Update on the Current Status of Kidney Transplantation for Chronic Kidney Disease in Animals

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KEYWORDS

• Transplantation • Immunosuppressive therapy • Cyclosporine • Allograft rejection • Retroperitoneal fibrosis • Lymphoma

KEY POINTS

- Renal transplantation is a viable treatment option for cats in chronic renal failure or those that have suffered irreversible acute kidney injury.
- Extensive screening of a potential recipient is critical to prevent both short- and long-term complications.
- Renal donation was not found to affect normal life expectancy in cats.
- Lifelong immunosuppression, consisting of a combination of cyclosporine and prednisolone are necessary to prevent allograft rejection.
- Treatment of complications directly related to the allograft or those secondary to chronic immunosuppressive therapy still remain a significant challenge for the clinician.

INTRODUCTION

Chronic kidney disease (CKD) is a progressive and debilitating disease in cats and dogs with no known cure. Although medical management may be effective initially in stabilizing a patient and improving his or her quality of life, it is not sufficient to maintain a patient with end-stage renal failure. Kidney transplantation was first introduced in 1984 as a novel therapy for cats suffering from CKD and continues to remain an accepted treatment option for this population of patients. Although some question the justification for the technique, in a report comparing survival time of cats that had undergone transplantation to a population of cats treated medically, renal transplantation improved patient quality of life and prolonged survival times compared with the medical management of the disease.[1] The majority of this article focuses on cats, because historically they have been the most predominant species to undergo renal transplantation in veterinary therapeutics.

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CANDIDATE PRESENTATION

Transplantation is often performed in patients when evidence of kidney decompensation is identified in the face of appropriate medical therapy or in patients with acute irreversible kidney injury. Clinical signs indicative of decompensation include worsening of the anemia and azotemia and continued weight loss. Although objective data are lacking with regard to the optimal time for intervention, based on studies investigating prognostic factors and survival in cats with naturally occurring CKD, conversation with owners regarding transplantation should occur proactively when a cat is in International Renal Insufficiency Society CKD stage 3.[2–5] At 1 facility, a serum creatinine of greater than 4.0 mg/dL or significant aberrations in calcium and phosphorus levels are indications for transplantation.[6] In a review of 156 cases performed at the author's facility from 1998 to 2015, 15% of the cats were in International Renal Insufficiency Society CKD stage 3 and 85% were in International Renal Insufficiency Society CKD stage 4 at presentation. Limited information regarding the degree of azotemia as a risk factor for postoperative morbidity and mortality exists. In 1 study, cats with a serum creatinine greater than 10 mg/dL and increased blood urea nitrogen (specific value not given) were more likely to die before discharge.[1] In a second study, the severity of azotemia significantly increased the risk of neurologic complications in the perioperative period, but was not related to long-term survival.[7]

Both congenital and acquired disorders have been treated successfully with renal transplantation (**Box 1**). It is unclear whether patients in chronic renal failure secondary to amyloidosis are appropriate candidates because of the potential effects on the transplanted kidney. Patients with a history of pyelonephritis or recent infection have been treated successfully with transplantation if the infection is confined to one kidney and that kidney is removed before immunosuppression and transplantation. Cats with renal failure secondary to ethylene glycol toxicity should only be considered for transplantation after the elimination of the ethylene glycol and its metabolites from the body.

RECIPIENT EVALUATION

Extensive screening (**Box 2**) is performed before transplantation to identify any contraindications to moving forward with the procedure. At our facility, findings that preclude transplantation include severe cardiac disease, underlying neoplastic disease,

Box 1
Conditions successfully treated with transplantation

Acquired conditions

- Chronic interstitial nephritis (cat, dog); most common
- Oxalate nephrosis (cat)
- Membranous glomerulonephropathy (cat, dog)
- Toxic nephropathy; ethylene glycol, Lily (cat)
- Pyelonephritis (cat)

Congenital disorders

- Polycystic kidney disease (cat)
- Renal dysplasia (cat, dog)