



The Renal Allograft Twin Study is kindly supported by the Alfred und Erika Bär-Spycher-Stiftung and Schweizerische Nierenstiftung.

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## 1. Background

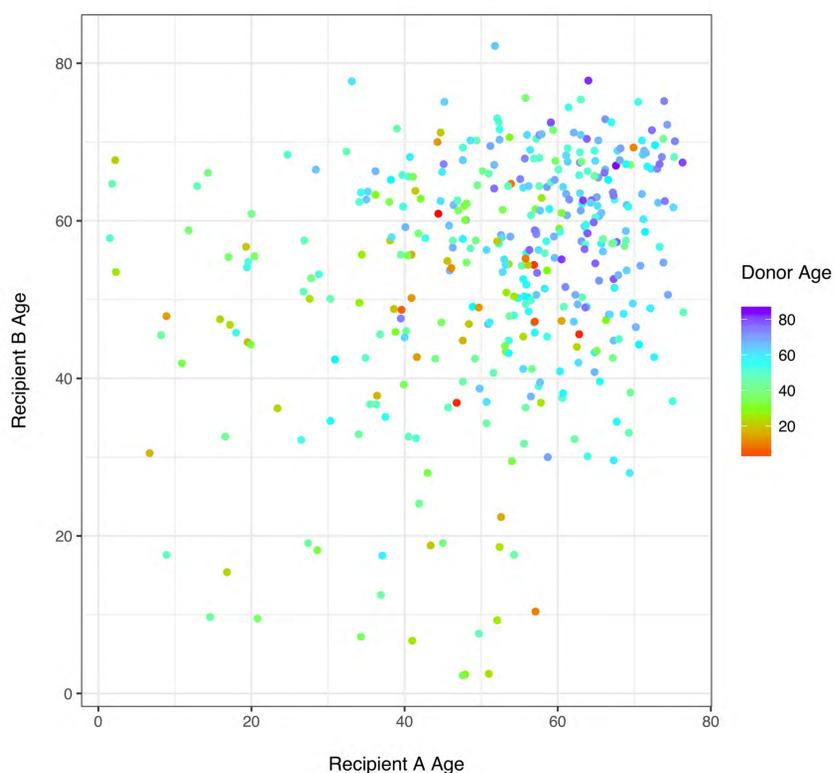
Despite significant progress in renal transplantation (TX), transplant survival in certain patients is significantly shorter than expected. We study all available pairs of kidney allograft recipients enrolled in the Swiss Transplant Cohort Study (STCS) where each of the two recipients has received its allograft from the same deceased donor ("kidney allograft twins").

Inclusion criteria: TX between 2008 and 2017, consent given, no previous TX, DBD donation

**Table 1. Recipient and donor characteristics**

	Recipients (n=790)		Donors (n=395)
Age (years), mean (sd)	53.2 (15.3)		50.8 (17.8)
Female, N (%)	302 (38.2%)		167 (42.3%)
Transplantation centre (%)	BE (14.6%)	SG (7.6%)	
	CHUV (15.1%)	USB (17%)	
	HUG (10.9%)	USZ (34.9%)	
Cold ischemia time (hours), mean (sd)	10.1 (4.1)		
Donor - recipient gender match (%)	F - F (17.2%)	M - F (21%)	
	F - M (24.9%)	M - M (36.8%)	
Time on the waiting list (years), mean (sd)	2.7 (1.7)		
Underlying disease, N (%)	132 (16.7%)		
- DM nephropathy			
- GN	154 (19.5%)		
- Nephrosclerosis	97 (12.3%)		
- ADPKD	137 (17.3%)		
- Other	261 (33%)		
- Missing	9 (1.1%)		

**Figure 1. Donor and recipients age relationship**



**Table 2. Within pair difference**

Within pair difference, mean (sd)	
Cold ischemia time (hours)	4.2 (3.3)
Age (years)	14.1 (12.2)
Time on the waiting list (years)	1.3 (1.5)

## 2. Methods

We analyzed concordance and discordance of delayed-graft function (DGF) and allograft failure (GL) in all.

Assumption:

1. "Full dependence" (Concordance): Donor characteristics (e.g. organ quality) fully determine the outcome within each pair. We observe the same outcome in each recipient of a pair that shares the same donor.
2. "Independence" (Discordance): Outcome of recipients within a pair are independent from each other. We may observe different as well as the same outcomes within a pair by chance.

"Relative proportion": The observed divided by the expected proportion of concordant or discordant pairs under assumption 1 or 2, respectively.

## 3. Results

DGF was diagnosed in 118 of 790 recipients (14.9%). Both recipients were affected in 19 pairs (19/395=4.8%). In contrast, recipients in 296 pairs (74.9%) did not show DGF and only one of both recipients experienced DGF in 80 pairs (20.3%).

**Table 3. Concordance and discordance of delayed graft function**

Events	Delayed Graft Function		
	Concordance (DGF - DGF)	Discordance (DGF - no DGF)	Concordance of non failure (no DGF)
Pairs (395)	19 pairs	80 pairs	296 pairs
Proportion	4.8%	20.3%	74.9%
Relative proportion	32%	80%	

Assuming full dependence, all 118 failures would have occurred in concordant pairs and 14.9% (59 pairs) of kidney pairs would have been concordant. In the case of independence 2.2% pairs would be concordant and 25.4% discordant\*.

The relative proportion of DGF under full dependence assumption was 32% (4.8%/14.9%), whereas the relative proportion of DGF under independence assumption was 80% (20.3%/25.4%).

**Table 4. Concordance and discordance of allograft failure**

Events	Allograft failure		
	Concordance (GL - GL)	Discordance (GL - no GL)	Concordance of non failure (no GL)
Pairs (395)	8 pairs	49 pairs	338 pairs
Proportion	2%	12.4%	85.6%
Relative proportion	25%	82%	

For graft failure, concordance of failure in 8 pairs (2%), concordance of non-failure in 338 pairs (85.6%) and discordance of graft failure in 49 pairs (12.4%). The of graft loss under full dependence assumption was 25% (2%/8.1%), whereas the relative proportion of allograft failure under independence assumption was 82% (12.4%/15.1%).

## 4. Conclusions

For delayed graft function and allograft failure, the relative proportion of discordant failures is clearly higher than the relative proportion of concordant failures. We conclude that the impact of recipient risk factors is more important than that of donor risk factors to explain delayed graft function and allograft failure.

\*under "Independence" assumption:  $P(\text{Concordant-pair}) = P(\text{DGF}) \cdot P(\text{DGF})$  with  $P(\text{DGF}) = \text{"Probability for DGF"} = 111/730$ ;  $P(\text{Discordant-pair}) = 2 \cdot P(\text{DGF}) \cdot P(\text{no DGF})$  with  $P(\text{no DGF}) = 1 - P(\text{DGF})$ . It doesn't matter if "DGF-no DGF" or "no DGF-DGF".