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Original Article

High-urgency kidney transplantation in the Eurotransplant Kidney Allocation System: success or waste of organs? The Eurotransplant 15-year all-centre survey

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ABSTRACT

Background. In the Eurotransplant Kidney Allocation System (ETKAS), transplant candidates can be considered for high-urgency (HU) status in case of life-threatening inability to undergo renal replacement therapy. Data on the outcomes of HU transplantation are sparse and the benefit is controversial.
Methods. We systematically analysed data from 898 ET HU kidney transplant recipients from 61 transplant centres between 1996 and 2010 and investigated the 5-year patient and graft outcomes and differences between relevant subgroups.
Results. Kidney recipients with an HU status were younger (median 43 versus 55 years) and spent less time on the waiting list compared with non-HU recipients (34 versus 54 months). They received grafts with significantly more mismatches (mean 3.79 versus 2.42; $P < 0.001$) and the percentage of retransplantations was remarkably higher (37.5 versus 16.7%). Patient survival ($P = 0.0053$) and death with a functioning graft (DwFG; $P < 0.0001$) after HU transplantation were significantly worse than in non-HU recipients, whereas graft outcome was comparable ($P = 0.094$). Analysis according to the different HU indications revealed that recipients listed HU because of an imminent lack of access for dialysis had a significantly worse patient survival ($P = 0.0053$) and DwFG ($P = 0.0462$) compared with recipients with psychological problems and suicidality because of dialysis. In addition, retransplantation had a negative impact on patient and graft outcome.

Conclusions. Facing organ shortages, increasing wait times and considerable mortality on dialysis, we question the current policy of HU allocation and propose more restrictive criteria with regard to individuals with vascular complications or repeated retransplantations in order to support patients on the non-HU waiting list with a much better long-term prognosis.

Keywords: graft survival, high-urgency, kidney, patient survival, renal, transplantation

INTRODUCTION

In times of a shortage of donor organs, long-term success and outcome of deceased donor renal transplantation (DDRT) gain crucial importance. The Eurotransplant Kidney Allocation System (ETKAS) was first introduced in 1996 [1] and thereafter continuously refined to improve patient and graft survival, guarantee objective recipient selection system based on medical and immunological criteria and streamline the use of available donor organs. The allocation is based on histocompatibility, waiting time, sensitization, logistic aspects and medical urgency [2, 3]. Patients waiting for a kidney graft can be granted high medical urgency (HU) status on condition that distinct criteria are fulfilled [4]:

- imminent lack of access for haemodialysis and peritoneal dialysis,
- high risk for suicide due to psychological inability to cope with dialysis,
- severe (uraemic) polyneuropathy (not applicable in all member countries) or
- severe bladder problems (haematuria, cystitis, etc.) due to kidney graft failure after simultaneous kidney and pancreas transplantation, provided that the pancreas graft is bladder-drained and functioning adequately.

The request for 'HU status' in Eurotransplant (ET) organ allocation reaches back to the early 1970s [5]. Exceptional near-term rescue DDRT intends to save the recipient's life, who otherwise would presumably die within a short period of time. Despite of marked advances in dialysis treatment, HU requests represent a consistent part of kidney allocation in the ETKAS.

After passing the HU audit, candidates receive a bonus of 500 additional points in the ETKAS [4, 5] to accelerate allocation of a graft. Currently, regular ETKAS DDRT allocation occurs when a recipient candidate accumulates between 850 and 900 points.

In contrast, the United Network for Organ Sharing (UNOS) together with the Organ Procurement and Transplantation Network (OPTN) in the USA has organized the allocation of kidneys based on medical urgency regionally. If there is only one regional renal transplant centre, the candidate's centre has the authority to use medical assessment in the allocation of medical urgency points. When there is more than one regional transplant centre, cooperative medical decision-making is required prior to assignment of medical urgency points [6, 7]. In other countries, such as the UK [8], Canada [9], Spain [10], Portugal [11], Brazil [12] and Turkey [13], urgency priority kidney transplant allocation is possible after an audit by independent nephrologists in case of an absolute absence of access for renal replacement therapy or severe complications despite or due to dialysis, such as uraemic cardiomyopathy or neuropathy.

