

# Uro- and Angiographic Findings in a "Normal" Population: Screening of 151 Symptom-free Potential Transplant Donors for Renal Disease

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Potentially significant renal abnormalities were encountered in 7.3% of 151 symptom-free renal transplant donors and included renal cysts, cortical adenoma, ectopic and solitary kidney, and vascular abnormalities. Findings as they relate to donation of a kidney were important in 2.1% of patients and included solitary kidney and certain rare vascular variants rejected for technical reasons and danger of distal ureteral necrosis after transplantation.

The significance of minor renal abnormalities and their frequency among healthy populations is not well known. Unsuspected abnormalities on excretory urography have been reported in women undergoing elective gynecological surgery [1] and children with bacteremia [2]. Our protocol for workup of living related renal donors [3, 4] includes excretory urography and renal arteriography, and offers the opportunity of thorough radiologic screening of an apparently normal population.

## Subjects and Methods

We studied 151 consecutive potential renal donors aged 16–67 years. None had history of renal disease and all had normal physical examinations, normal values of blood urea nitrogen, creatinine and 24 hr creatinine clearance, normal urinalysis and urine cultures, and normal blood pressure. Excretory urography included tomography as well as abdominal compression after intravenous administration of 50 ml of diatrizoate meglumine (Renografin 76). Semiselective renal angiography [5] was used in 150 of 151 donors after percutaneous transfemoral approach after excretory urography. One patient with a single kidney on excretory urogram was excluded from angiography.

## Results

Findings on excretory urography and/or angiography (table 1) included normal variants such as fetal lobulations, dromedary humps, renal dysmorphism, multiple renal arteries, and duplication of ureters. Four (2.7%) of the 151 patients showed changes of old pyelonephritis on excretory urogram and angiogram without a documented history of pyelonephritis. Uroradiographic hallmarks included coarse focal renal scars with clubbing of underlying calices. Two of the 151 patients exhibited gross renal parenchymal scars without blunting of underlying

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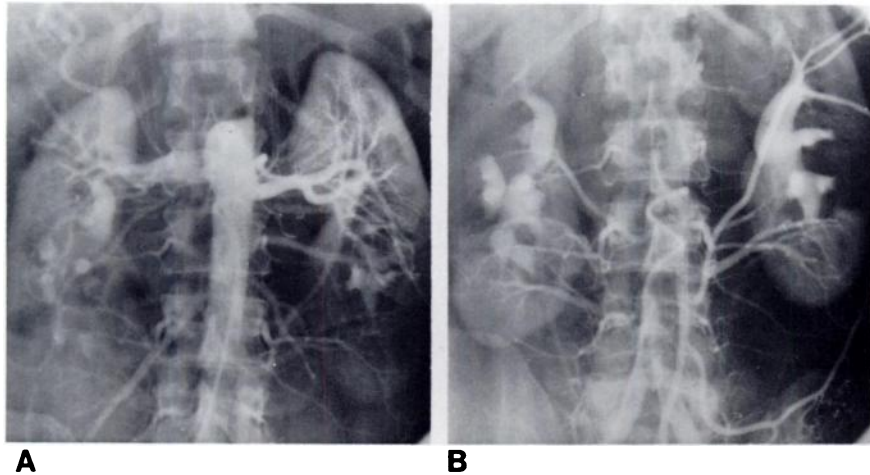


Fig. 1.—Three renal arteries bilaterally preclude donation for technical reasons and danger of prolonged acute tubular necrosis after transplantation.

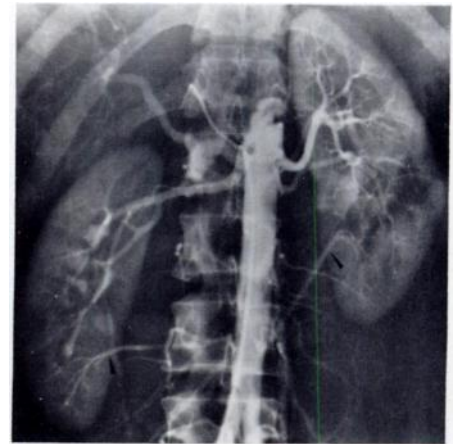


Fig. 2.—Bilateral lower polar branches (arrows) associated with high risk of ureteral necrosis after transplantation.

calices suggestive of focal renal infarction. A single renal adenoma 0.5 cm in diameter was detected on angiogram and removed before transplantation. Other abnormalities included vascular impressions, renal cysts, calyceal diverticula, and ectopic and solitary kidneys. Vascular abnormalities on angiograms included fibromuscular dysplasia and arteriosclerosis of renal arteries.

