Acute Tubular Necrosis with Loin Pain and Persistent Multiple Wedge-Shaped Contrast Enhancement on CT

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A 38-year-old man had severe loin pain and computed tomography performed 48 hours later, after drip infusion pyelography (DIP), revealed wedge-shaped contrast enhancement. He showed mild impairment of renal function with no evidence of rhabdomyolysis. The loin pain lasted for 5 days and the wedge-shaped contrast enhancement on CT persisted for 14 days and improved. The case was compatible with the new syndrome, loin pain and persistent wedge-shaped contrast enhancement on CT, proposed by Ishikawa et al (Nephron 27: 31, 1981).

Key words: acute renal failure, vasoconstriction, analgesics

Introduction

Ishikawa et al reported the first demonstration of patchy vasoconstriction of the kidneys in man, with a temporary impairment of the renal function (1). They proposed that the impairment of the renal function accompanied by severe loin pain after exercise and by patchy wedge-shaped contrast enhancement on CT is a new disease (1, 2). This disease has some common findings such as mild and non-oliguric renal failure, good prognosis and no evidence of massive rhabdomyolysis. Often these patients had taken analgesics before exercise or the onset of the pain.

The case reported here is compatible with this proposed new disease because the patient had severe loin pain and computed tomography performed 48 hours later, after drip infusion pyelography (DIP), revealed wedge-shaped contrast enhancement. He showed mild acute renal failure with no evidence of rhabdomyolysis.

Case Report

A 38-year-old man had sudden severe loin pain in the right side and lower abdominal pain with nausea and vomiting on October 11, 1991. In the morning of the previous day, he was treated for an arm incised wound with lenampicillin hydrochloride (LAPC), ampfenac sodium and indomethacin. He drank heavily in the evening. He visited a local hospital because of exacerbation of the loin pain; hematuria was then detected. Renal infarction was suspected at this hospital based on the finding of a low density area and a patchy contrast area by renal computed tomography (CT) 3 hours after DIP.

He was transferred to Nagasaki University Hospital on October 12 for evaluation of renal infarction. There was no family history of renal disease. On physical examination, his body temperature was 37.5°C, blood pressure 150/68 mmHg and pulse rate 60/min regular. His height was 166 cm and body weight 58 kg. No anemia or icterus in his conjunctiva was observed. There was no murmur or rale in the chest examination. Tenderness and knock pain were revealed in the right flank region. Pretibial edema and pathological reflexes were not observed in the extremities.

Laboratory investigation revealed hematuria (RBC 10–20/HPF) by urinalysis on admission. The white blood cell count (WBC) was 9,200/μl with polymorphonuclear leucocytes and the red blood cell count (RBC) was 461×10⁶/μl in the peripheral blood. The erythrocyte sedimentation rate was elevated to 25 mm/h and the C-reactive protein was 2.29 mg/dl. Blood urea nitrogen (BUN) was 16.0 mg/dl, serum creatinine 1.9 mg/dl, uric acid 5.5 mg/dl, Na 143 mEq/l, K 4.1 mEq/l and Cl 105 mEq/l. The creatinine phosphokinase (CPK) level was slightly elevated but the myoglobin was not, his liver function was within normal limits. The serological tests were within normal limits and antinuclear antibodies (ANA), lupus erythematosus (LE) factor and immune complexes were not observed. The serum and urine-β₂-microglobulin and urine-β-N acetyl glucosaminidase (NAG) were within normal limits. His urine fibrin/fibrinogen degradation products (FDP) were slightly elevated. There was no massive rhabdomyolysis.

He was suspected of having acute renal failure with severe loin pain and patchy renal vasoconstriction. On October 12, a
renal CT scan was carried out without contrast medium. The CT scan showed multiple wedge-shaped high density areas persistent in both kidneys (Fig. 1). Magnetic resonance imaging (MRI) showed a slightly lower signal intensity in the right kidney (Fig. 2). A renogram using $^{131}$I Hippuran in the right kidney revealed a delayed pattern. Double renal aortography was carried out on October 12. There was no evidence of renal infarction in either kidney (Fig. 3).

A $^{67}$Ga scintigram finding revealed a slight accumulation in the right kidney. A renal biopsy was performed on the right
kidney on October 25, which showed normal glomeruli and partial degeneration of the tubulus (Fig. 4). The findings of immunofluorescence were all negative. The loin pain persisted for 5 days and the wedge-shaped enhancement improved, but persisted for 14 days (Fig. 5). The serum creatinine level was reduced to 1.0 mg/dl on October 25.

Discussion

Mild impairment of the renal function accompanied by severe loin pain and patchy wedge-shaped contrast enhancement on computed tomography was described as a new disease entity by Ishikawa et al (1, 2). Patients with this new disease come to emergency rooms, typically late at night, complaining of severe bilateral loin pains with nausea, vomiting and slight fever after strenuous exercise, or after heavy drinking (2, 3). Acute renal failure is usually mild and non-oliguric and has a good prognosis. None of the patients display evidence of massive rhabdomyolysis (1, 2).

The case reported here is compatible with this new syndrome based on the symptoms and CT findings. He showed mild acute renal failure not due to contrast medium. He had taken analgesics and been drinking heavily before the onset of pain, but he had not exercised. A multiple wedge-shaped contrast enhancement that persists after urography (IVP) has been recently associated with acute renal failure (2, 4). This patchy nephrogram pattern has been seen in trauma, bacterial nephritis and polycystic kidneys, even in healthy persons (5). The cause of the persistent patchy wedge-shaped contrast enhancement on CT is thought to be due to a low renal blood supply and glomerular filtration in the patchy area without multiple infarction of the kidney. This wedge-shaped high density area seen several hours to a few days after an injection of contrast medium has been proposed as a characteristic of patchy vasoconstriction.

In contrast, renal infarction in the segmental form is generally represented by a wedge-shaped area of low density surrounded by a high density subcapsular rim on contrast CT. Pazmino et al (4) have also described 2 cases of ischemic acute renal failure showing multiple patchy wedge-shaped contrast enhancements areas. It has been suggested that the primary mechanism is probably of vascular origin at the level of the arcuate artery or a distal part of the interlobar renal artery (1, 4). The clinical course suggests that the patchy vasoconstriction lasts for about 1 week. The combination of exercise and intake of analgesics (abstract). Kidney Int 25: 170, 1984.

The present case suggested that reduction in renal blood flow due to the administration of analgesics which are known to inhibit prostaglandin and the heavy drinking may be associated with patchy renal vasoconstriction. Enhancement CT and plain CT after IVP are the most effective for the differential diagnosis of patients with this new disease. The patchy contrast enhance-

References