The HU option for kidney allocation is controversial, as mortality on the HU kidney waiting list diminished towards nil during the past decades [14]. Critics state that in DDRT, the HU status lost its 'life-saving' intention compared with rescuing indications in heart, lung and liver transplantations. However, proponents feel vindicated in the success of HU allocation in the ETKAS. Regardless, factors such as optimal human leucocyte antigen (HLA) matching [15], younger recipient age, better physical condition and higher quality of transplanted organs [16–18] are associated with a better outcome of both patient and graft survival.

Due to the proportionally small number of HU renal transplant recipients compared with all kidney transplantations and the exceptional disease structure, which leads to an HU request in each individual case, data from these patients are very inhomogeneous. Until now, there have been no comprehensive data comparing patient and graft survival under HU conditions with those following standard ETKAS allocation.

This study surveys the available information on priority (HU) DDRT in the literature, compares the insights with the results from all kidney transplant centres within the ET area for the first 15 years since introduction of the new ETKAS, outlines the outcome of HU DDRT compared with standard ETKAS allocated deceased donor transplantation and then comprehensively discusses the findings with regard to benefit and necessity.

MATERIALS AND METHODS

The outcome of HU DDRT from all 61 centres in the ET area where HU transplantations were performed between 1996 and 2010 was investigated using a standardized digital questionnaire. This request was issued in April 2012 and asked for the determining medical reason that led to the HU request, retransplantation and the sequence of organ transplantation, date of last follow-up, last creatinine, graft loss and date of loss, patient's death and date of death, as well as death with a functioning graft (DwFG). Additional information on gender, age, underlying kidney disease, waiting time, transplant period and general information on the overall ET waiting list and transplantations were obtained from the ET database and recent annual reports. All data were anonymized for both the patient's and centre's identity at the ET registry department and then analysed by the authors. Cumulative incidence curves were calculated for patient and graft survival to meet the problem of competing risks [19] of DwFG versus graft loss. Hazard rates for death and cause-specific hazard rates for graft loss and for DwFG were compared, using the log-rank test, with all investigated subgroups and with all standard ETKAS-allocated

DDRTs between 1996 and 2010 for which data were available in the ET database (n = 44 461). For factors with more than two groups, Bonferroni's correction was applied to account for multiple pairwise comparisons. A two-sided level of significance of 0.05 was used. Repeated DDRTs of one recipient were treated as statistically independent observations and follow-up was capped at 5 years after DDRT.

Statistical analysis was performed using R version 3.0.2 (R Foundation for Statistical Computing, Vienna, Austria). All data collection and analyses were performed in accordance with ethical standards as laid down in the Declaration of Helsinki.

RESULTS

From 1996 to 2010, 61 of 71 kidney transplant centres performed HU DDRTs and 10 centres performed no HU DDRTs within this period. A total of 937 patients received an HU DDRT and 7 candidates with HU status (0.7%) died while waiting. In contrast, mortality on the ordinary waiting list for kidney-only transplantation was 5.2% [SE 0.25; mean 548 patients per year (SD 19)] between 2006 and 2011. Since 2000, the number of HU kidney recipients in the ET area has ranged between 42 and 84 per year (1.1 and 2.5%; mean 1.9%), while the number was 60–70 per year (4–5%) in the three preceding decades [5]. The highest absolute number of HU DDRTs at a single centre within 1 year was 11, and the mean percentage ranged from 1.2 to 12.8%. A total of 60/61 DDRT centres performing HU transplantation returned the questionnaire and information was available for 898 HU DDRT recipients (95.8%). Whereas the median elective waiting time in standard ETKAS allocation is ∼54 months [14], the median HU waiting time was 5 days (1–657) in the observed time period between 2000 and 2013. Data from the period before 2000 were not available at the ET database. However, the median overall time from acceptance on the ordinary waiting list until request, approval of HU status and successful HU allocation was only 34 months (range 0–213). HU recipients had a median age of 43 years (range 0–74) compared with a median age of 55 years for the patients on the ordinary kidney waiting list [14]. More than 75% of the HU kidney recipients were <55 years of age. Furthermore, within the HU transplantations, as much as 37.5% were retransplantations, compared with 16.7% (range 16.0–17.7) in the non-HU allocation group during 2006–10 [14]. The number of HLA mismatches with regard to allocation urgency in the ET database was significantly higher in HU recipients when compared with non-HU recipients [mean 3.79 (SD 1.2) versus 2.42 (SD 1.5); P < 0.001]. Unambiguous specification of the respective HU motivation was available from 639/898 (71.2%) patients. Data from patients without this distinct information were excluded from subgroup analyses concerning the HU indication.

