

CHAPTER 1.3 Criteria for selecting a deceased donor

Raphael Schild¹ & Florian Grahammer²

¹ Department of Paediatric Nephrology, Paediatric Hepatology and Paediatric Transplantation, University Medical Centre Hamburg-Eppendorf, Hamburg, Germany

² III. Department of Medicine, University Hospital Hamburg Eppendorf, Hamburg, Germany

ORCIDs:

Raphael Schild: <https://orcid.org/0000-0002-0416-6142>

Florian Grahammer: <https://orcid.org/0000-0002-7851-754X>

There are no guidelines for the selection of a deceased donor kidney. However, the transplant team must make a quick decision to accept or reject the offered organ. The aim is to ensure the best chance of a successful transplant and long graft survival, while minimising the waiting time spent on dialysis. Long-term graft survival is particularly important for paediatric recipients due to their higher life expectancy. Therefore, organ quality criteria are generally more stringent than for older recipients. On the other hand, the burden and health consequences of dialysis are particularly high in this age group, and complications or co-morbidities increase with time on dialysis.

Quality of the donor and the organ

Donor organs can be classified according to the risk of subsequent graft failure. The ideal donor after brain death (DBD) is a donor with isolated brain trauma and no pre-existing conditions such as diabetes or hypertension.

- ▶ “Ideal” standard criteria donor (SCD): < 35 years; terminal S-creatinine < 1.5 mg/dl, no hypertension or diabetes, no cerebrovascular cause of death
- ▶ Expanded criteria donors (ECD): > 60 years or > 50 years *with at least 2 of the following*: hypertension, diabetes, cerebrovascular cause of death or terminal S-creatinine > 1.5 mg/dl. Paediatric recipients of these organs have an increased risk of graft loss (adjusted hazard ratio (aHR) 1.6 compared with matched non-ECD recipients) and also show no survival benefit over remaining on the waiting list [1]. However, in special cases (high sensitisation, long waiting time, dialysis problems) they may offer an advantage even in children.

- ▶ Donor age: Paediatric donors show better long-term graft function and superior growth and are therefore preferably allocated to children. However, in donors under 5 years of age, the risk of early graft loss increases to up to 10% while long-term graft survival remains comparable. In specialised paediatric surgical centres, these kidneys can give excellent results. En bloc transplantation may be appropriate for larger recipients and has been shown to provide a survival benefit over remaining on the waiting list and waiting for an organ from an adult donor [2–4].
- ▶ Cause of death, time without circulation (“down time”) and need for cardiopulmonary resuscitation are other important factors in donor selection. In addition, diseases that affect renal prognosis such as hypertension (left ventricular hypertrophy as an indicator), stroke, diabetes and diseases that pose a risk to the recipient (malignancy, infection) should be identified and assessed. For the latter, European recommendations exist to guide management (Council of Europe, Guide to the quality and safety of organs for transplantation 8th edition; <https://www.edqm.eu/en/guide-quality-and-safety-of-organs-for-transplantation>).
- ▶ **Kidney function and acute kidney injury in the donor:** Although donor terminal serum creatinine > 1.5 mg/dL is considered a risk factor for delayed graft function (DGF) and graft loss, the results are inconsistent. Recent studies in both adult and paediatric recipients have failed to confirm terminal serum creatinine > 2 mg/dL as an independent risk factor for DGF. Therefore, the acceptance of particularly young donors with non-high-grade acute kidney injury (AKI) (< stage 3) may be considered also for children in individual cases [5, 6]. It is important to look for signs of pre-existing chronic kidney disease (proteinuria, high baseline serum creatinine and creatinine trajectory) and to differentiate from reversible causes of AKI (resuscitation, rhabdomyolysis).
- ▶ **Pre-transplant risk prediction tools:** Several risk prediction tools have been developed, but their limitations to adult recipients or substantial differences between countries reduce their usefulness for European recipients.
 - **Kidney Donor Profile Index (KDPI):** Provided by the Organ Procurement and Transplantation Network (OPTN) and is based on U.S. data. It has replaced the SCD/ECD classification for organ allocation. While it has been primarily validated in adult recipients, paediatric studies have shown that paediatric recipients of high (> 85) KDPI kidneys have a survival advantage over remaining on the waiting list (aHR 0.41

for death) [1]. The usefulness for non-US recipients is reduced due to country differences in the donor population.

- **A Dutch pre-transplant risk prediction tool** has shown good performance in predicting monthly graft survival from pre-transplant donor and recipient variables, including data on HLA matching and living vs. deceased donation [7]. While it only performs well in the Dutch population, country-specific variants for France and Germany have recently been developed, which also show good performance (AUC 0.73–0.77) [8]. These tools could in the future support clinical decision making as well as shared decision making with patients and families.

Human Leukocyte Antigen (HLA) Matching

- ▶ In current studies, poorer HLA matching is still associated with a higher risk of graft loss (aHR 1.43 in 3–6 mismatches vs. 0–2 mismatches). It also increases the risk of de novo HLA-DSA formation and leads a longer waiting time for retransplantation. Good HLA matching is therefore particularly important for paediatric recipients [6].
- ▶ Each transplant centre can determine the criteria for HLA matching. A common minimum requirement is to require at least 2 matches in the systems relevant to allocation (A-B-DR), with at least 1 match in the DR system (= maximum of 4 mismatches, including a maximum of 1 DR mismatch). HLA typing in C and DQ is performed but not used for allocation, and DP typing of the donor is not routinely performed in the ET region.
- ▶ In addition, pre-formed HLA antibodies in the recipient may need to be registered as non-acceptable HLA antigens (NAHA) in the potential donor, as they pose an increased risk for long-term graft survival, even with a negative crossmatch [9]. The resulting virtual panel reactivity (vPRA) reduces the number of potential donors and increases the waiting time, so that a critical selection and regular re-evaluation of these unacceptables are required in collaboration with the local HLA laboratory is necessary, taking into account the urgency of the transplantation [10].

Other recipient factors: Criteria for the urgency of the transplantation, which may lead to a potential benefit even if a non-ideal organ is accepted, are particularly relevant here: Previous waiting time, expected waiting time (sensitisation,

planned living donation) and clinical condition on dialysis (vascular situation, peritonitis episodes).

Cold ischaemia time (CIT): The cold ischaemia time is the time between kidney retrieval and initiation of cooling until transplantation. The shorter the CIT, the rarer the occurrence of DGF and the better the graft survival. Current data show that the risk of graft failure and patient death increases proportionally by 8% for each additional 6 hours of CIT beyond 6 hours [11]. Recipients of organs with CIT > 18 hours vs. < 18 hours have a 21% higher risk of graft failure.

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