

Successful Treatment of Bilateral Renal Vein Thrombosis in a Patient with Nephrotic Syndrome: A Case Report

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ABSTRACT

Renal vein thrombosis is a well-known complication of nephrotic syndrome, but precise and early diagnosis remains a problem. We report a 29-year-old patient presenting with loin pain, oliguria and macroscopic hematuria. A computed tomography scan showed chronic left renal vein thrombosis and acute right renal vein thromboembolism. The thrombus was recanalized with long-term anticoagulant therapy. This report highlights the importance of an early and timely diagnosis and RVT therapy in a patient with nephritic syndrome.

Keywords: Hepatic vein, nephrotic syndrome, renal vein thrombosis

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INTRODUCTION

Nephrotic syndrome (NS) is associated with a high frequency of renal vein thrombosis (RVT). According to the time of onset, RVT is divided into acute or chronic RVT. Although the clinical characteristics of acute and chronic RVT are well described, the precise and early diagnosis of RVT, especially chronic RVT, is easily ignored because of the chronic onsets, early non-specific clinical manifestations and unawareness of clinicians. Here, we report a case of NS complicated with bilateral renal vein thrombosis.

CASE REPORT

A 29-year-old woman was admitted to our hospital with chief complaints of “loin pain for 1 month, oliguria for 2 days and macroscopic hematuria for 1 hour”. One month previously, the patient felt left loin pain, which improved after anti-infection therapy. Three weeks previously, she felt distending pain in her right lower back without any relief after Chinese herbal medications, accompanied by edema in both lower limbs. Two days previously, she complained of sudden oliguria, with urine output of approximately 200 ml per day, nausea and vomiting. One hour prior to presenting at our hospital, she experienced intense pain in her lumbar region, with macroscopic hematuria. The patient was then admitted to our division for further treatment. Physical examination at admission indicated: blood pressure of 105/60 mmHg and heart rate of 80 beats/min. Percussion pain was observed in bilateral kidney regions, especially the right side, and slight edema was observed in both lower extremities. Laboratory findings were as follows: creatinine (CREA) 146 μ mol/L; albumin

(Alb), 19.8 g/L; and cholesterol, 6.58mmol/L. Humoral immunity exams, including: ANA, anti-double-stranded DNA (ds-DNA), antineutrophil cytoplasmic antibodies, and anti-glomerular basement membrane antibody, were negative. D-dimer levels were 2651 ug/L. Protein urinalys was 3+. Proteinuria over 24 h was 9 g. Other blood analyses were within normal limits.

Imaging examination: Color ultrasonography of the urinary system and renal arteries/veins indicated kidney enlargement and thrombosis in both renal veins. Contrast-enhanced abdominal CT with 3D vascular reconstruction showed a low-density filling defect in both renal veins, an invisible right renal vein, contracture of the left renal vein in the inferior vena cava segment (likely due to thrombosis), collateral circulation formation around the left renal vein, enlarged right kidney with poor blood flow, slightly enlarged left kidney with clear demarcation between cortex and medulla, more conspicuous fluidity in the right kidney capsule and no filling defect in the renal arteries (Figure 1).

The patient was diagnosed with nephrotic syndrome, chronic left renal vein thrombosis, acute right renal vein thromboembolism and acute renal failure. Because left renal vein thrombosis is chronic and collateral had formed, interventional thrombolytic therapy was ceased, and conservative anti-coagulant treatment was prescribed as follows: low molecular weight heparin calcium (0.4 ml) subcutaneously twice a day and clopidogrel bisulfate tablets (50 mg) once a day for anti-platelet therapy. Methylprednisolone (40 mg) was administered intravenously once a day. Five days after corticosteroid and anticoagulant therapy, the patient's waist pain had relieved, and urine output gradually increased to 1500 ml per day. Serum creatinine decreased to

normal levels, and D-dimer levels reduced to 468 ug/L (Figure 2). Twenty-three days later, abdominal enhanced vascular three-dimensional reconstruction CT showed that the sizes of the two kidneys were normal; the right renal vein thrombosis disappeared, the left renal vein was slightly narrow, and no abnormally dense shadow filled the cavity (Figure 3). Serum albumin levels increased to 22.7 g/L, and 24 h urine protein decreased to 5.47 g/24 h, D-dimer levels decreased to normal levels (Figure 2). Thirty-two days after admission, the patient received cyclophosphamide (CTX) (200 mg) intravenously every other day. Then, she was discharged with prednisone (50 mg) once a day, CTX (50 mg) twice a day and anticoagulant drugs. At three-months of follow up, serum albumin levels increased to 37.2 g/L, and renal function, and coagulation function remained within normal ranges.