Basic patient demographics, transplant-specific information, the completeness of available data and subgroup-related transplant outcome are outlined in Table 1. Patient survival was significantly worse in recipients 56–64 years of age compared with recipients 16–55 years of age. Analysing patient and graft outcome, no relevant differences could be found concerning gender, transplant period, waiting time and underlying renal disease. However, recipients with end-stage renal disease (ESRD) due to diabetic nephropathy showed a strong negative trend in both patient and graft survival after ∼30 months and 3 years after transplantation, respectively (Table 1). Since information on the last creatinine with functioning graft was available from only 566 recipients (63.0%), this point was not analysed further.

In Figure 1, patient death, graft loss and DwFG of all HU recipients and the major subgroups of HU indications are displayed together with the respective results of the non-HU controls from the same period. Both patient survival and DwFG turned out to be significantly worse in HU recipients compared with non-HU recipients (P = 0.0053 and P < 0.0001), whereas graft loss was similar (P = 0.094). Furthermore, the subgroup of HU recipients with lack of access for renal replacement therapy showed a significantly decreased patient survival compared with non-HU recipients (P = 0.0011) and HU recipients with suicidality (P = 0.0051). Moreover, DwFG was significantly higher in HU recipients with an imminent lack of access for dialysis compared with HU recipients with suicidality (P = 0.0462).

The impact of the sequence of transplantation on the outcome of HU DDRT is outlined in Table 1 and Figure 2. DwFG after HU DDRT was not affected by the sequence of transplantation. However, we found a significantly increased graft loss after HU retransplantations compared with HU first transplantations (P = 0.0026). Further analyses of HU retransplantations revealed a significantly worse patient survival of third- and higher-degree re-transplantations compared with first DDRTs (P = 0.0002) and first re-DDRTs (P = 0.0004). Additionally, graft loss turned out to be higher after third- and higher-degree re-DDRTs compared with first DDRTs (P = 0.018).

In a multivariable regression analysis of potential risk factors associated with favourable or unfavourable graft outcome of HU DDRT, age, gender, HU indications, diabetes and retransplantation were included. However, only retransplantation was significantly associated with impaired graft survival (P = 0.008).

DISCUSSION

Since the introduction of the revised ETKAS in March 1996 through until December 2010, 937 HU DDRTs were performed, accounting for 2.1% of all kidney-only transplants within this time period. However, for a variety of reasons only 61/71 transplant centres in the ET area performed HU DDRTs. Hypothetically, improvements in dialysis techniques and the risk of unfavourable HLA mismatches possibly motivate centres to refrain from HU transplantations. De Meester *et al.* previously reported on significantly worse matching compared with standard allocation [5], and our survey confirmed this disadvantage. Thus, impaired graft survival must be anticipated, which can even be potentiated in the presence of panel reactive antibody [15, 20]. Next, critical voices argue that 'true lifesaving urgency' in this case cannot be compared with the necessity for other organs since reported mortality rates on the waiting list (1–2% [7], 5.1% [14] and 7–8% [21]) appear to be low when compared with mortality while waiting for a lung (13.6%), heart (20.1%) or liver (22.3%) transplant [5, 14].