**Discussion**

Normal variations on excretory urograms and angiograms among healthy populations were seen in a large percentage of patients (table 1). Potentially significant renal abnormalities were encountered in 7.3% of patients in contrast to previously reported percentages of 20.6% and 26.8% [1, 2]. The term "potentially significant" is applied to lesions, the detection of which may have some immediate or future importance to the patient as opposed to the detection of normal variants, old quiescent disease, or a clearly benign lesion.

Normal variations that may mimic renal mass lesions include fetal lobulations [6], dromedary hump [7], and renal dysmorphism [8-10] occurring in 8%, 5.3%, and 1.3% of our cases, respectively. Pelvic kidneys occurred in 1.3% of the patients and may mimic a pelvic mass on clinical examination. All mass lesions in this report were benign and included cortical adenoma and renal cysts. However, renal cell carcinoma in one asymptomatic potential renal donor has been previously reported [11]. Some vascular impression on the renal collecting system occurred in 4% of patients, most commonly involving the upper pole infundibula. Complete evaluation required correlation of excretory urography with angiography [12]. All of our patients were asymptomatic but nephralgia may very rarely be associated with vascular obstruction [13]. No calculous disease of the urinary tract and no malignant tumor was encountered in this group of 151 asymptomatic patients. (Recently we have found two patients with very small renal calculi.)

Multiple renal arteries, the most important and frequent

TABLE 1: Findings on Excretory Urography and/or Renal Angiography

Renal Finding	No. Patients (n = 151) (%)
<b>Insignificant abnormalities:</b>	
Fetal lobulations	12 (8.0)
Dromedary hump	8 (5.3)
Renal dysmorphism	2 (1.3)
Double ureter:	
Bilateral	1 (0.7)
Unilateral	2 (1.3)
Multiple renal arteries (including polar branches)*	53 (35.0)
Caliceal diverticulum	3 (2.0)
Old pyelonephritis	4 (2.7)
Old infarction	2 (1.3)
Vascular impression on renal collecting system	6 (4.0)
<b>Total</b>	<b>93 (61.6)</b>
<b>Potentially significant abnormalities:</b>	
Solitary renal cyst	2 (1.3)
Benign cortical adenoma	1 (0.7)
Ectopic kidney	2 (1.3)
Solitary kidney	1 (0.7)
Fibromuscular dysplasia	3 (2.0)
Mild arteriosclerotic changes at origin of renal arteries	2 (1.3)
<b>Total</b>	<b>11 (7.3)</b>

\* Potentially significant for transplantation: 2.1% (see text).

findings on angiography [14], occurred in 35% of our potential renal donors. Angiographic findings as they relate to donation of a kidney were important in two (1.4%) of the 151 potential renal donors. These included certain vascular variants such as three renal arteries bilaterally (fig. 1) in one patient (0.7%) and bilateral small polar branches to lower pole (fig. 2) in another (0.7%). Donation of a kidney by the patient with three renal arteries bilaterally was rejected for technical reasons and the danger of prolonged acute tubular necrosis after transplantation. Kidneys with small lower pole branches have a high risk of postoperative distal ureteral

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necrosis after transplantation [4]. Other angiographically detected abnormalities that could potentially cause significant difficulty included fibromuscular dysplasia and mild arteriosclerotic changes of the origin of the renal arteries.

All five patients with either mild renovascular atherosclerosis or mild fibromuscular dysplasia in this series were accepted as renal donors. These entities are not considered absolute contraindications to transplantation [14].

Other renal abnormalities, considered insignificant, included vascular impressions on the renal collecting system (relieved during dissection) and renal cysts. These minor abnormalities do not alter the prognosis of the transplant [11] and are not considered contraindications to donation. If these changes are unilateral, the affected kidney is usually removed and transplanted [11].

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