Acute Multifocal Bacterial Nephritis Complicated with Acute Renal Failure and Thrombocytopenia

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Abstract

A 50-year-old woman was transferred to our hospital because of acute renal failure and thrombocytopenia. Due to rapid enlargement of the kidney, we first suspected that she had diffuse renal invasion of anaplastic carcinoma or lymphoma of the kidney. Anti-bacterial treatment for complicated urinary tract infection and hemodialysis treatment resulted in recovery of both renal function and thrombocytopenia. Serial CT study demonstrated disappearance of kidney swelling and multiple masses within the kidney. We finally made a diagnosis of acute multifocal bacterial nephritis. Timely initiation of dialysis therapy and appropriate anti-bacterial treatment was essential to rescue this case.

(Internal Medicine 44: 1084–1087, 2005)

Key words: acute multifocal bacterial nephritis, hydronephrosis, acute renal failure, thrombocytopenia, systemic inflammatory response syndrome

Introduction

Acute focal bacterial nephritis (AFBN) or acute multifocal bacterial nephritis (AMBN) is an uncommon, severe form of acute interstitial nephritis. Focal swelling or mass is present as the predominant radiographic abnormality in a patient with clinical evidence of pyelonephritis, without abscess formation (1). These disorders occur most commonly as a complication of bacteriuria and ascending infection caused by an accompanying urinary tract abnormality. These abnormalities include obstructive problems, vesicoureteral reflux and abnormalities associated with diabetes mellitus or primary hyperparathyroidism (2). Here, we report a case of AMBN presented as acute renal failure and thrombocytopenia in a patient with unilateral kidney, successfully treated by appropriate antibiotic administration and timely hemodialysis initiation.

Case Report

A 50-year-old woman presented with right lower abdominal pain, nausea and vomiting. She had received left nephrectomy due to branched calculus 20 years previously. She had been previously diagnosed as having right ureteral stone and mild hydronephrosis by ultrasonic examination and was admitted. On the next day, a ureteral double J stent was inserted for avoiding hydronephrosis, and administration of cefazolin for urinary tract infection was started. Her hydronephrosis was restored but diffuse renal swelling by echogram was observed, and her urinary volume was further decreased. Although she received hemodialysis for two consecutive days for treatment of acute renal failure, her general condition deteriorated and thrombocytopenia appeared. Therefore, she was transferred to our institution. On admission to our hospital, physical examination revealed a temperature of 37.5°C, blood pressure of 150/90 mmHg, a dry rale at both lower lung fields, and a right costovertebral angle tenderness. There was a palpable enlarged kidney at right upper to lower quadrant abdomen. There was no family history of urolithiasis or known renal disease. The white blood cell count was 8,500/mm³, platelet count was 19,000/mm³, prothrombin time was 13.2 seconds (control 12.3 seconds), activated partial thromboplastin time was 36.8 seconds (control 33.1 seconds), fibrinogen was 716.0 mg/dl,
serum fibrin degradation products was 19.7 µg/dl, lactate dehydrogenase was 557 U/l (124–232 U/l), blood urea nitrogen was 53.6 mg/dl, serum creatinine was 5.38 mg/dl and C-reactive protein was 18.7 mg/dl. Urinalysis demonstrated about 20–99 red blood cells and 20–99 white blood cells per high-power field. Tests for C3, C4, antistreptolysin O, rheumatoid factor, antinuclear antibody, hepatitis C virus antibody, and hepatitis B surface antigen were negative or normal. Urine cultures revealed Klebsiella Pneumoniae but blood culture was negative. Chest X-ray showed cardio-megaly with lung congestion. Plain computed tomography (CT) showed a diffuse swelling of the right kidney with exudation toward perinephric fat tissue (Fig. 1A). Abdominal echogram revealed diffuse right renal swelling with echogenic medulla. Patency of right renal vein was confirmed by Doppler echogram. For radiographical examinations, we suspected that she had diffuse renal invasion of anaplastic carcinoma or lymphoma of the kidney. For treatment of complicated urinary tract infection, she received parenteral Cefozopran of 1.0 g/day, gamma globulin of 5,000 mg/day for 3 days and Gabexate Mesilate of 1.8 g/day for thrombocytopenia. After she received 4 more hemodialysis sessions, her renal function gradually improved. On the 7th hospital day, post-contrast CT revealed that her right kidney was slightly decreased in size ( 8.4×7.6×13.0 cm), exudation toward perinephric fat tissue had disappeared, and mass-like hypo-dense lesions were observed (post-contrast CT). A diagnosis of acute multifocal bacterial nephritis with thrombocytopenia due to severe infection was then made. The patient’s platelet count was increased to 230,000/mm³, but C-reactive protein was 5.98 mg/dl and urinalysis showed 20 to 50 white blood cells per high-power field. Parenteral Cefozopran was changed to Meropenem of 0.5 g/day. With this treatment, C-reactive protein was decreased to 0.88 mg/dl and serum creatinine was decreased to 1.63 mg/dl at the 21st hospital day. Follow-up of CT on the 35th hospital day showed hypo-dense masses had disappeared, and right kidney size was decreased to 6.4×7.2×11.5 cm (Fig. 1C). The ureteral stent was removed 3 months later, and a renal stone was removed by extracorporeal shock wave lithotripsy 4 months later.