Table 1. Outcome of HU DDRT with regard to HU indication and the impact of patient- and transplant-specific factors

Investigated subgroups (excerpt of relevant data)	Patients		Patient survival				P-value	Cumulative incidence of graft loss				P-value
			Patients,	Compl.,	1 year,	5 years,		Patients,	Compl.,	1 year,	5 years,	
	n	%	*n*	%	% ± SE	% ± SE		*n*	%	% ± SE	% ± SE	
Non-HU	44 461	100	37 890	85.2	94.1 ± 0.1	83.4 ± 0.2	1 2	37 872	85.2	14.8 ± 0.2	30.0 ± 0.3	
HU indication												
All HU	898	100	883	98.3	92.3 ± 0.9	79.5 ± 1.5		840	93.5	14.2 ± 1.2	25.6 ± 1.6	
Access	500	55.7	493	98.6	91.1 ± 1.3	76.8 ± 2.1	3	473	94.6	15.4 ± 1.7	25.9 ± 2.2	
Suicidality	109	12.1	107	98.2	97.2 ± 1.6	93.1 ± 2.8		96	88.1	8.4 ± 2.9	18.0 ± 4.3	
Neuropathy	30	3.3	30	100	92.6 ± 5.0	80.5 ± 7.9		28	93.3	18.3 ± 7.6	33.9 ± 9.5	
Gender												
Female	452	50.3	447	98.9	93.8 ± 1.2	79.5 ± 2.1		426	94.2	14.6 ± 1.7	28.1 ± 2.3	
Male	446	49.7	443	99.3	90.9 ± 1.4	79.4 ± 2.1		410	91.9	13.7 ± 1.7	23.1 ± 2.2	
Age of recipient												
0–15 years	74	8.2	69	93.2	89.6 ± 3.7	89.6 ± 3.7		65	87.8	6.1 ± 3.0	11.8 ± 4.3	
16–55 years	623	69.4	613	98.4	93.8 ± 1.0	82.1 ± 1.7	4	562	90.2	14.8 ± 1.5	27.3 ± 2.0	
56–64 years	164	18.3	164	100	89.2 ± 2.5	68.7 ± 3.9		152	92.7	16.6 ± 3.0	24.6 ± 3.7	
≥65 years	37	4.1	37	100	86.2 ± 5.7	66.1 ± 9.2		34	91.9	8.8 ± 4.9	25.4 ± 8.1	
Transplant period												
1996–2000	239	26.6	239	100	93.6 ± 1.6	80.5 ± 2.6		219	91.6	14.7 ± 2.4	27.0 ± 3.0	
2001–5	344	38.3	339	98.5	92.7 ± 1.4	79.6 ± 2.3		333	96.8	14.2 ± 1.9	25.5 ± 2.4	
2006–10	315	35.1	312	99.0	91.0 ± 1.7	77.9 ± 3.4		284	90.2	13.7 ± 2.1	24.6 ± 3.2	
Waiting time												
0–11 months	182	20.3	176	96.7	93.0 ± 2.0	78.3 ± 3.5		154	84.6	12.7 ± 2.7	24.4 ± 3.6	
12–23 months	149	16.6	147	98.7	93.0 ± 2.1	86.0 ± 3.1		133	89.3	14.8 ± 3.1	28.6 ± 4.0	
24–59 months	349	38.9	343	98.3	91.4 ± 1.5	77.4 ± 2.5		321	92.0	14.5 ± 2.0	25.7 ± 2.6	
≥60 months	218	24.3	217	99.5	92.8 ± 1.8	76.7 ± 3.2		204	93.6	14.4 ± 2.4	24.3 ± 3.2	
Underlying disease												
Autoimmune	265	29.5	263	99.2	91.5 ± 1.7	76.8 ± 2.9		239	90.2	15.2 ± 2.3	22.9 ± 2.8	
Diabetes	92	10.2	91	98.9	92.3 ± 2.8	71.3 ± 5.0		85	92.4	9.2 ± 3.1	28.3 ± 5.1	
Sequence of graft												
1st transplantation	561	62.5	556	99.1	92.6 ± 1.1	80.4 ± 1.9	5	521	92.9	11.1 ± 1.4	22.1 ± 1.9	7 8
Retransplantation	337	37.5	331	98.2	91.9 ± 1.5	77.1 ± 2.5		316	94.6	19.0 ± 2.3	31.8 ± 2.9	
1st retransplantation	259	76.9	254	98.1	91.5 ± 1.8	81.2 ± 2.7	6	242	93.4	17.6 ± 2.5	29.4 ± 3.1	
2nd retransplantation	59	17.5	58	98.3	94.8 ± 2.9	74.8 ± 6.1		57	96.6	22.8 ± 5.6	34.9 ± 6.6	
≥3rd retransplantation	19	5.6	19	100	89.5 ± 7.0	40.2 ± 11.6		17	89.5	29.4 ± 11.5	47.1 ± 12.7	
HU access and sequence of graft												
1st transplantation	313	62.6	308	98.4	92.0 ± 1.6	79.2 ± 2.6		298	95.2	10.3 ± 1.8	20.6 ± 2.6	9 10 11
Retransplantation	187	37.4	182	97.3	90.8 ± 2.3	72.4 ± 2.3		177	94.6	23.5 ± 3.3	34.4 ± 3.8	
1st retransplantation	133	71.1	113	97.4	89.2 ± 3.0	78.5 ± 4.5		114	98.3	23.2 ± 3.8	32.0 ± 4.4	
2nd retransplantation	40	21.4	39	97.5	97.4 ± 2.5	70.7 ± 7.9		38	95.0	28.9 ± 7.5	44.0 ± 8.5	
≥3rd retransplantation	14	7.5	14	100	85.7 ± 9.4	49.0 ± 13.6		12	85.7	16.7 ± 11.3	33.3 ± 14.3	

