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Spontaneous Renal Hemorrhage ： Unusual Complication of Urinary Tract Infection

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Abstract

Spontaneous renal hemorrhage is an unusual and severe complication of urinary tract infection. A 73-year-old woman with diabetic nephropathy was admitted with fever and intermittent abdominal pain for one day. She had pyuria and was treated for a presumed urinary tract infection. Initial abdominal ultrasonography showed only bilateral renal atrophy. Subsequently, she developed more severe abdominal pain and her hemoglobin dropped. Computed tomography showed a right perirenal hemorrhage. A right nephrectomy was performed, revealing both a perirenal hemorrhage and abscess. Postoperatively, various complications intervened and the patient died 10 days later. In conclusion, accurate diagnosis of spontaneous renal hemorrhage requires prompt immediate imaging studies to guide the management, and computed tomography is the procedure of choice. (J Intern Med Taiwan 2006; 17: 177-181)

Key Words ：Renal hemorrhage, Complicated urinary tract infection, Pyelonephritis, Renal abscess

Introduction

Spontaneous renal hemorrhage is an uncommon event in the absence of trauma or a bleeding diathesis. However, it has occasionally been described in association with benign or malignant renal tumors, vascular disease, renal infarction, and (rarely) infection[1]. Renal hemorrhage has been reported as an unusual complication of emphysematous pyelonephritis, renal abscess, and acute pyelonephritis, but it may

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be difficult to diagnose in the presence of already complicated renal pathology[2-5]. We report a case of spontaneous perirenal hemorrhage associated with a complicated urinary tract infection.

Case Report

A 73-year-old woman was admitted because of fever for one day. She had had diabetes for about 20 years which was being treated with insulin. Complications of her diabetes included retinopathy, neuropathy, and nephropathy. She had been diagnosed as having stage-5 chronic kidney disease one year previously and had been admitted 15 and 8 months previously with acute pyelonephritis.

She had been in her usual state of health until one day before admission when she developed a fever up to 39 ℃ with rigors and intermittent abdominal pain. Antipyretics and oral antibiotics prescribed at a local clinical did not improve her symptoms. On presentation to the emergency department, she appeared well. Her temperature was 38.4 ℃, pulse rate 120/min, respiratory rate 20/min and blood pressure of 108/90 mmHg. Her examination was otherwise unremarkable except for right costovertebral angle punch tenderness and mild right upper quadrant tenderness on deep palpation without inspiratory arrest. Her white blood cell count was 4,600/mm^3 with a shift to the left, hemoglobin 7.7 g/dL, blood urea nitrogen 74 mg/dL, creatinine 7.2 mg/dL, sugar 197 mq/dL and C-reactive protein 30.4 mg/dL. Coagulation studies were normal. Urinalysis showed pyuria (white blood cell: 42/high power field) and bacteriuria. Abdominal ultrasonography on the day of admission revealed fatty liver and bilateral renal atrophy. The admitting diagnosis was acute pyelonephritis.

She was treated with cefmetazole 1 gm Q12H and tobramycin 60 mg QD. However, she continued to complain of intermittent abdominal pain. On hospital day 2, she had the abrupt onset of severe epigastric pain. There were no peritoneal signs on examination of the abdomen. Plain abdomen showed no significant abnormality. Initially, it was thought that she had ischemic bowel disease, but the hemoglobin level was found to have dropped to 4.9 mg/dL. Because of suspect internal bleeding and survey of the condition of pyelonephritis, an unenhanced computed tomographic (CT) scan of the abdomen detected swelling of the right kidney with a crescent-shaped hyperdense lesion in the right perirenal space, hemorrhagic event was strongly suspected. There is a lower attenuation area at the lateral side of right kidney; partial liquefaction of the hematoma or renal abscess should be considered (Figure 1). The findings were consistent with either a perirenal hemorrhage or a renal abscess. Angiography was contraindicated because of her poor renal function. She was transfused, and an operation was performed on hospital day 5, revealing a huge hemorrhage encapsulated within Gerota's fascia along with pus around the upper pole of the right kidney. There were no stones or tumors found. A right radical nephrectomy was performed without incident. Pathology examination revealed subcapsular hematoma, distorted cortico-medullary junction at renal purenchyma without dilation of renal pelvis and calyces grossly, and pyelonephritis with hematoma and neutrophils infiltration with abscess formation microscopically, and no evidence of

Fig.1. Unenhanced CT scan showing swelling of the right kidney and a crescent of higher attenuation (arrow) than the renal parenchyma.

malignancy. Pus culture grew *Escherichia coli* and *Proteus mirabilis*.

Although the surgery was successful, the patient subsequently developed a cascade of severe complications, including massive gastrointestinal bleeding, sepsis, acute oliguric renal failure, and acute pulmonary edema with hypoxemia. Despite intensive management, she died on hospital day 15.

Discussion

Complicated urinary tract infection (UTI) is defined as infection in a structurally or functionally abnormal urinary tract[6]. Antimicrobial resistance is more common in such situations, and the response to therapy is often disappointing if the complicating factors cannot be resolved[7]. Certain disorders, such as diabetes, sickle-cell disease, or immunosuppression, also predispose to treatment failure, as do more severe complications, including renal or perinephric abscess, emphysematous pyelonephritis, hydronephrosis, and papillary necrosis[8]. However, perirenal hemorrhage is an unusual complication even in these settings.

