Logistics, unaccounted for risk, and mutual understanding are required to achieve a Pareto-optimal transplant system: Reflections from both sides of DonorNet

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Introduction

Transplant systems are intricate dances between transplant centers (TC), organ procurement organizations (OPO), and regulatory bodies (RB), each with different goals, logistical needs, and interpretations of each other. The competing interests and needs are becoming more apparent with recent changes in the organ allocation system in the United States. We present a qualitative analysis of the current allocation system with a focus on kidney transplantation.

Methodology

Qualitative observations of the US transplant system by an experienced working transplant surgeon who has worked for different TC and OPOs in various roles over three decades and an experienced transplant nephrologist, both of whom are also health services researchers.

Results & Discussion 1

As allocation policy changed, TC and OPO logistical needs align less. Many TC are not so much afraid of risk, but rather unaccounted-for risk, as RB emphasized two high stakes metrics. These metrics resulted in riskier patients and donors being sidelined—particularly for those with poorly accounted-for risk in RB's statistical models. Having learned those ramifications for TC, RB relaxed them, which allowed TC to more aggressively transplant those who historically had poor access due to risk. However, RB promptly imposed two high stakes metrics on OPOs.

Results & Discussion 2

For kidneys, this change was contemporary with change in kidney allocation. While kidneys were more aggressively recovered, predictably unused rates increased. Organs typically underutilized in the past were often from older and riskier donors—increases in overall organ recovery would be expected to result from a relative expansion of these donors. Growth of rapid DCD and US health care consumers' expectations of "a perfect organ" contribute to these ratios. These issues pose significant difficulty for OPOs, as they are pressured by RB to recovery more organs while at the same time unrealistically expected to decrease unused rates.

Results & Discussion 3

For kidney, the process is hampered by volume and timing. TC get multiple offers at all times of the day. However, compared to extrarenal organs, TC don't follow kidney candidates that closely, as they are primarily cared for by their local nephrologist. Logistics are further hampered by high rates of ongoing complications in dialysis patients, resulting in a significant fraction being passed for a given offer.

Results & Discussion 4

OPO need provisional yes's (PY) to be actual PYs, but given the volume of offers TC surgeons must face 24/7 for days on end, this expectation is unrealistic. When offers are not primary, it is not surprising that TC haven’t done patient checks, performed virtual XM, or otherwise processed offers—particularly for offers released overnight. Human physiology—even for MDs—isn’t compatible with such long-term sleep disruptions. Some OPO have started waiting to release kidney offers until after recovery, further pressuring the system.

Conclusions & Recommendations

To prevent system instability, realistic quantitative and qualitative mutual understandings by TC, OPO, and RB are required for transplant systems to be optimized, or at least Pareto-optimized.

Additionally, human physiology and logistics, particularly the impact of volume and time of offers, must be considered. More creative solutions, particularly for kidney offers, need to be considered, including the possibility of interval offer windows that allow centers to cluster their organ evaluation, recipient identification, and virtual crossmatching.