DISCUSSION

Rayer reported the first case of renal vein thrombosis (RVT) in 1840(1). Patients with RVT may exhibit a series of clinical manifestations caused by blood coagulation, thrombosis, and partial or total obstruction of the renal vein and/or its branches. RVT, which is used to describe presence of thrombus in the major renal veins or their tributaries, may result in trunk obstruction and is commonly accompanied by vascular thrombosis of other organs (2). The diagnosis of acute onset RVT according to typical symptoms, such as severe waist pain, abdominal tenderness, fever, hematuria, proteinuria, oliguria and anuria, is easy (2); however, due to the non-specific clinical manifestations during the formation of collateral circulation, chronic RVT is commonly ignored; Serious complications, such as fatal pulmonary embolism

and renal failure, can occur during the formation of RVT (2-4).

In the clinical course of NS, a high coagulation state and thrombosis are the frequent complications. The pathogenesis of hypercoagulability in nephrotic syndrome is characterized by imbalance between normal anticoagulation/antithrombosis mechanisms and procoagulant/prothrombotic factors (5), such as the loss of small molecules anticoagulation substances, including anti-thrombin III, anti-coagulation factor protein C, and protein S, compensatory synthesis of many coagulation factors, inhibition of plasmin activity, enhanced aggregation and adhesion of platelets and hyperlipidemia(2,3,5,6,7). NS is associated with a high frequency of RVT, and the underlying mechanisms are unclear. The incidence of RVT in NS ranges from 5-62%, and membranous nephropathy, membranoproliferative glomerulonephritis, and minimal-change disease have a higher risk of thromboembolism than other nephropathies (2, 6). RVT can be unilateral or bilateral, and acute or chronic. According to the laboratory tests, increased blood leukocyte count, D-dimer levels, hematuria, and urinary protein, decreased antithrombin III and plasminogen, and sharp increases of urea nitrogen and creatinine, which indicate acute renal function failure, occur during nephrotic syndrome with RVT (3, 6). Selective renal venography is considered the gold standard for diagnosing RVT, but because of its invasiveness and nephrotoxicity, it is not commonly used. Doppler ultrasonography for the diagnosis of RVT is not recommended because results are inconsistent and operator-dependent. Because it is noninvasive and has high sensitivity (92%) and specificity (100%), CT is the recommended initial diagnostic tool (8).

RVT treatment includes anticoagulation, thrombolysis, and interventional and

surgical method. The choice of therapy must be individualized according to clinical conditions. Due to the uncertainty of the therapeutic effect and high risk, surgical treatments, such as thrombectomy and radiofrequency ablation, are seldom used in RVT patients. Surgical treatments in RVT patients are limited to selected patients, such as those with recurring pulmonary embolism, acute venous thrombosis endangering limb blood supply, chronic RVT with severe hypertension or kidney failure, and acute thrombosis in the major trunk of the renal vein that is resistant to conservative treatment (2, 6). For most RVT patients, primary treatment is anticoagulant or thrombolytic therapy to prevent the spreading of thrombosis and recover venous blood flow as quickly as possible. For chronic thrombosis patients, long-term anticoagulant therapy can prevent the spread of thrombus in the renal vein, promote the recanalization of formed thrombus and inhibit the formation of new thrombus, thus improving renal function and reducing complications, although thrombolysis may have remarkable effects in patient with acute thrombosis (2, 4, 7). Low molecular weight heparin (LMWH) is first recommended in anticoagulant therapy for RVT. Although the effect is similar to unfractionated heparin, LMWH does not require extensive laboratory monitoring, can be administered efficiently subcutaneously, and has higher bioavailability (>80%), a longer half-life and fewer side effects (2, 4). Currently, the application of LMWH in thromboembolic diseases is widely accepted. Even for the pregnant women, patients with thrombolysis, and patients resistant to anticoagulation treatment, LMWH remains relatively safe and effective (2, 4).

The recommended treatment dose of LMWH in nephrotic syndrome is 0.6~1.2 ml daily for at least 8 weeks (9). The duration of anticoagulation therapy should be decided by

the recurrent thrombosis conditions and risk factors. Anticoagulant therapy should be continued when the thrombus is recurrent and serum albumin levels are lower than 25 g/L. Anticoagulant therapy can be maintained until nephrotic syndrome is relieved (2).