Spontaneous, that is, non-traumatic, renal hemorrhage confined to the subcapsular or perirenal space, was first described by Wünderlich in 1856[5]. It has been found in association with a wide variety of underlying disorders (Table 1)[1,5]. Tumors are the most common, accounting for two thirds of cases in 165 cases reported in the English literature between 1985 and 1999[1]. In that series, only 2% of hemorrhages occurred in association with infection. Despite no definite risk factor of spontaneous hemorrhage was established in cases of renal infection, diabetes mellitus was the most common underlining disease in a majority of case reports, including ours[2,4,9-11]. In our hospital from 2000 to 2005, there were another 8 cases of spontaneous renal hemorrhage (excluding cases involving renal cystic disease and drug-induced coagulopathy). These included 4 cases of angiomyolipoma and 1 case each of arteriovenous malformation, and adrenal tumor rupture. The cause was undetermined in 2 other cases.

Table 1.Causes of spontaneous renal hemorrhage[1,5]

Tumors	**Vascular disease (17%)***
Benign tumors (32%)*	Polyarteritis nodosa**
Angiomyolipoma**	Renal artery aneurysm
Myelolipoma	Renal artery infarction
Adenoma	Arteriovenous malformation
Hamartoma	**Infection (2%)***
Malignant tumors (30%)*	Acute/chronic pyelonephritis
Renal cell carcinoma**	Emphysematous pyelonephritis
Metastatic tumor	Renal abscess
Sarcoma	**Other causes**
	Drug-induced (anticoagulant)
	Renal cysts
	Idiopathic hemorrhage

*Percentages from a series of 165 patients[1]
**Most common causes

Definitive diagnosis of spontaneous renal hemorrhage usually depends on imaging studies in patients with suggestive clinical findings. The latter may vary greatly depending on the degree and duration of bleeding. Local symptoms may overlap with those of pyelonephritis, ranging from slight flank or abdominal pain to circulatory compromise[4,12]. Lenk's classical triad consists of acute lumbo-abdominal pain, a palpable mass, and hypovolemic shock. While quite specific, it is usually present only in very severe hemorrhage[5]. In our patient, the sudden drop in hematocrit along with the pain suggested hemorrhage.

Ultrasound is often the initial examination because it is quick, readily available, and relatively inexpensive[7]. While it may help establish the diagnosis, it's not as helpful in determining etiology. CT is a better investigation for evaluating the nature and extent of the lesion. On unenhanced CT, early hemorrhage has a higher attenuation value than the renal parenchyma; on contrast-enhanced scan, the opposite is true, the hemorrhage having a lower attenuation value than the normally enhancing renal parenchyma[13]. As with ultrasound, however, CT is only moderately sensitive in identifying an etiology at the time of an acute hemorrhage. If no underlying cause is vi-

sible on CT, selective renal angiography may be helpful, particularly if the problem involves abnormal vasculature.

After establishing the diagnosis of perirenal hemorrhage, most urologists choose nephrectomy as an appropriate approach because of the high likelihood of an underlying malignancy[12]. Evidence of a concurrent complicated urinary tract infection, as our patient had, is also an indication for nephrectomy or at least surgical drainage[14]. At the same, patients with these conditions are often at high risk of complications of surgery, particularly if a hemorrhage has rendered them hypovolemic. In an acute hemorrhage, one option to consider is renal arteriography with embolization[11,15]. This was relatively contraindicated in our patient, however, both because of her probable complicated urinary tract infection and because she had chronic renal disease, mitigating against the use of contrast. Kim et al reported a case of spontaneous renal subcapsular hemorrhage associated with acute pyelonephritis that was treated successfully with percutaneous needle aspiration and drainage[13]. If surgery is deemed necessary, every effort should be made to optimize the patient's condition preoperatively, including giving blood transfusions and volume replacement, along with correcting any coagulation defects. Despite those efforts in our case, and even though nephrectomy was successfully carried out, the patient ultimately succumbed.

In summary, in a patient with a complicated UTI, the persistence of symptoms despite appropriate antibiotics or the onset of more severe pain, especially if accompanied by a decreasing hemoglobin, should prompt immediate imaging studies to look for a renal hemorrhage. Treatment will depend on the patient's general condition, but delay in diagnosis should be avoided.

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自發性腎臟出血：不尋常的泌尿道感染併發症

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摘　要

泌尿道感染時，自發性腎臟出血是不尋常且非常嚴重的併發症。本篇病例報告一位糖尿病腎病變的73歲女性，因爲發燒及間斷性的腹痛已一天，且檢驗出膿尿需住院接受治療，初步的腹部超音波顯示兩側腎臟萎縮，其餘並無特別異常。之後因病患發生嚴重的腹痛，且檢驗出血色素下降，電腦斷層掃描顯示右側腎臟出血，進而施行右側腎臟切除手術，證實右側腎臟有出血及膿瘍的情形，儘管術後給予積極治療，該病患十天後仍因術後併發症死亡。要正確地診斷並處理自發性腎臟出血需要立即的影像學檢查，當中以電腦斷層掃描是最佳的選擇。