Life-threatening hemorrhage from abdominal aorta following a percutaneous renal biopsy

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Abstract. We report on a case of life-threatening abdominal aorta hemorrhage following percutaneous renal biopsy. A 42-year-old woman with chronic kidney disease stage 2 and microscopic hematuria underwent a percutaneous renal biopsy to evaluate renal insufficiency. One hour following the biopsy procedure, she complained of an abdominal pain and developed signs of oligemic shock. In despite of 4 blood units transfusion, the patient continued to be in shock. She was transmitted urgently to the operating room without any other examinations (such as abdominal computer tomography) and underwent an emergency laparotomy. A transverse tear in the abdominal aorta was identified as the bleeding site, and after occlusion, the hemorrhage was stopped. The patient gradually recovered and she was discharged in good clinical condition after a few days.

Introduction

Since its introduction in 1951, renal biopsy [Iverson and Brun 1951] has become a useful tool in the every-day clinical nephrology. It provides information to the physician for assessing prognosis and managing the patients’ clinical problems. It is considered a quite safe procedure and the incidence of complications is remarkably low, nowadays, by using newer imaging techniques, such as abdominal computer tomography and ultrasound examination to relieve the location, the direction and the depth of the kidneys. In several large series of biopsies, the incidence of major bleeding requiring transfusion has varied from 1 – 3% [Altebarakian et al. 1981, Boulton-Jones 2003, Diaz-Buxo and Donadio 1975], frank hematuria occurs in 15% of cases and painful perirenal hematoma develops in 2% of cases [Boulton-Jones 2003]. Arteriovenous fistula occurs in about 10% of patients [Boulton-Jones 2003]. Deaths secondary to bleeding are extremely rare and have occurred in 0.07 – 0.17% dating back to the 1970s [Parrish 1992], while no deaths are described in large series from the 1990s [Fraser and Fairley 1995, Hergesell et al. 1998, Marwah and Korbet 1996]. A wide variety of other complications have been described. These include calyceal-peritoneal fistula, hemothorax, colonic perforation as well as the more common hepatic or splenic biopsy. More rare complications are pancreas biopsy, “page kidney” [McCune 1991] and lumbocostal artery puncture [Jamison and Cowar 1985, Wall et al. 1986].

We report an extreme rare complication, a life-threatening hemorrhage from abdominal artery, following percutaneous renal biopsy.

Case report

A 42-year-old woman visited the Department of Nephrology because of impairment of renal function. She had a history of hypertension and was on therapy with β-blocker plus calcium channel blocker (metoprolol plus felodipine, 47.5 + 5 mg, respectively), angiotensin-converting enzyme inhibitor (imidapril 10 mg) and diuretic (indapamide 2.5 mg) for 1 year. Further, she was heterozygous for β-thalassemia. Her father, who suffered from end-stage renal failure on dialysis of unknown origin, had died 7 years before.

On physical examination she was normotensive under therapy (arterial blood pressure 130/75 mmHg). She had a normal chest examination and no enlargement of liver or spleen. There was no edema. The hematocrit (Ht) was 32%, hemoglobin (Hb) 9.8 g/dl,
platelets 250,000, serum urea (sUrea) and creatinine (sCr) were 45 and 1.4 mg/dl, respectively. Creatinine clearance calculated by Cockroft-Gault formula was 40 ml/min (stage 3 of chronic kidney disease). The urine analysis showed 1(+) proteinuria and no hematuria. The 24-hour urine collection revealed a proteinuria of 0.5 g/day. The ultrasound test of the upper abdomen showed two kidneys of normal size (right kidney 10.8 and left kidney 10.5 cm of length diameter) and echogenity without obstruction. Because of the positive family history, the impairment of renal function and the proteinuria, the patient agreed to undergo a renal biopsy. The day before biopsy, her Ht was 31%, Hb 9.5 g/dl, platelets count 270,000 and bleeding parameters were normal (INR 0.9, PT 12.5 sec and aPTT 28.7 sec). Blood pressure before the biopsy was 140/90 mmHg and pulse rate 72/min. Renal biopsy was performed by a Trainee Nephrologist with supervision of a Senior Adviser Nephrologist. The outline of the lower pole of the left kidney was visualized and marked by ultrasound. After local anesthesia with a long 18 G needle, one pass was made using a 16 G Franklin-Silverman needle. The procedure was uneventful. Blood pressure and pulse rate were stable during and after the biopsy. 1 hour after the biopsy, the patient began to complain of left flank pain, and 1 hour later she complained of an abdominal pain and became hypotensive (blood pressure 100/60 mmHg, pulse rate 100 /min). The Ht dropped to 26% (from 32%). No hematuria was observed. Despite continued blood transfusions (4 blood bags in 30 min), she failed to stabilize and became more hypotensive (blood pressure 70/30 mmHg, pulse rate 120 /min) requiring dopamine and infusion of large amounts, via subclavian central venous catheter, of blood, plasma, albumin and isotonic saline solutions.

An ultrasound at bedside revealed a small perinephric hematoma at the left kidney insertion site. As the patient fell into oligemic shock, she was transmitted urgently to the operating room without any other examinations such as abdominal computer tomography or selective angiography. Under general anesthesia she underwent an emergency laparotomy. The abdomen was opened through a midline incision and a huge retroperitoneal hematoma was found. The descending colon was mobilized and the left kidney and aorta were exposed. In the left lateral surface of the aorta, near the lower pole of the kidney there was a small (2 – 3 mm) bleeding transverse tear, which was closed with interrupted sutures. No other damage was found. The patient stabilized and remained for 3 days in the Intensive Care Unit. Despite the oligemic shock, renal function remained almost stable (sCr 1.5 mg/dl) and urine output was 1.5 l/day. The patient was transferred to the Department of Nephrology in a good clinical condition and she was discharged after 7 days with stable renal function. An abdominal computer tomography with radio contrast she underwent 1 month later did not reveal any anatomical abnormality of abdominal aorta in relation to the left kidney. The renal biopsy revealed mesangial-proliferative glomerulonephritis.

**Discussion**

Percutaneous renal biopsy is a diagnostic procedure in the every-day nephrology practice. Ultrasound has now been universally accepted as superior to intravenous urography for localization of the kidney and set the co-ordinates of direction and depth.

Although renal biopsy is considered a quite safe procedure and the incidence of complications is remarkably low, however, in some cases, serious complications may be observed which some times lead to nephrectomy.

In our case described above, we had an abdominal aorta bleeding after renal biopsy. To our knowledge, this is the first report case with such an extremely rare event after a percutaneous renal biopsy. Given the local anatomy, it is surprising how the biopsy needle crossed the left kidney and punctured the abdominal aorta approximately 5 cm apart from the inner margin of the left kidney. A possible explanation could be that the direction and the entrance angle of the biopsy needle were such that the needle passed the outer zone of the cortex of the left kidney and the interstitial tissue between left kidney and abdominal aorta and penetrated the wall of the aorta.

The above extremely rare complication after a percutaneous renal biopsy signifies the importance of the close post-biopsy monitoring of the vital signs, such as arterial blood pressure and pulses, to determine any small or severe hemorrhage without micro- or macro-
scopic hematuria. Moreover, the biopsy procedure must be considered by doctors as occurring for the first time, which means that we have to observe carefully all the rules of renal biopsy procedure.

Acknowledgment

The authors wish to thank Mrs. Aleka Papageorgiou for the skilled secretarial assistance.

References


