Peritransplant management of retained native kidneys in autosomal dominant polycystic kidney disease

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As with other forms of end-stage kidney disease, transplantation is the treatment of choice for patients with autosomal dominant polycystic kidney disease (ADPKD) [1]. Transplantation is both life-extending and provides a superior quality of life for those patients who reach the need for renal replacement therapy. Most transplant centers proceed with transplantation either from a living donor or from a deceased donor without removal of the native polycystic kidneys since in most patients these kidneys are asymptomatic and removal pretransplant entails additional surgery with finite complications [2]. Bilateral nephrectomies done simultaneously with the transplant extend the procedure and introduce potential complications that presumably would not occur in patients undergoing standard transplants [3]. The major indications for nephrectomy of polycystic kidneys prior to the transplant are shown in Table 1.

Many patients complain about abdominal pain related to their autosomal dominant polycystic kidneys and if this pain is refractory to medical management, it could be an additional indication for native kidney removal [4]. It is actually unusual for patients after the transplant to require nephrectomies for complications related to their native kidneys (<20% in my experience). Also, there is evidence that the size of the kidney stabilizes and perhaps even regresses after a successful transplant, particularly with mTOR inhibitors used as immunosuppression [5]. The major advantages of polycystic kidneys left in situ are the maintenance of urine output that make the fluid restrictions on dialysis easier to handle and the kidney’s ability to produce erythropoietin and thus maintain hemoglobin values higher than other patients with chronic renal disease. In the absence of a major indication for nephrectomy, the major argument favoring this procedure is the potential need for post-transplant nephrectomy that involves major surgery in an immunosuppressed patient. However, this risk is mitigated by having a patient with normal renal function which avoids the inherent risk of operating on a patient with end-stage renal disease.

The standard approach to removing polycystic kidneys has been by a separate operation prior to transplantation. For living donor recipients, this can be staged so that when the patient recovers from the nephrectomy surgery there is only a short-time dialysis requirement in the anephric state. For a deceased donor recipient, pretransplant nephrectomy does provide a hardship since the patient must be maintained on dialysis until a suitable donor is identified thus having to endure severe restrictions on fluid intake.

A paper in the current issue of *Nephrology Dialysis Transplantation* contains a large experience with ipsilateral nephrectomy at the time of renal transplant [6]. This series is unique in that the procedure was done whether or not an indication for a nephrectomy existed. In these authors’ experienced hands, the procedure is relatively safe and did not impair graft or patient survival. However, since there are no concomitant controls, the paper raises many questions in regard to patient management. Obviously, since the ipsilateral nephrectomy was done in some cases without specific indications, it is possible that the extra surgery by adding anesthesia and prolonged cold ischemia could cause inferior long-term transplant results. Although the mean weight of the removed kidneys was substantial, some kidneys as small as 500 g were removed making the indication for the extra operation more questionable. If the indication for nephrectomy is a chronic infection, it seems hard to justify leaving one kidney in place. Likewise, if the indication for nephrectomy is a massive enlargement of the kidneys producing symptoms, it would be very difficult to know which kidney has to be removed before the transplant was actually performed. Bilateral nephrectomy is not a simple operation and even in the hands of this experienced group neither is ipsilateral nephrectomy. The complication rate of 12% requiring reoperation is not trivial and is additive to the potential surgical complications of the transplant procedure itself.

The remaining polycystic kidney after transplantation is another obvious drawback to this procedure. In the series, the contralateral kidney was already removed from the patient prior to the transplant in 22 patients. Another 20 patients had this done after the transplant, 2 at retransplantation. The timing was anywhere from 5 to 153 months. However, 57 patients still had their contralateral kidney in place. Thus, the argument that the number of surgical procedures would be reduced by the simultaneous ipsilateral transplant and nephrectomy is only true if the patient is left alone. Clearly, a major concern for any type of nephrectomy operation is to do it safely without...
jeopardizing the transplant results. This series had relatively good outcomes with 97% and 95% patient survivals at 1 year and 5 years, respectively, and with 96% and 80% graft survivals at 1 year and 5 years, respectively. Using the Scientific Registry for Transplant Recipients (SRTR) as a large database for comparison, the live donor 1- and 5-year patient survival rates are 99.5% and 96%, respectively, for ADPKD patients [7]. Graft survival for live donors is 97% at 1 year and 89% at 5 years. For deceased donors who make up the bulk of this issue’s reported series, the patient survival from the SRTR database is 98% at 1 year and 93% at 5 years with graft survival of 95% at 1 year and 82% at 5 years, respectively [7]. Thus, it seems that the reported results and a large registry are comparable, although the death of three patients in the first year posttransplant is worrisome.

While the authors have provided a unique experience, it is not clear as to how this should be translated into standard clinical practice. The experience with pretransplant bilateral nephrectomy done as a separate operation as the standard procedure will probably not change due to this reported experience. The removal of diseased native kidneys can be associated with severe hemorrhage and hemodynamic instability. It has been our anecdotal experience that the removal of large polycystic kidneys is often associated with hypotension similar to that seen in patients who are operated on for pheochromocytoma. If nephrectomies are to be performed, the patients probably should be prepared with pre- and intra-operative volume expansion since it is well known that the renin–angiotensin system is involved in the hypertension of autosomal dominant polycystic kidneys [8, 9]. The reduction in blood pressure of course would not be ideal in the transplant situation. For the asymptomatic patients with no indications for nephrectomy prior to transplant, the common practice should remain to leave the native kidneys in situ. Interestingly, experience with mTOR inhibitors such as sirolimus showed faster regression of kidney size posttransplant than in patients with other immunosuppressive protocols. This of course has led to exploration of the use of mTOR inhibitors to treat increasing kidney volume in autosomal dominant polycystic kidney disease [10, 11].

For the patients in whom the renal size is a barrier to transplantation, the ipsilateral approach could be considered. It would seem logical to make sure that the transplant was placed opposite the side with the most retained renal function as estimated by separate kidney function studies.

The procedure of ipsilateral nephrectomy concomitant with transplantation should be subjected to a controlled study that would necessitate multicenter cooperation. While this is an important detail of the transplant care for these patients, the current reported experience, while impressive, suffers from the lack of control patients. In the context of 2012 renal transplantation where outstanding results are already obtained, it is hard to know whether this is a therapeutic advance or addition of an unnecessary surgical procedure.


### References


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**Table 1. Major indications for nephrectomy of polycystic kidneys**

| Size of kidneys so large that there is no space in which to place the new kidney |
| Chronic pain and/or symptoms of early satiety or esophageal reflux |
| Chronic infection |
| Hypertension (rare) |
| Recurrent nephrolithiasis (rare) |