Compl. = completeness of data available; subgroups with <10 patients are omitted; SE = standard error.
P-values: 1, P = 0.0053; 2, P = 0.0011; 3, P = 0.0051; 4, P = 0.002; 5, P = 0.0002; 6, P = 0.0004; 7, P = 0.0026; 8, P = 0.018; 9, P = 0.0004; 10, P = 0.029; 11, P = 0.0046.

Therefore, HU DDRT is sometimes no longer ascribed to be 'lifesaving' but rather 'improving quality of life and life prolonging' [5, 7]. However, concerns exist about the reliability of the data regarding death on the waiting list directly or indirectly due to a lack of dialysis access because of interrelated multimorbidity and potentially imprecise depiction on official report forms [7]. Moreover, an unknown number of unreported patients either not listed or delisted as 'unfit for transplant' who died thereafter must be assumed. Some transplant centres do not perform HU DDRT to either adhere to their minimal HLA-matching standards or to avoid favouritism and competition between patients and/or centres [5, 22].

HU grafts are exposed to the same influencing factors as kidneys allocated via standard ETKAS processing, i.e. all organizational, logistic and operative processes such as transport and ischaemia, perioperative management and possible complications. However, unfavourable donor-specific data such as age, comorbidities, quality of organs, anatomy, cytomegalovirus status and of course a poor HLA match might be accepted because of time pressure in the HU situation.

However, for the first time in the literature, this survey demonstrates that only distinct subgroups profit from HU DDRT in its current form and reveals several remarkable characteristics of this group that differ from those of non-HU recipients on the ET waiting list.

The increased percentage of recipients <16 years of age (8.2%) compared with the average ET range of 0.96–1.11% for the last 5 years causes the consecutively low median recipients' age (43 years). This survey additionally confirmed the increased rate of retransplantations (37.5%) in the HU cohort in contrast to among non-HU recipients in 2010 (16.7%) [14] and as reported before in small collectives for the ET area [5] and Brazil [12].

The median waiting time before HU request and successful allocation was remarkably short (34 months). Compared with

