Case Report

Infarction of the lower pole of the right kidney mimicking acute appendicitis: A case report

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Received 27 March 2012; accepted 21 August 2012
Available online 15 October 2012

Abstract

Renal infarction is frequently misdiagnosed as other common diseases, such as urolithiasis, pyelonephritis, or intra-abdominal lesions, because of its rareness and nonspecific clinical presentation and laboratory findings. However, delayed diagnosis is associated with persistent clinical symptoms, risk of renal impairment, and even death. We report a 43-year-old man who was diagnosed with acute appendicitis initially as a result of right lower abdominal pain/tenderness with leukocytosis. Contrast enhanced computed tomography was done because of refractory pain and infarction of the lower pole of the right kidney infarction was found. Renal infarction should be included in the differential diagnosis of abdominal/flank pain, especially in those with risk factors such as atrial fibrillation, valvular heart disease and previous thromboembolic events. Copyright © 2012, Taiwan Society of Emergency Medicine. Published by Elsevier Taiwan LLC. All rights reserved.

Keywords: Clinical presentation; Renal infarction

1. Introduction

Renal infarction is an uncommon disease, with an estimated incidence rate of about 0.004% to 0.007% of emergency department (ED) visits.1,2 As the presentation is usually nonspecific, diagnosis is difficult and the disease is frequently mistaken for other common diseases such as urolithiasis, lumbago, or other abdominal lesions. Accurate diagnosis is usually delayed for days to weeks after admission.3–5

We report a patient who presented to our ED with a clinical presentation mimicking acute appendicitis.

2. Case report

A 43-year-old man presented to our ED with sudden onset of right lower abdominal pain, with a desire to defecate. He had a history of hypertension and hyperglycemia without regular control for a few years. The pain radiated to the right flank area and this was exacerbated when the patient lay down and relieved when he stood up. He denied nausea, vomiting, diarrhea, painful voiding and hematuria. His blood pressure = 150/70 mmHg, heart rate = 70 beats per minute, and respiratory rate = 20 per minute. On physical examination, there were no abnormal findings, except for right lower quadrant abdominal tenderness and right flank soreness. Laboratory data showed leukocytosis (white cell count 14,400/μL) with a left shift (segments 80.6%). Other laboratory data including renal, liver and coagulation function tests, routine urinalysis and microscopic examination of the urine sediment, showed no abnormal findings. Chest and plain abdominal radiography and electrocardiography (ECG) also showed non-specific findings. Bedside sonography of the liver and kidneys revealed no significant findings, including renal stones. Under the impression of acute appendicitis, a general surgeon arranged for an exploratory laparotomy.
Because no hospital beds were available, the patient remained in the ED for 3 hours. His right flank pain and abdominal pain progressed and did not respond to parenteral narcotic analgesics. Computed tomography (CT) was performed, to exclude other intra-abdominal lesions. Enhanced CT showed a renal infarction in the anterior aspect of the lower pole of the right kidney (Fig. 1). The patient was treated with angiography with intra-arterial thrombolytic therapy with recombinant tissue-type plasminogen activator and anticoagulation therapy with heparin and later warfarin. He was discharged on hospital day 10, in a good condition, and his renal function tests were within the normal range after a 1-year follow up.

3. Discussion

The actual incidence of renal infarction is still unknown. A previous study reported on 17 patients, over 14 years, from clinical practice or autopsy. An estimated incidence of 0.007% (17/248,842) was found.6 Huang et al’s retrospective review of 10 years of ED visits, reported an incidence of 0.004% (20/481,540).2 The presentation of renal infarction usually includes a sudden onset abdominal or flank pain/tenderness, nausea, vomiting, and fever.1,2,7-9 Because the clinical presentation is non-specific, renal infarction is frequently misdiagnosed as renal colic, pyelonephritis, urinary tract infection or nonspecific abdominal pain.2,10 As a result, an early, accurate diagnosis of renal infarction is very difficult.6,10 The average delay in diagnosis ranges from 3 to 65.2 hours.2,6 The rate of correct diagnosis of renal infarction on the first ED visit is also low.2,8 Hazanov et al found that only 40% of patients were correctly diagnosed at admission.11 Our patient came to the ED because of the sudden onset of right low abdominal pain, with radiation to the right flank. On physical examination, right lower abdominal tenderness was also found. He was misdiagnosed with acute appendicitis initially.

