In 2/3 of the patients, microscopic hematuria is present. The absence of hematuria shows hypo perfusion of the infarcted area with resulting reduction of glomerular filtration and urine production.⁽²⁾ Serum lactate dehydrogenase (LDH) is the most sensitive marker, but it has poor specificity. Urinary LDH may be more specific than the other tests. In renal infarction, LDH which is originated in the kidneys is found to be high in the urine analysis due to the increased excretion. It is not possible to measure LDH in ED of our hospital so we could not obtain the LDH levels of the patients.

There are many ways for diagnosing renal infarction such as radioisotope renography, excretion urography, renal angiography and contrast enhanced CT scan. Although the sensitivity of radioisotope renography and excretion urography is high, they are rarely used. The sensitivity of renal angiography is also high, but it is an invasive procedure. For this reason, it is not the first choice.⁽³⁾

Abdominal CT scan and magnetic resonance imaging (MRI) are usually preferred for parenchymal evaluation of the kidney. Renal infarction can be easily diagnosed by contrast enhanced CT scan and T1-weighted gadolinium enhanced MRI. The most suitable strategy for the patient presented with renal colic is to perform an unenhanced helical CT scan to rule out nephrolithiasis, and then to perform a contrast enhanced CT scan to observe the renal infarction.⁽¹¹⁾

The standard management for the renal infarction is anticoagulant and/or thrombolysis. Anticoagulant therapy starts with intravenous heparin and oral warfarin. Cornerstones of conservative treatment are analgesics, reg-

Table. Outcomes in renal artery embolism.⁽²⁾

Outcomes	Patient(%)
Normal renal function	57.7
Mild renal impairment	16.7
Moderate renal impairment	15.4
Severe renal impairment/ESRD	10.2
Death within 1 year*	14.3
Embolic disease	50.0
Myocard infarction	25.0
Sepsis	25.0

Abbreviation: ESRD, end stage renal disease.

*Severe renal dysfunction or ESRD in 58.3%

ulation of blood pressure and systemic heparinization. A thrombolytic therapy should be considered; the decision depends on the extent of infarction and the remaining renal function and clinicians' decision. This therapy prevents other thromboembolic events from happening. Perfusion is provided by thrombolysis or surgical revascularization.⁽¹²⁾ In our case 1 and 2, total occlusion of the renal artery made surgeons choose the surgical intervention. But in the other cases, anticoagulation or thrombolytic treatment was chosen because there weren't revealed total occlusions.

Renal insufficiency may arise in a great deal of patients with renal infarction in acute period, but in most of these cases, their renal functions return to their baseline. Hemodialysis is required in those whose renal functions do not return to their baseline. When hemodialysis is necessary, the rate of mortality is higher. Death in these patients is usually caused by either ischemic events or heart diseases when compared to renal complications. In the studies, the early diagnosis of renal infarction prevents the complications and morbidity of the renal infarction.^(13,14) In our patients, we diagnosed renal infarction in the early period of the infarction and no complications were observed. The literature on renal embolism subject is limited. In a few of the reported case studies, the epidemiology and clinical characteristics of this entity are described.

CONCLUSION

Renal infarction should always be considered among the differential diagnosis of a patient who is presented to ED with abdominal and/or flank pain and have risk factors. Advanced imaging should be performed to confirm the diagnosis.

CONFLICT OF INTEREST

None declared.

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