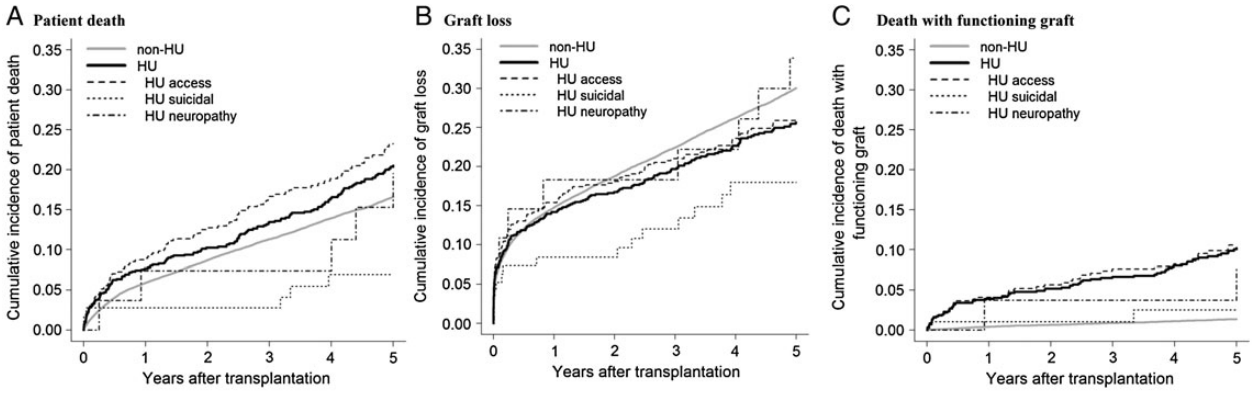

FIGURE 1: Outcome of HU DDRT with regard to the subgroups of HU indications.

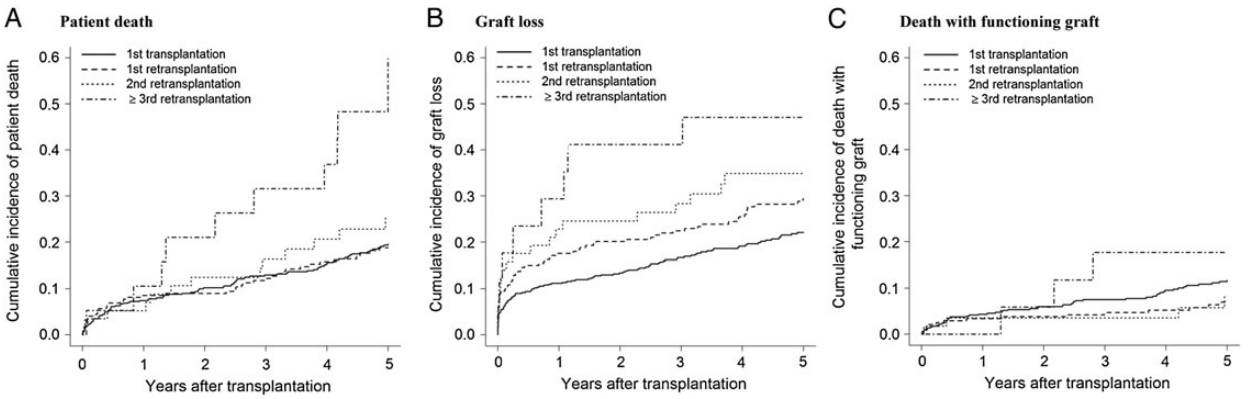

FIGURE 2: Outcome of HU DDRT with regard to sequence of transplantation.

the average waiting time for a DDRT in the ET area (~54 months in 2010), this is a noticeable decrease in time.

The cohort of HU recipients was previously reported to be inhomogeneous [5, 11, 12] because of the complex manifestation of particular diseases and comorbidities leading to HU request. Consistent with earlier reports, the majority of patients were put on the HU waiting list after a rather short period of time on the standard waiting list [5, 12]. The need for HU DDRT is apparently not a matter of long-term dialysis and waiting time, but rather an individual disposition. On the other hand, the shortened waiting time until HU request possibly results from emotional motivations facing young patients close to death and multimorbid recipients who lost their previous transplant(s) but have a strong demand for retransplantation. In contrast, elderly and less demanding patients might not be taken into consideration for HU requests. Furthermore, recipients who lost a transplant already have a close relationship with the transplant centre, which most likely makes it easier to restart the listing process compared with candidates who have to make the first contact. These motivations might lead to an HU request markedly before standard ETKAS would allocate a graft. However, the design of this survey was not able to elucidate these hypotheses.