The highlights of this case report are the combined long-term glucocorticoid treatment with sustained LMWH anticoagulant therapy; the bilateral renal vein thrombus was recanalized, and the coagulation indexes returned to normal. Early anticoagulant treatment may play an important role in the successful recanalization of bilateral renal vein thrombus. Second, we used contrast-enhanced abdominal CT with 3D vascular reconstruction to confirm the diagnoses and curative effect. Contrast-enhanced abdominal CT should be timely used to confirm the diagnosis. Early and timely diagnosis and therapy can improve the prognosis of RVT.

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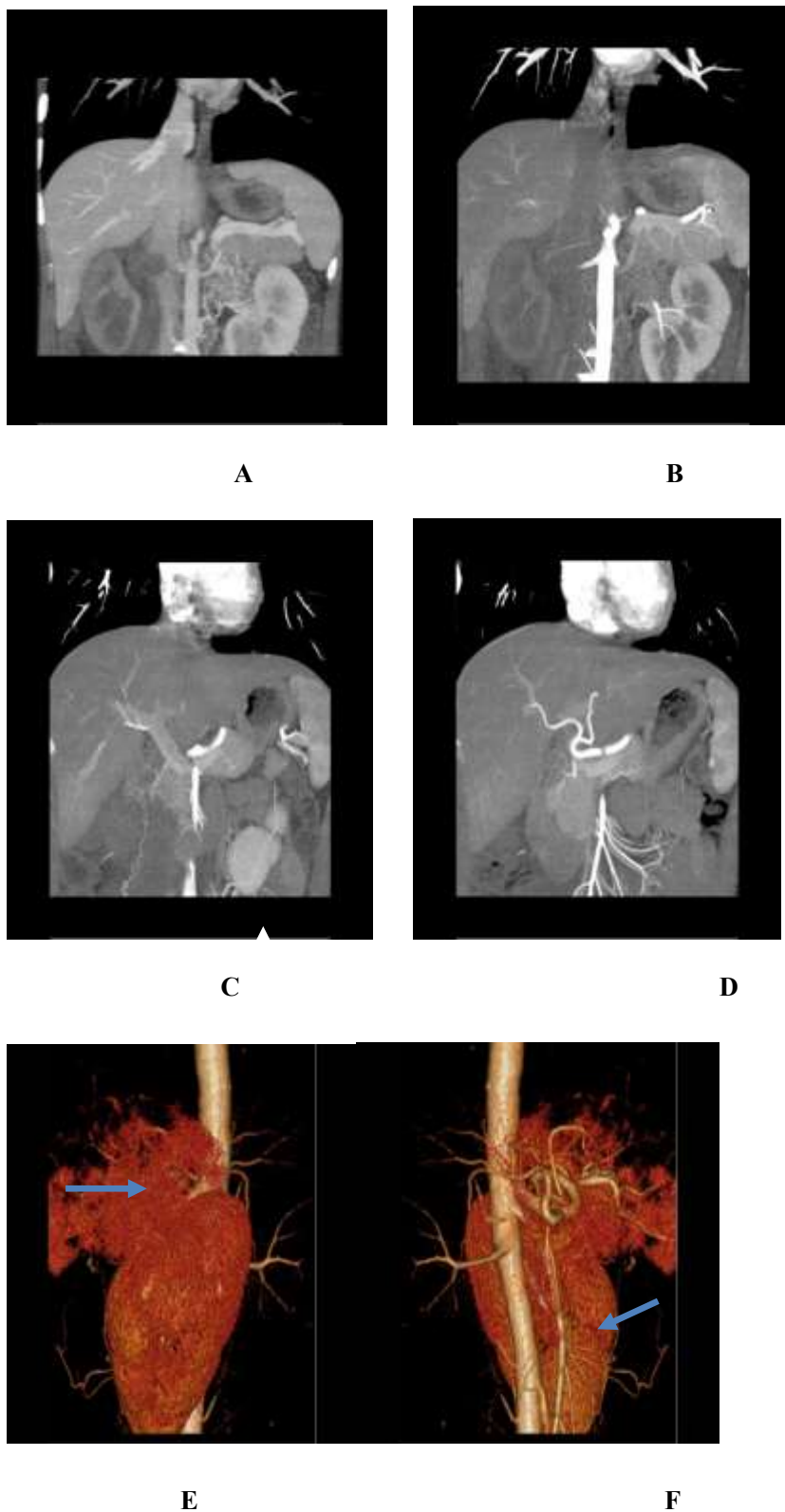
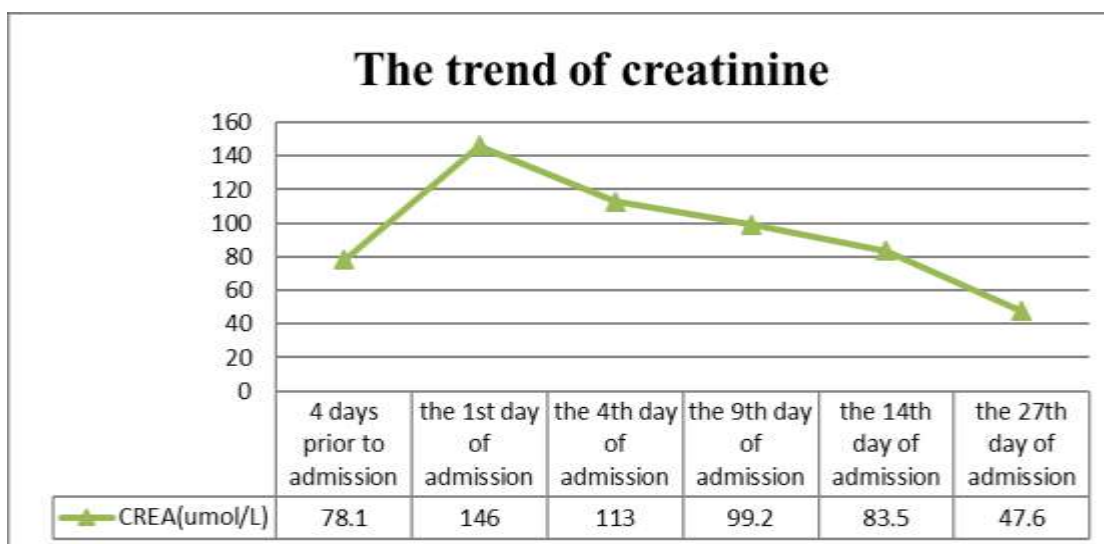
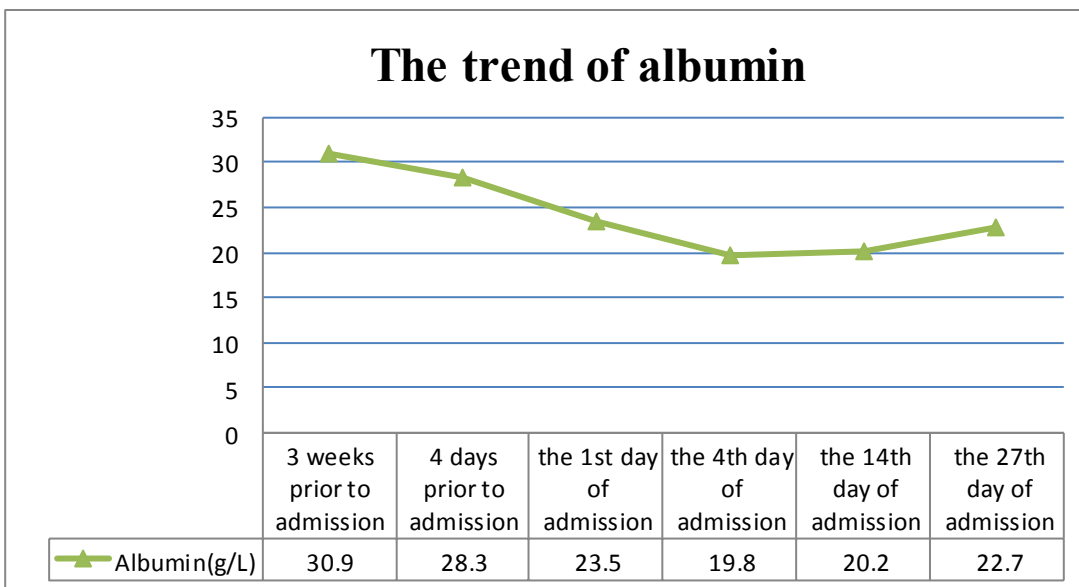


