

Unraveling the Cause of Anuria Post Kidney Transplantation by Renal Scintigraphy

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Abstract: A dynamic renal scintigraphy is widely used after renal transplantation to evaluate transplant function and possible complications. We report the case of a 27-year-old man with persisting anuria after kidney transplantation. A renal scintigraphy using ^{99m}Tc -ethylenedicysteine followed by SPECT/CT of the abdomen was performed showing tracer accumulation in the colon without any activity in the bladder, as a result of ureter reimplantation onto the sigmoid instead of onto the previously reconstructed bladder. Renal scintigraphy identified the cause and localization of the urinary leak, which led to immediate surgical reimplantation of the ureter onto the augmented bladder with onset of diuresis.

Key Words: kidney transplant, renal scintigraphy, anuria, early onset

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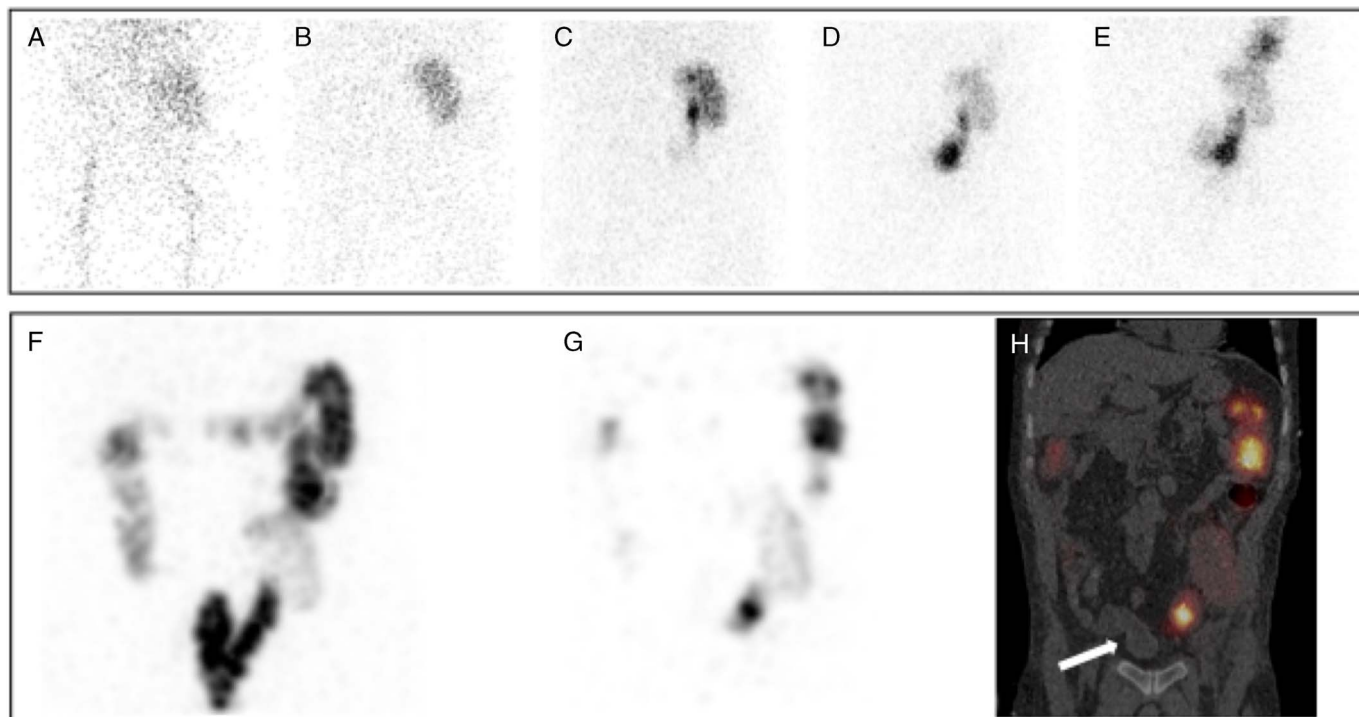


FIGURE 1. A 27-year-old man with Epstein syndrome underwent deceased donor kidney transplantation. In the past, multiple surgical interventions had been performed because of obstructive voiding, including bladder augmentation and redo ureteral implantation. The patient had been treated with hemodialysis for 4 years and was anuric before transplantation. Except for considerable diarrhea, the early postoperative course after transplantation (day 1) was clinically uneventful, with decreasing serum creatinine levels. Ultrasound of the transplant kidney was anatomically normal, and renal resistive indices were normal on Doppler ultrasound. Nevertheless, the patient remained anuric. To further evaluate the unexplained anuria, the patient was referred to the nuclear medicine department on the second postoperative day for a renal scintigraphy. A dynamic renal scintigraphy for 30 minutes was performed after IV administration of 65 MBq ^{99m}Tc -ethylenedicycysteine (^{99m}Tc -EC).¹ Analysis of the first frames after tracer administration revealed a visually normal and homogenous perfusion of the kidney transplant distal to the bifurcation of left common iliac artery (A and B).^{2,3} This was further supported quantitatively by a Hilson perfusion index of 30 (normal <150).^{4,5} Subsequent images demonstrated good cortical function of the kidney transplant (C–E), with tracer accumulation in the pyelon. This was followed by diffuse tracer uptake in the left pelvis and flank, which did not correspond to the location of the augmented bladder on the right side (D–E). To further confirm and localize the exact site of tracer accumulation, a SPECT/CT of the abdomen was performed. The MIP image (F), coronal SPECT (G), and coronal fused SPECT/CT images (H) showed diffuse tracer accumulation in the entire colon and rectosigmoid, without any activity in the augmented bladder (H, white arrow). Detailed revision of the SPECT/CT images revealed that the transplant ureter had been reimplanted onto the sigmoid lying adjacent to the augmented bladder, which caused the persisting anuric state as well as the diarrhea. An urgent surgical revision was performed, with successful reimplantation of the ureter onto the bladder. Immediately afterward, diuresis started and steadily increased up to normal values, with further decrease of serum creatinine values to normal values. Dynamic renal scintigraphy with ^{99m}Tc -EC or ^{99m}Tc -mercaptoacetylglycine-3 (MAG-3) is a valuable imaging technique for assessing kidney transplant function both in the early and late postoperative period as well as for evaluating possible posttransplantation complications.^{6,7} Although the usefulness and added value of hybrid SPECT/CT imaging has been widely demonstrated in other areas,⁸ few cases have been reported on its use to assess posttransplant complications such as a urinary leak. This case not only demonstrates a rare cause of anuria posttransplantation but also the accurate confirmation and localization of the urinary leak by SPECT/CT after dynamic planar scintigraphy, which is important for subsequent image-guided surgical reintervention.