Patient survival after DDRT is a multifactorial process based on both donor and especially individual patient's criteria such as age and the presence and severity of comorbid diseases. Patient and graft survival have increased, particularly among DDRT recipients, over the past decades [23]. Patient survival is high among recipients with persistent long-term graft function and reaches 5-year survival rates of up to 92% [23].

Compared with standard recipients, survival of HU kidney transplant recipients has been previously reported to be poor. A single-centre report from Portugal [11] reported a high morbidity and mortality after 'very urgent' DDRT. A previous report from the ET collaboration revealed a 2-year patient survival of 84% between 1993 and 1996 [5]. However, graft survival dropped to only 66% after 1 year and 59% after 2 years [5]. These data are comparable with our current observations, but they were not further analysed.

HU recipients with access problems

Patient survival and DwFG for the HU subgroup with psychological indications were superior to the outcome of recipients with access problems (Figure 1 and Table 1), while the median age was similar (44 and 42.5 years, respectively). We therefore assume that cardiovascular comorbidities, diabetes or thromboembolism in the subgroup of recipients with access problems [11] triggered both mortality and DwFG. Even though diabetes was only surveyed as a cause of ESRD, the negative trends in both patient and graft survival of diabetic HU recipients underline this hypothesis (Table 1). Additionally, the increased survival of younger recipients (16–55 versus 56–64 years; Table 1) could be related to a potentially lower prevalence of cardiovascular and arteriosclerotic diseases in this subgroup as well. Unfortunately, the number of recipients in the paediatric cohort (0–15 years; $n = 69$) is too small to further support this explanation.

Death within the first year after transplantation can primarily be ascribed to complications not directly associated to the procedure of transplantation, such as cardiovascular diseases (especially acute myocardial infarction) causing 47.1% of the deaths within the first 30 days and accounting for 40–55% of all deaths [24]. However, these complications are not related to the urgency status and therefore are considered applicable to all renal allograft recipients. In the cohort of HU recipients with access problems, pre-existing cardiovascular diseases may possibly cause repeated shunt problems. Next, these disorders may lead to an HU request. Finally, they may be responsible for the recipient's early non-transplant-related DwFG due to thrombosis or infarction and the disappointing patient survival despite a comparable incidence of graft loss (Table 1 and Figure 1). In this respect, HU recipients with a risk for suicide seem to be in better physical health, which causes their superior DDRT outcome. Unfortunately, no valid conclusions can be made on the impact of particular recipient-associated comorbidities (vascular disorders, diabetes, coagulation disorders or autoimmune diseases) because of limited obligations to transmit the recipients' data to ET.

HU recipients with suicidality

Recipients with a risk of suicide turned out to have significantly better results for patient survival and DwFG compared with recipients with access problems (Table 1 and Figure 1), whereas both graft survival and median age were similar. Therefore, it can be assumed that candidates with a risk of suicide suffer less frequently from life-limiting comorbidities.

Once the status of HU has been granted, recipients can choose among organs, as there is no obligation to accept the first organ allocated to the recipient. This might additionally explain the superior success of the suicidality subgroup, as time pressure is less based on physical complaints.

HU recipients with neuropathy

Due to the small number of recipients in this subgroup, no further statements can be derived from these data.

In addition to the negative impact of access problems, this survey clearly revealed retransplantation as having a major negative impact on both patient and graft survival (Table 1 and Figure 2). Factors influencing graft survival in standard allocation have been investigated in various trials and can—apart from logistic and technical factors—mainly be ascribed to HLA mismatch, preformed HLA antibodies, rejection, delayed graft function, recipient characteristics (e.g. age, time on dialysis, concomitant diseases) and donor-specific parameters (e.g. age, vascular diseases). In principle, all influencing factors of 'non-HU DDRT' should have a comparable impact in the HU situation. As expected, our investigation showed a significantly increased mean number of HLA mismatches in HU recipients compared with non-HU recipients [3.79 (SD 1.2) versus 2.42 (SD 1.5); $P < 0.001$]. This finding actually should impact worse graft survival because of increased immunological complications, especially in retransplantation. However, the results from our analyses on graft loss did not reveal a significantly increased rate compared with non-HU DDRT recipients (Figure 1 and Table 1). On the contrary, our investigation confirmed a shortened time on the waiting list, as previously reported by De Meester *et al.* [5], which actually should have a positive impact on graft and patient outcome [21, 25, 26].

