Should polycystic kidneys ever be used for renal transplantation?

Robert A. P. Koene

Department of Nephrology, University Medical Centre St Radboud, Nijmegen, The Netherlands

Introduction

Without any doubt, it is our ideal in renal transplantation to give each patient with end-stage renal disease a perfectly healthy, new organ. If sufficient donor kidneys were available, we would certainly reach this goal. Unfortunately, donor kidneys are scarce. As quite often occurs in daily life and equally so in medical practice, we have to make compromises. Due to the shortage of donor organs we have to expand our acceptance criteria and consider the use of so-called, marginal or borderline donors for renal transplantation. An example of this policy most widely addressed in the transplant literature is the use of kidneys from elderly donors. That issue and its possible solutions have been discussed recently in this journal [1]. Other examples of extended criteria are the use of kidneys from non-heart-beating donors or from donors with pre-existent disease, such as hypertension, proteinuria or diabetes mellitus. Sometimes, already existing knowledge of the post-transplant course can help in deciding whether to use the kidneys from a donor with renal disease. We know, for instance, from previous reports, that diabetic nephropathy in the donor kidney can reverse after its transplantation to a non-diabetic recipient [2]. In a recent report of a successful transplantation of two kidneys from a donor with focal segmental glomerulosclerosis, a more or less analogous reasoning was used. Based on the current evidence that this usually progressive form of nephrotic syndrome is caused by a circulating humoral factor, it was expected that the kidney disease would go into remission after transplantation [3].

The use of polycystic kidneys as donor organs

In the case of polycystic donor kidneys described in the current issue of the journal [4], there is not much reason to expect that the disease will resolve after transplantation. When such clues are lacking, the important and most difficult question is how far we can go in making compromises. Where do we cross a borderline? The two transplantsations performed by Shan and his colleagues [4] seem at first sight to approach this borderline very closely. The donor was 21 years old and had normal renal function. His kidneys were apparently not very much enlarged and the multiple cysts seen were of small size. Although they do not explicitly mention their considerations, those findings have probably convinced the authors
that it was justified to use these kidneys for transplantation. Like the donor, the recipients were of young age. Follow-up data collected at 1 year after transplantation showed that the length of the kidneys and the size of the cysts had not increased very much.

In the title of their paper the authors ask whether their decision to use these kidneys for transplantation was appropriate. Before answering this question a more detailed study of the available literature may be helpful. There are two aspects to address: (i) is the complications rate higher, and (ii) does the disease progress after transplantation and if so, at what rate. With the inclusion of the patients in the current report, seven cases can be traced in English journals [4–8]. All transplantations reported were successful. One must be aware of the fact that there may be publication bias, since successful cases are more likely to be reported than failures.

Is there an increased risk of complications due to the abnormal anatomy of the polycystic kidney?

The kidneys were normally sized or only moderately enlarged. The largest kidney length reported was 16 cm [4]. There is no mention of intracystic bleeding, infection, or stone formation in these seven transplants after a follow-up ranging from 1 to 12.5 years. The risk of a renal biopsy in a polycystic kidney is obviously increased, but this procedure was not performed in the patients reported, since rejection episodes apparently did not occur.

The risk of cyst growth and of progression to renal failure

The major fear when using these kidneys for transplantation is of course the likelihood that the polycystic disease will progress. The rate of progression might even increase due to the glomerular hyperfiltration that will probably occur in the single kidney graft. In this regard the data reported by Zeier et al. [9] are reassuring. They compared 47 patients with adult polycystic disease who had undergone uninephrectomy for several reasons, with 47 non-nephrectomized, matched controls. Uninephrectomy did not appear to accelerate the progression of renal failure in these patients.

The currently available data on the course after transplantation of these kidneys are somewhat confusing. Surprisingly, in three patients with follow-up periods of 19 months, 29 months and 8 years [5,7], there was no further enlargement of the kidneys or of the renal cysts. In two patients shrinkage of cyst size seemed to have occurred [5] and in one even disappearance of most of the cysts [7]. Unfortunately, exact measurements were not provided in these reports. These unexpected findings require confirmation before we can assume that polycystic disease can be cured or halted after renal transplantation. The recent report of Howard et al. [8] is more in line with our expectations. In their patient painful enlargement of the graft occurred some years after transplantation. The patient slowly progressed to end-stage renal disease after 12.5 years. There is not much doubt that this was caused by the pre-existing disease in the donor kidney, because at nephrectomy it showed all the anatomical characteristics of an end-stage polycystic kidney. This is also the report with the longest follow-up period. It suggests that disease progression in a polycystic kidney will not stop after transplantation.

Conclusion

The available data suggests that the expected graft survival of a normally sized or moderately enlarged polycystic kidney with normal renal function may be about 10 years. So far, no serious complications related to the presence of multiple cysts in the graft have been reported. Therefore, in light of the donor shortage it seems appropriate to use these kidneys for renal transplantation. However, I would like to put in two provisos. Firstly, only kidneys of normal or only moderately enlarged size should be used. Secondly, given the uncertainty about the life span of these grafts, polycystic kidneys should not be transplanted to young patients. In this regard I disagree with the authors of the current report, who decided to give these kidneys to two adolescents. For the time being it seems wise to reserve them for recipients whose life expectancy is in the order of 10 years. This policy might change if the interesting observations of shrinkage of the cysts will be confirmed in the future. Although these observations are quite unexpected, they must not be disregarded. It is conceivable that cyst growth in a grafted kidney can be inhibited by the smouldering immune response in the graft, that is almost always present, or by the nephrotoxic side effects of immunosuppressive drugs, such as the calcineurin inhibitors.

References


Editor’s note

See also Case Reports by Shan et al., pp. 410–411 and Rea et al., pp. 416–417.