Previous studies demonstrated that hematuria, proteinuria, leukocytosis, and elevated lactate dehydrogenase (LDH) support the diagnosis of renal infarction.2,8,12 Huang et al found that the serum LDH was three times higher than the normal upper limit in these patients.12 In another study, Huang et al suggested a flow chart, using elevated LDH, proteinuria or hematuria as parameters when renal infarction is suspected.5 However, LDH is not specific to renal infarction. Other diseases, such as mesenteric ischemia, hemolysis, intra-abdominal infection, and acute myocardial infarction are associated with an elevated LDH and should be excluded as soon as possible.1 Theoretically, proteinuria and hematuria are caused by glomerular damage.13 Renal infarction induces glomerular damage and thus hematuria and proteinuria are found in some cases, however, it takes several hours to develop these symptoms. Therefore, initially negative urinalysis findings do not exclude the possibility of renal infarction. The routine urinalysis and microscopic examination of urine sediment in our patient revealed negative findings. The LDH was not checked on the first day, but was elevated the next day (LDH = 877 U/ L, normal range = 135–225 U/L).

Previous studies have revealed that the most important risk factor for renal infarction is thromboembolism.1,2,5,8 The most common cause of thromboembolism is cardiogenic.

Etiologies of thromboembolism include atrial fibrillation, intracardiac thrombus, infective myocarditis, valvular heart disease and coagulation dysfunction.1,2,8,10,11

Our review of these studies showed that the proportion of patients with these risk factors is around 40% to 80%,1,2,8,12,14 Other risk factors for renal infarction include hypertension, malignancy and previous thromboembolic events.1,2,8,12,14 However, in this case, the initial ECG showed a normal sinus rhythm and subsequent echocardiography also revealed negative findings. The patient denied any previous thromboembolic events and his coagulation function tests were within the normal range. Thus, an accurate diagnosis was difficult in this case.

Angiography is the gold standard for the diagnosis of renal infarction,15,16 but it has been gradually replaced by contrast enhanced CT, as this is relatively available, noninvasive and convenient.1,2,5,6 Hazanov et al demonstrated diagnoses made by renal scans (97%), contrast CT (80%) and ultrasonography (11%) using angiography results as the standard criteria in 44 patients with atrial fibrillation.11 However, contrast CT is still the preferred choice in the ED, because it may detect extrarenal causes of abdominal or flank pain, such as appendicitis, diverticulitis and aortic aneurysm. In some studies, renal infarction was not suspected until radiological studies were performed.11 Tsai et al reported that in only 66.6% (12/18) of cases was contrast CT done, because a renal lesion was favored and in the remaining 33.3% (6/18), contrast CT was performed, because an intra-abdominal lesion was favored.11 In this case, contrast CT was done to exclude intra-abdominal lesions. For the above reasons, we suggest that contrast CT should be the first choice when renal infarction is suspected.

Fig. 1. Enhanced computed tomography shows renal infarction of the anterior aspect of the lower pole of the right kidney.
Although therapeutic guidelines for renal infarction have not yet been established, early anticoagulation with heparin and/or warfarin has been favored in most studies.1,2,8 Local thrombolytic therapy appears to be another choice of treatment for renal infarction, while the ischemic renal tissue can still be rescued by reperfusion.10,17 Our patient had angiography with local thrombolytic therapy and anticoagulation therapy with heparin and warfarin. He was discharged 10 days later, with an acceptable outcome.

In conclusion, renal infarction is still an easily overlooked disease. A delayed diagnosis or initial misdiagnosis is associated with persistent clinical symptoms, risk of renal impairment, and even death.5,11 As the result, renal infarction should be in the differential diagnosis of abdominal or flank pain, especially in those with risk factors such as atrial fibrillation, valvular heart disease, previous thromboembolic events, and coagulopathy. An elevated serum LDH, hematuria and proteinuria are helpful laboratory data in the diagnosis of renal infarction. Contrast enhanced CT should be used for a prompt diagnosis. Anticoagulation therapy, with or without local thrombolytic therapy, provides a favorable outcome when the diagnosis is confirmed.

Conflicts of interest statement

The authors have no conflicts of interest related to this work to declare.

References