INVITED COMMENTARY

It is the time to rethink the criteria to define transplantable kidneys. Should we combine histological and clinical evaluation?

Giovanni Stallone & Giuseppe Grandaliano

Nephrology, Dialysis and Transplantation Unit, Department of Medical and Surgical Sciences, University of Foggia, Foggia, Italy

Correspondence
Prof. Giovanni Stallone MD, Nephrology, Dialysis and Tranplantation Unit, Department of Medical and Surgical Sciences, University of Foggia, Viale Luigi Pinto, 1, 71100 Foggia, Italy.
Tel.: +39 0881736002
fax: +39 0881736001
e-mail: giovanni.stallone@unifg.it

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In this issue of *Transplant International*, Sanchez-Escudero *et al.* [1] report the results obtained from a prospective single-centre study enrolling 485 consecutive transplant recipients receiving a kidney with a Remuzzi score (RS) [2] of pretransplant donor biopsies (PTDB) lower or equal to 4. Then retrospectively, the authors compared their organ allocation policy based on RS with kidney donor profile index (KDPI) [3] and evaluated the discard rate between KDPI and PTDB and five-year graft and patients survival. Their data support the hypothesis that PTDB could support the acceptance of kidneys with the highest KDPI.

The increasing gap between the inadequate supply and the growing demand for kidney grafts observed in the last two decades led to investigate novel policies to obtain more transplantable organs [4–6]. In this setting, expanded criteria donors (ECD) may represent a valuable source. Indeed, transplantation of ECD kidneys assures a clear survival advantage over remaining in the waiting list and receiving a standard criteria organ [7]. The main issue in this scenario, however, is to identify reliable criteria to recognize transplantable organs and to allocate them to the best set of recipients and/or to single or double transplant. A great number of clinical investigations proposed several acceptance and allocation principles and/or transplantation strategies to reduce the discard rate of available kidneys and to improve their outcome [8,9]. Several studies investigated PTDB as a tool to direct organs' distribution [7,10,11]. Some of them support the hypothesis that PTDB may represent a valuable tool to identify transplantable kidneys [12,13], while others demonstrate that employing the histological criteria increases the risk to discard acceptable kidneys [14]. The OPTN/UNOS Kidney Transplantation Committee in 2011 completed a full review of the US kidney allocation policy in the attempt to address the concerns on the waiting time priority list and the use of ECD kidneys. To maximize the number of transplantable kidneys and to improve their outcome, the Committee proposed a matching based on the chances to survive, allocating the best 20% of the kidneys to younger recipients [15]. Meanwhile, it

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was recommended to allocate kidneys from older donors and with a higher risk of failure primarily to older patients on the waiting list [15].

This suggestion is coherent with the consolidated practice of the Eurotransplant Senior Program (ESP) [16]. ESP reported that younger patients receiving kidneys from senior donors experience an inferior graft survival, confirming the observation of Waiser *et al.* [17] and the recommendation from Hariharan *et al.* [18] that an "old-to-old" allocation leads to a significantly better graft outcome. Numerous strategies have been suggested to further improve the outcome of ECD transplantation. In particular, Remuzzi *et al.* [4] proposed the use of dual kidney transplantation on the basis of a histological score of PTDB. This approach is intended to reduce the disparity between the limited nephron mass featuring older donors and the recipient metabolic demand [8,19].

To improve the use and outcome of obtainable kidneys, on June 2013, the OPTN ratified a innovative allocation program stratifying deceased donors on the basis of a KDPI, taking into account age, height, weight, ethnicity, history of hypertension and diabetes, cause of death, serum creatinine, hepatitis C status, and the eventual donation after circulatory death [19]. This clinical score is intended to calculate the kidney donor risk index (KDRI), representing the potential risk of graft failure of a kidney harvested from a deceased donor compared with the failure risk of a kidney from the average donor of the previous year [3]. Even with this innovative approach, the discard rate of grafts from high KDPI donors, corresponding to ECDs, remains very high [8]. It is noteworthy that the KDPI scale, such as ECD definition, has been developed to forecast the risk of a graft to fail on the basis of simple and easily collectable clinical data, without considering potential histological information obtained from a PTDB. According to this approach, the risk of premature failure for a kidney graft from a Caucasian ECD "for age" without cardiovascular disease and with a brain death independent from cerebrovascular events should exceed by 30–70% the chances to fail of a kidney harvested from the average donor of the previous year [20]. On the other hand, Remuzzi *et al.*, in an international multicentre study, demonstrated that the short- [20] and long-term [4] survival of kidney grafts from ECDs over 60 years of age and/or with an history of hypertension, diabetes or renal disease allocated to single or dual transplant or, eventually, discarded on the basis of an histological score of PTDB, were comparable to the survival of kidneys from standard criteria donors allocated using the routine clinical approach.

The observation of Sanchez-Escudero *et al.* [1] strongly support the hypothesis that applying both clinical and histological criteria may significantly improve our ability to safely allocate ECD kidneys consistently reducing the rate of discard. Indeed, in their study the use of PTDB in donors with high KDPI, especially in those with a KDPI >91%, provides useful clinical information for decision-making on accepting and allocating these kidneys for single transplants, with guarantees of good graft and patient survival despite very high KDPI [1]. Their observation confirms a previous multicentre study from Italy suggesting a key role for PTDB in the allocation of kidneys from high KDPI donors [21]. In this study, Gandolfini *et al.* demonstrated that the use of PTDB in donors with high KDPI score resulted in very low discard rate and a similar graft survival in patients with a RS lower or equal to 4.

To sum up, there is an increasing body of evidence that it is the time to optimize the use of ECD kidneys using both KDPI score and RS of PTDB. The real challenge now is to define the weight of clinical and histological criteria in the decision process, leading to acceptance and allocation of kidneys at an increased risk of failure.

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Conflicts of interest

The authors declare no conflicts of interest.

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