Fluoroscopy-Guided Percutaneous Biopsy of Kidney
An Alternative to Open or Laparoscopic Approaches

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INTRODUCTION

Percutaneous kidney biopsy is most frequently performed under the guidance of ultrasounography or computed tomography (CT).[(1)] In some patients, however, other options for kidney biopsy should be resorted to in order to obtain an adequate specimen. We hereby describe the technique of fluoroscopy-guided percutaneous needle biopsy of the kidney after retrograde contrast injection through a ureteral catheter in patients with previously failed ultrasonography-guided percutaneous needle biopsy of the kidney.

CASE REPORTS

We report on 4 men who underwent fluoroscopy-guided percutaneous needle biopsy of the kidney after retrograde contrast injection. Ultrasonography-guided percutaneous biopsy had failed in all of the patients. The relevant clinical and laboratory data are shown in the Table. After inducing general endotracheal anesthesia, cystoscopy was performed in the dorsal lithotomy position and the ureter was catheterized with a 6-F ureteral catheter. The ureteral catheter was taped to a Foley catheter and the patient was then placed in the prone position. The lower pole of the kidney was identified using a C-arm fluoroscope after gentle retrograde contrast injection through the ureteral catheter. A Tru-cut biopsy needle targeted at the lower pole was inserted under fluoroscopic guidance. Displacement of the kidney on short to-and-fro movements of the biopsy needle confirmed proper needle position, and several biopsy cores were taken from each patient (Figures 1 and 2).

The specimens were placed in saline and sent for light, immunofluorescence, and electron microscopy studies. The ureteral catheter was removed at the completion of the procedure. Vital signs were monitored for approximately 6 to 8 hours and the hematocrit was measured 4 to 6 hours after the biopsy. The patient was

Clinical and Laboratory Data of Patients

Patient	Age, y	Clinical and Laboratory Findings	Final Diagnosis
1	22	Hematuria, severe proteinuria	IgA nephropathy
2	25	Hematuria, elevated serum creatinine (3 mg/dL), no family history of Alport syndrome	Alport syndrome
3	28	Hypertension, hematuria, proteinuria (1.8 g/d), elevated serum creatinine (2.5 mg/dL), kidney size at the lower limit of normal	Diffuse proliferative glomerulonephritis
4	36	Hematuria, proteinuria (2.5 g/d), morbid obesity (body mass index, 37.8 k/m^2)	Focal segmental glomerulosclerosis

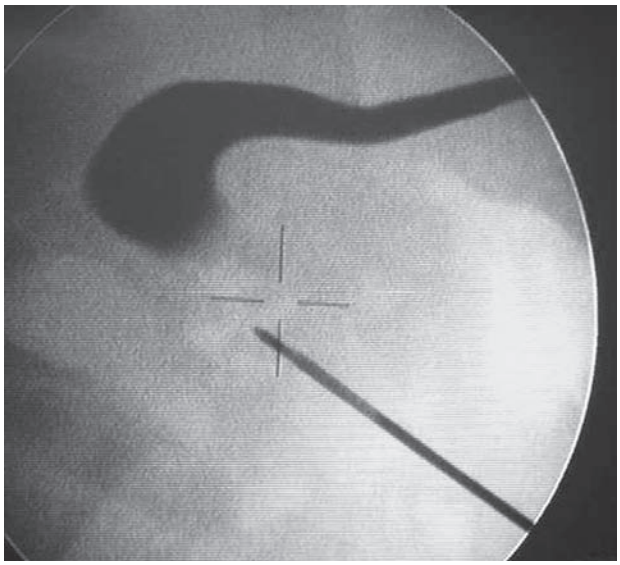

Figure 1. Biopsy needle properly positioned within the renal cortex.

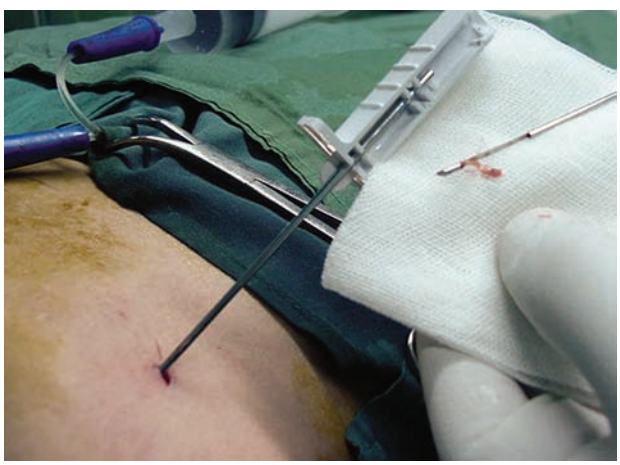

Figure 2. Adequate renal tissue was obtained.

discharged at that point if there was no evidence of complications. Perioperative antibiotic prophylaxis was provided in all 4 patients.

The median operative time (including cystoscopy and ureteral catheterization) was 25 minutes. Adequate biopsy cores were obtained in all 4 patients. No medical or surgical complications were noted after the procedure, and all of the patients were discharged within 8 hours after the biopsy.

DISCUSSION

Percutaneous kidney biopsy is usually a minimally invasive procedure performed under local anesthesia using a standard biopsy needle or a biopsy gun. Ultrasonographic guidance can be used to aid in the biopsy procedure. Should ultrasonography-guided biopsy fail, however, other options for biopsy of the kidney may prove necessary.[1] Computed tomography-guided biopsy can be performed on an outpatient basis without the need for general anesthesia. Real-time visualization or intervention to achieve hemostasis is not possible, however, and extreme obesity may preclude CT-guided kidney biopsy.[1] Although endovascular transjugular or transfemoral biopsy of the kidney can be safely performed in patients with percutaneous kidney biopsy contraindications or failures,[2,3] radiation exposure, allergic reactions to intravenous contrast, risk of contrast nephropathy, and difficulty in achieving hemostasis are significant drawbacks for this approach. Open renal biopsy can provide adequate samples of the renal tissue in almost every patient. It entails, however, increased hospital stay and significant morbidity associated with the surgical incision. Laparoscopic transperitoneal or retroperitoneal biopsy of the kidney offers the advantages of open biopsy with the decreased morbidity of a 2-port outpatient procedure.[4,5]

We used retrograde pyelography to aid in localization of the kidney for percutaneous biopsy in 4 patients with prior failed ultrasonography-guided biopsy. The median operative time was 25 minutes and no complications occurred. Few authors have reported this technique of kidney biopsy.[6,7] Lindqvist and Nystrom performed percutaneous kidney biopsy in severely uremic patients with the aid of retrograde pyelography,[6] and McCanse and colleagues reported the same technique in 6 patients.[7] They had no complications with this procedure and obtained adequate tissue in all cases. Some patients with failed ultrasonography-guided percutaneous kidney biopsy can thus benefit from retrograde pyelography for localization of the kidney. Open and laparoscopic biopsy require general anesthesia, dissection of perinephric tissues, and longer hospital stay, and are associated with longer operative time and convalescence. In contrast, percutaneous kidney biopsy aided by retrograde pyelography is a fast, safe, and efficient technique that is familiar to endourologists and is associated with minimal radiation exposure. The risks of allergic reactions to contrast media and development of contrast nephropathy are virtually nonexistent. Although general anesthesia was employed in our small case

series, the entire procedure can be done under local anesthesia and in an outpatient setting, especially if the flexible cystoscope is used for ureteral catheterization.

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