CONCLUSIONS

This 15-year multicentre survey on HU DDRT in the ET area is the first comprehensive investigation including an analysis of HU subgroups. Increased patient death and DwFG despite comparable graft outcome of HU recipients with access problems can hypothetically be ascribed to the assumed worse cardiovascular status of these recipients. These disappointing results from the largest HU subgroup cause the bad patient outcome and increased DwFG of all HU DDRT recipients compared with the non-HU recipients. The outstanding patient survival and low DwFG of the HU subgroup with suicidality compared with the subgroup with access problems underline the assumption of the poor cardiovascular status of the latter. Within the HU DDRT group, only retransplantation was significantly associated with impaired graft survival in a regression analysis of potential risk factors, which underlines the relevance of immunology after repeated DDRT. Our investigations revealed especially disappointing results in patient and graft survival when the HU DDRT was a third- or higher-degree retransplantation, especially in the subgroup of HU recipients with access failure. More HLA mismatches and a significantly shorter waiting time compared with non-HU recipients are found to be characteristic for HU DDRT recipients in the ETKAS. With regard to these influencing variables, the complex inhomogeneity of the relatively small subgroup of HU recipients with numerous opposing variables unfortunately seems to make statistically relevant results impossible.

In view of the increasing shortage of kidneys within the ET area, increasing numbers of candidates, longer waiting times and the negative impact of dialysis on graft survival, mortality, morbidity, quality of life and healthcare costs, the question arises whether those organs allocated within the HU programme would not have reached a better outcome if they had been allocated to well-matched non-HU recipients instead.

Our results demand a conscientious discussion of whether HU status should be assigned much more carefully and perhaps be restricted to fewer indications or subgroups in the future to avoid wasting organs.

In reviewing the current rules and with the objective of devising a future regimen for these candidates in the ETKAS, we suggest the following basic points and put them up for discussion.

As basically all patients suffer from a deep depression once on dialysis, there are no objective means to analyse the real urgency in patients who claim to be suicidal. Thus, at least in this group of patients, the option to pick the best organs should not been granted. The same holds true for dialysis-related neuropathy, where even the indication can be doubted. In these subgroups, marginal organs should be utilized and a cherry-picking of suitable organs should be avoided.

The situation is different in the group with lack of access. In these patients, we have to think about comprehensive profiling to distinguish between patients who are otherwise 'healthy' and patients with a very poor prognosis, disregarding the lack of access. In a situation where organs are extremely scarce, we have to accept that some patients have to be denied transplantation in order to save others. However, in the absence of a dedicated scoring system, we have to judge ourselves and try to develop such a system.

Should we then transplant marginal organs such as organs from extended criteria donors in this group of patients? If the patients not only have a lack of access but also a poor prognosis for survival, marginal organs should be utilized. However, in a situation where the overall prognosis is good, such an approach would mean that the patient will soon be listed as HU again as the marginal organ fails. Thus, in a case like this, only good organs should be transplanted.

The data from this comprehensive multicentre survey on the very poor outcome of HU recipients with access problems and repeated re-DDRT suggest that we will have to accept that the HU audit sometimes has to be truncated in specific candidates according to rules defined by transplant experts, politicians and ethicists in order to save the kidneys and lives of others in the future.

Therefore, further multivariate investigations have to be performed to evaluate possible deficiencies in grafts accepted for HU recipients, comprehensively analyse demographic data and comorbidities of recipients and indications for HU request and then identify in detail donor- and recipient-specific factors such as concomitant diseases that may cause an unfavourable outcome. Furthermore, it would be helpful to identify subgroups that extraordinarily profit from HU transplantation of even marginal grafts. However, the ET community has to increase the prospectively recorded information of the ET registry for both transplant recipients and donors to provide answers to these questions.

CONFLICT OF INTEREST STATEMENT

None declared.

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