Discussion

AFBN and AMBN are uncommon, severe forms of acute interstitial nephritis. AFBN is also called focal pyelonephritis or acute lobar nephroma, because the pathology consists of a heavy leukocyte infiltrate confined to a single renal lobe with focal areas of tissue necrosis. AFBN is considered to be a midpoint in the spectrum of upper urinary tract infections, ranging from pyelonephritis to intrarenal abscess. AMBN is a more severe form and a heavy leukocytic infiltrate occurs not in a single lobe but throughout the kidney. Coalescence of multiple abscesses of AMBN can often lead to intrarenal abscess (3).

In the present case, urinary tract obstruction due to a ureteral stone was observed, but hydronephrosis was restored by immediate ureteral stent placement. However, progressive renal failure and diffuse enlargement of kidney was observed after removal of urinary tract obstruction. Due to rapid diffuse enlargement of kidney, we suspected renal vein thrombosis or diffuse renal invasion of anaplastic carcinoma or lymphoma of the kidney during initial evaluation, and we felt that histological examination other than radiographic examination might be required for proper diagnosis. However, serial CT examinations revealed the decrease in size of the swollen kidney. The management of AFBN or AMBN, like that of acute pyelonephritis, is limited to intravenous antibiotics, whereas renal abscess may require surgical drainage in addition to systemic antibiotic therapy (4). Furthermore, acute phase hemodialysis initiation was necessary to control uremia, lung congestion, and infectious complications in the present case. Although urinary tract infection is an unusual cause of acute renal failure (5), this patient had received left nephrectomy 20 years before, and this was why she suffered...
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acute renal failure by AMBN. There is only one reported case which showed AFBN presented as acute renal failure (6). Appropriate anti-bacterial treatment and hemodialysis initiation resulted in not only renal functional improvement but also disappearance of multiple masses within the kidney, and prevented the establishment of renal abscess.

Blood culture of the present patient was negative but she had severe thrombocytopenia which might have been due to urogenic sepsis. In this situation, a systemic inflammatory response syndrome (SIRS) is often induced, and her severe thrombocytopenia might be one of the manifestations of SIRS. For the treatment of SIRS, continuous or intermittent dialysis treatment is one of the treatments of choice (7). Due to blood pressure stability, we selected intermittent daily hemodialysis, and successfully recovered thrombocytopenia and renal function.

In this case, for the treatment of the renal stone, we performed extracorporeal shock wave lithotripsy. Unfortunately, we did not study the components of her renal stone, because it was not retrieved. Although she experienced recurrence of a renal stone from 20 years before, she did not have endocrinological abnormalities nor familial history of urolithiasis. Approximately 70 to 80% of calcium stones are made of calcium oxalate or calcium phosphate, and previous reports suggested that recurrence rate of urolithiasis was 75% during a follow-up of 20 to 30 years (8). In general, patients who will have stone recurrence cannot be distinguished by laboratory evaluation as in the present case (8).

In summary, we report a case of a severe form of AMBN presenting thrombocytopenia and acute renal failure. Careful clinical observation and serial radiographic study were required for the differential diagnosis. Furthermore, timely initiation of dialysis therapy and appropriate anti-bacterial treatment was essential to save this patient.

References

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