

Accepting a High-KDPI Kidney versus Waiting for Another Offer Can Improve Likelihood of a Functioning Graft

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Introduction

- Fewer than 50% of waitlisted candidates undergo a first deceased donor transplant within 5 years.
- Approximately 20% of recovered kidneys and >50% of kidneys with high donor risk (kidney donor profile index [KDPI] >85%) are discarded.
- Receiving high-KDPI kidneys is associated with better long-term survival compared with remaining on the waiting list for a lower-KDPI kidney (Massie et al., 2014), despite a higher risk of delayed graft function (Gill et al., 2016).
- Despite potential long-term benefits, at least two potential reasons for declining high-KDPI kidneys remain:
 1. Candidate has high priority and will more quickly receive an offer for a low-KDPI kidney.
 2. Candidate is listed in a high-supply donation service area (DSA) and will more quickly receive an offer for a low-KDPI kidney.
- To address these reasons, we developed an offer acceptance decision tool that estimates the probability of graft function after accepting versus declining 1-3 years post-offer while accounting for candidate priority and local donor supply.

Methods

- If the offer is accepted, the probability of a functioning graft is obtained through estimated posttransplant graft survival curves derived from a Cox proportional hazards model.
- If the offer is declined, the probability of a functioning graft corresponds to the probability of receiving a living or deceased donor kidney that remains functioning 1-3 years after the offer.
- Cumulative incidence functions estimate the likelihood of receiving a living or deceased donor kidney with offers declined for first-time kidney-alone candidates between January 1, 2013, and March 31, 2013. Local estimation accounts for the potential effects of:
 1. Offer number (candidate priority)
 2. Age
 3. Blood type
 4. Diabetes status
 5. Donor supply within local DSA
- The difference in the estimated probability of graft function assessed the tradeoff of accepting versus declining and remaining on the waiting list for 5000 randomly selected declined offers across:
 - Offer number, and
 - Low-, medium- and high-supply DSAs

Results

Figure 1. Probability of waitlist removal and the corresponding removal reason after declining an offer for a deceased donor kidney.

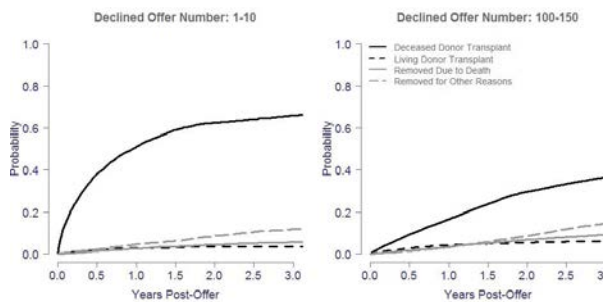


Figure 2. Calibration and predicted error (AUC) for estimating the probability of graft function 3 years after an offer is declined.

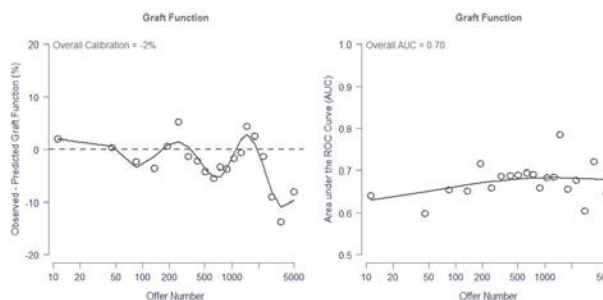


Figure 3. The estimated differences in predicted graft function 3 years after an offer between accepting versus declining and remaining on the waiting list.

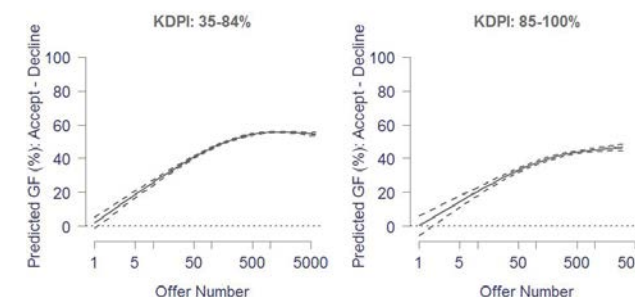


Table 1. Estimated difference in predicted graft function for accepting versus declining across donor supply of local DSAs. Donor supply was defined by the 1/3 and 2/3 quantiles of percentages who underwent transplant within 3-years of listing within a DSA.

Outcome	Donor Supply in Local DSA	Overall	KDPI, %	
			35-84	85-100
Graft Function	Low Supply	55%	57%	45%
	Medium Supply	43%	45%	36%
	High Supply	36%	38%	28%

Conclusions

- Acceptance was almost always associated with higher likelihood of graft function 3 years after an offer regardless of offer number, local donor supply, or donor KDPI. However, the difference attenuated for candidates with high priority or high local donor supply.
- The offer acceptance decision tool slightly overestimated the likelihood of graft function for declined offers, especially for offers later in the match run.
- The offer acceptance decision tool had relatively good AUC, although it was lower for offers early in the match run.
- Next steps include:
 1. Extending the decision tool to include patient mortality in offer acceptance decisions.
 2. Integrating the impact of donor pool restrictions on potential outcomes after declining an offer.

References

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- Gill J, Dong J, Rose C, Gill JS. The risk of allograft failure and the survival benefit of kidney transplantation are complicated by delayed graft function. *Kidney Int.* 2016;89:1331-1336.

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