



## Catheter-Directed Thrombolysis for Acute Renal Infarction

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Acute renal infarction is an uncommon disease, which is frequently misdiagnosed or diagnosed late because of its nonspecific clinical presentation, and may result in irreversible damage to the renal parenchyma. Here, we present a case of acute renal infarction in a 51-year-old male, presenting with left flank pain and being diagnosed through computed tomography. We successfully performed catheter-directed thrombolysis to rescue the ischemic renal tissue and preserve the renal function.

**Key words:** Catheter-directed thrombolysis, acute renal infarction, thrombolytic therapy

### INTRODUCTION

Acute renal infarction is an uncommon disease, which might be misdiagnosed or diagnosed late because of nonspecific clinical presentation and sequentially result in irreversible damage of renal parenchyma.<sup>1</sup> Based on the emergency department admission data, the incidence of acute renal infarction is estimated to be 0.004%–0.007%.<sup>2,3</sup> Atrial fibrillation is the most common risk factor for renal infarction in 64% of published cases.<sup>4</sup> Early diagnosis of this disease is crucial to rescue the ongoing ischemic renal parenchyma, as delayed diagnosis always leads to irreversible kidney damage, impaired renal function, and even permanent hemodialysis.<sup>5,6</sup> In this report, we successfully treated a male with acute renal infarction by means of percutaneous catheter-directed thrombolysis.

### CASE REPORT

A 51-year-old male presented with sudden onset of severe left flank pain lasting for several hours. He had no urinary or gastrointestinal symptoms. He had mixed hyperlipidemia and overactive bladder with medications for years. The patient denied any trauma or systemic disease, and no particular family medical history was recorded. The electrocardiogram showed normal sinus rhythm. The physical examination on admission revealed a soft abdomen and tenderness over the

left iliac fossa. The patient did not experience any rebound tenderness or muscle guarding. The laboratory data revealed mildly elevated liver enzymes (alanine aminotransferase: 66 U/L) and hyponatremia (Na: 131 mmol/L), while renal function and the coagulation profile were within normal range.

Abdominal computerized tomography demonstrated thrombosis of the left renal artery and extensive infarction of the left kidney [Figure 1]. We immediately administered intravenous heparin and performed emergent catheter-directed thrombolysis through the left femoral artery. Meanwhile, the aortogram revealed patency of the celiac axis, superior and inferior mesenteric arteries. Selective left renal arteriography revealed a perfusion defect over the upper part of the left kidney [Figure 2a] without thrombus in the left renal artery. Then, we did catheter-directed thrombolysis with a bolus injection of urokinase 60,000 IU. Approximately 20 min later, the repeat angiogram displayed improved perfusion in the previous defect of the left kidney [Figure 2b].

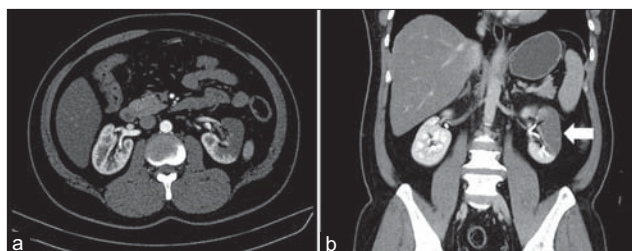
After the thrombolysis therapy, the left flank pain gradually subsided, and aspirin 100 mg and warfarin 2.5 mg were administered every day. Subsequently, no positive finding was identified in the rheumatology profile or tumor marker screening. The echocardiography showed no significant valvular disease or intracardiac thrombus. No renal function impairment was noted when he was

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**Figure 1:** Axial view (a) and coronal view (b) on computed tomography showed decreased attenuation over the upper and middle part of the left kidney (white arrow)

released from our hospital and during the regular outpatient department follow-up.

## DISCUSSION

Acute renal infarction is often misdiagnosed, and its incidence is often underestimated. Due to its rare occurrence and nonspecific symptoms, early detection in clinical practice is difficult. The most important risk factors for acute renal infarction include atrial fibrillation, previous embolism, and valvular and ischemic heart disease.<sup>3</sup> Other possible etiologies include thromboembolism caused by endocarditis, hypercoagulant conditions, catheterization, and trauma. Acute renal artery embolism often has a variable and vague clinical presentation. The most common symptoms include abdominal pain, flank pain, nausea, and vomiting. Meanwhile, the most common abnormality in laboratory findings are leukocytosis and elevated lactate dehydrogenase levels.<sup>4</sup>

The key points to an early diagnosis are the awareness of unexplained flank pain and immediate radiology image studies, such as computerized tomography and angiogram. We strongly advise the contrast-enhanced computed tomography for advanced differential diagnosis. Contrast-enhanced computed tomography has both high specificity and sensitivity in verifying renal infarction, which demonstrates perfusion defects of the renal parenchyma.<sup>7</sup>

The management of acute renal infarction remains controversial. In the literature, compared to the conservative treatment, open surgical treatment to remove the embolism is less effective.<sup>8</sup> In addition, recent studies have shown that treatment with oral anticoagulants and/or intravenous or intra-arterial thrombolytics is feasible.<sup>3,5,9</sup> In the current era, catheter-directed thrombolysis has been reported as a viable and highly successful treatment.<sup>10</sup> Advances in endovascular techniques have made it possible to perform transcatheter thrombolysis together with balloon angioplasty and stenting, if indicated,<sup>11-14</sup> in patients with spontaneous renal artery dissection complicated with renal infarction and deterioration of renal function.<sup>11-15</sup>



**Figure 2:** Selective left renal arteriogram revealed perfusion defect of the left kidney (a). To reperfuse the defect area of infarction, the catheter was used to inject a single bolus of urokinase 60,000 IU into the left renal artery. Approximately 20 min later, the repeat angiogram displayed improved perfusion in the previous defect of the left kidney (b)

It should be noted that an early diagnosis of acute renal infarction is crucial for early rescue therapy to preserve the renal function.<sup>3</sup> Therefore, the key point is to shorten the renal ischemic time to prevent the irreversible damage. In this scenario, endovascular catheter-directed thrombolysis has the advantage of minimally invasive properties and early revascularization. In addition, longer-term anticoagulants should also be considered.

## CONCLUSION

We present a case of acute renal infarction that was successfully treated by catheter-directed thrombolysis with urokinase and subsequent oral antiplatelet and anticoagulation therapy. Acute renal infarction is often misdiagnosed due to its nonspecific symptoms. From the reported cases, acute renal infarction might be identified in relatively low-risk patients.<sup>3</sup> Hence, clinical suspicion is required when the flank pain is unexplained. Moreover, catheter-directed thrombolysis could be a good treatment to rescue the ischemic renal parenchyma.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given his consent for his images and other clinical information to be reported in the journal. The patient understand that his name and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

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