Fig 1: (Before the treatment) : Contrast-enhanced abdominal CT with 3D vascular reconstruction: the arrows on the A left、 B left、 C、 E refers to thrombosis; the arrows on the A right、 B right、 D、 F suggests to The formation of collateral circulation.



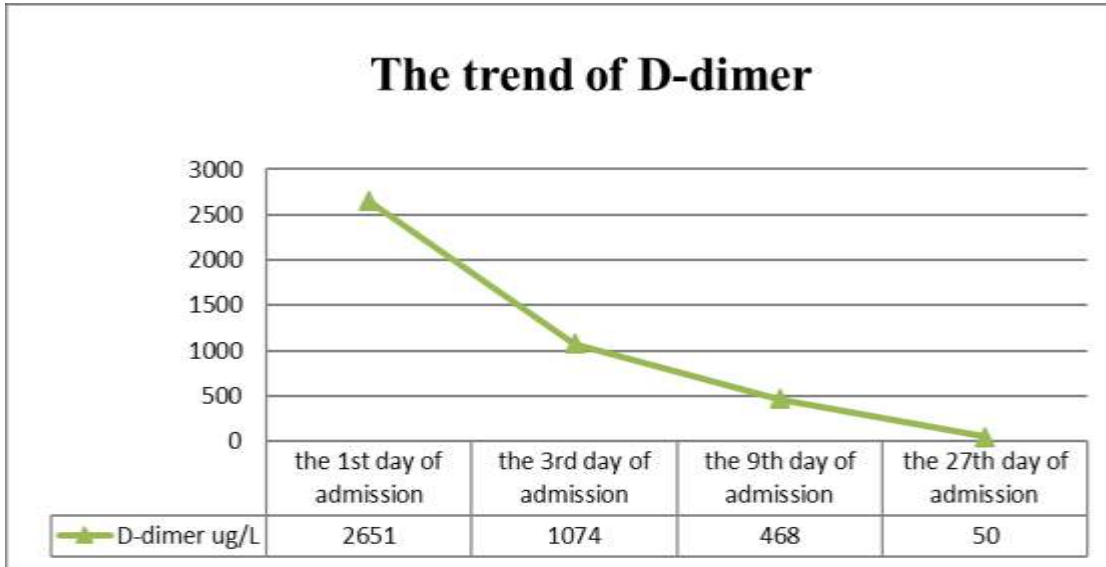
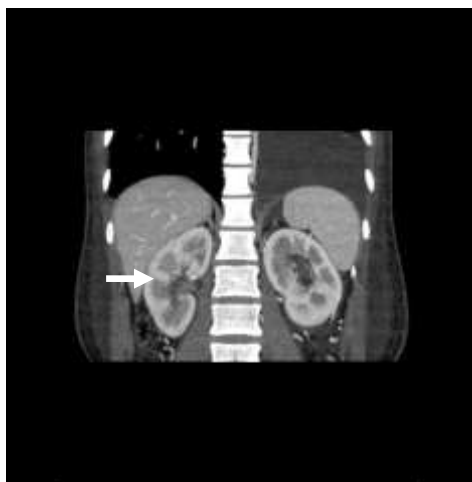


Fig 2: The trends of albumin,creatinine and D-dimer before and after treatment.



A



B

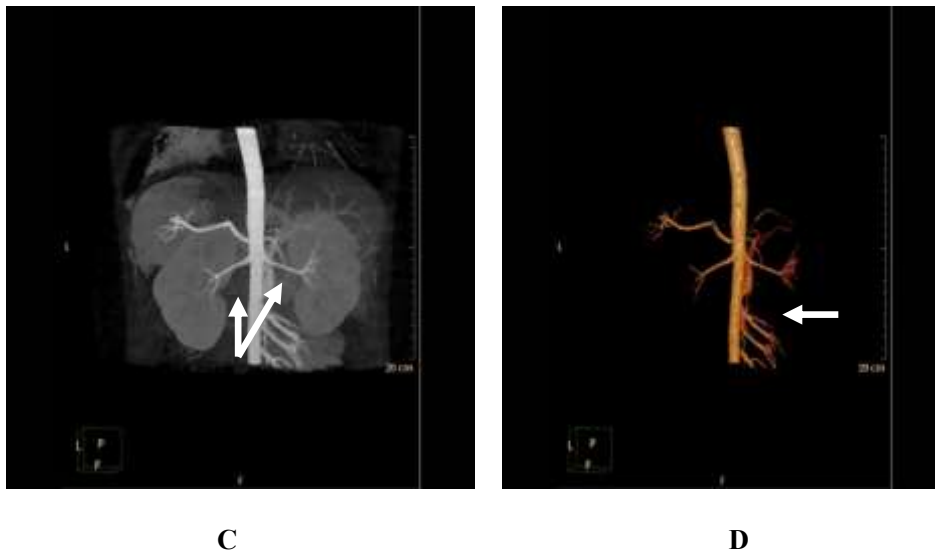


Fig 3: (23 days after treatment): Abdominal enhanced vascular three-dimensional reconstruction CT showed the original right kidney swelling disappeared, the right kidney was normal(A), the original right renal vein thrombosis disappeared, the left renal vein was slightly narrow (B and C),no abnormal density shadow filling the cavity and the formation of collateral circulation around it (D).