From the Clinic

Gross hematuria after kidney transplantation

A 42-year-old male with a history of end-stage kidney disease secondary to diabetes mellitus type 1 received a deceased donor simultaneous kidney/pancreas transplant 10 months prior to presentation. The patient had prompt graft function and no other complications. He presented with gross hematuria and kidney allograft dysfunction with serum creatinine elevation from baseline of 114.92 to 221 $\mu\text{mol/L}$ (1.3 to 2.5 mg/dL). Ultrasound and abdominal computed tomography were normal. Polyomavirus and cytomegalovirus (CMV) polymerase chain reaction (PCR) were negative. A kidney biopsy showed patchy necrotizing and vaguely granulomatous tubulointerstitial inflammation (Figure 1A). The infiltrate consisted of neutrophils, macrophages and lymphocytes with abundant epithelial cell destruction. Occasional epithelial cell nuclei had glassy chromatin suggestive of viral cytopathic effect (Figure 1B). Immunohistochemical staining for C4d, SV40, CMV and HSV was negative, while staining for adenovirus showed strong reactivity. Positivity of adenovirus PCR of

more than 1 000 000 copy/mL confirmed the diagnosis of adenovirus tubulointerstitial nephritis. Immunosuppressive medications were reduced and one dose of cidofovir and intravenous immunoglobulin (IVIG) was given. Adenovirus PCR decreased to 175 000 after 1 week, and was no longer detected after 1 month. Creatinine gradually decreased to baseline over 3 months.

Adenoviruses are non-enveloped double-stranded DNA viruses. Such virus presents as a self-limited respiratory, gastrointestinal and conjunctival disease in immunocompetent patients. In kidney transplant recipients, it manifests as allograft dysfunction, and hemorrhagic cystitis, but can result in severe fatal cases [1]. Infection is rare with an incidence rate of around 4% in kidney transplant recipients [2]. Infection can be *de novo*, or through reactivation of a latent infection of the recipient or from the allograft. Adenovirus serology is not routinely checked before transplantation, but serology mismatch might be a risk factor for infection [1]. The presence of patchy necrotizing infection, large nuclei with basophilic glassy inclusions and negativity of polyoma and CMV serology should suggest additional work-up for adenovirus, especially in the setting of hemorrhagic cystitis. A PCR offers a highly sensitive tool to confirm the infection and monitor the response of treatment [3]. Management starts with reduction of immunosuppressive medications. Severe cases might require one or two regimens of cidofovir, and administration of IVIG. Outcomes of reported cases showed that clearance of adenovirus viremia occurs within 1–3 weeks [2], and that there is an improvement in kidney allograft function to baseline or near baseline in the majority of cases [4].

Conflict of interest statement. None declared.

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Fig. 1. (A). Lower power image showing patchy tubulointerstitial inflammation (H&E, $\times 40$). (B). Tubular epithelial cell necrosis (arrow heads), and a glassy viral inclusion (arrow) (H&E, $\times 400$).

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