The Adoption of a One-Day Donor Assessment Model in a Living Kidney Donor Transplant Program: A Quality Improvement Project

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Background: Survival of kidney transplants and their recipients is significantly better after living donor than after deceased donor transplantation. However, historically, Northern Ireland has had a low rate of living donor kidney transplantation. The length and complexity of donor evaluation has been one of the main factors contributing to this pattern.

Study Design: Quality improvement project.

Settings & Participants: All people in Northern Ireland expressing an interest in becoming a living kidney donor between 2010 and 2015.

Quality Improvement Intervention: Potential donors deemed to be suitable after a screening questionnaire attended a comprehensive 1-day evaluation including all investigations that had been previously been implemented across multiple clinical visits.

Outcome: Change in rate of living donor transplantation following the quality improvement intervention.

Measurements: Demographic data and reasons for nondonation.

Results: 431 potential donors underwent a 1-day assessment, with 284 (66%) ultimately donating and 12 (3%) still active in the program. Of the 135 (31%) potential donors who did not donate, 48 were unsuitable due to medical or surgical issues, 2 became pregnant, and 18 withdrew. For 38 (9%) potential donors, intended recipients found an alternative living or deceased donor transplant. For 29 (6%) potential donors, the transplantation did not proceed because of recipient-related issues. The annual rate of living donor kidney transplantation in Northern Ireland increased from a mean of 4.3 per million population (pmp) between 2000 and 2009 to 32.6 pmp between 2011 and 2015.

Limitations: Single geographical region with a potentially unrepresentative population and health care organization. Retrospective observational study. Paucity of data from the pre-intervention period.

Conclusions: Following implementation of a 1-day assessment process, we observed a considerable and sustained increase in the rate of living donor kidney transplantation. Making donor evaluation easier holds promise to increase the number of living donor kidney transplants, potentially optimizing outcomes for both recipients and donors.

Complete author and article information provided before references.

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Kidney transplantation is the optimal treatment for end-stage kidney disease with regard to both patient survival and quality of life.[1,2] Living versus deceased kidney donation offers greater transplant and recipient survival in addition to facilitating preemptive transplantation.[3,4] With increasing obesity rates and changing donor demographics,[5] efforts to increase living donation rates must be balanced with ensuring donor safety through a comprehensive screening process.

Before 2010, Northern Ireland had a low rate of living donor kidney transplantation (4.3 per million population [pmp] per annum [pa]), with few kidney transplantations performed preemptively. A major contributing factor was likely a lengthy donor workup process. With multiple assessment stages and hospital visits, the entire journey could take 2 years (Fig S1). Unsurprisingly, this resulted in donor fatigue and subsequent dropout. For recipients, this led to suboptimal outcomes, including more time accumulated on dialysis therapy, receiving a deceased donor instead of a living donor transplant, or becoming unsuitable for transplantation.

In an effort to improve the potential donor journey, a 1-day assessment pathway was introduced in March 2010. The aim of this quality improvement project was to limit the number of hospital visits for each donor by streamlining the process and performing all investigations in 1 day. This required collaboration between multiple specialities, including radiology, histocompatibility and immunogenetics, nuclear medicine, and cardiac investigations, along with reorganization of the local transplantation service. The outcomes of potential donors who entered this process between March 2010 and March 2015 were evaluated, the reasons why some did not proceed to donation were explored, and the impact of this new pathway on the regional living donor transplantation rate was assessed.

Methods

Setting and Participants

From March 2010 to March 2015, we evaluated all potential donors who self-referred to our program. Of note, Belfast City Hospital is the sole institute for transplantation,

living kidney donation, and donor assessment in this region. This work was performed with the permission of the clinical leadership at our institution. According to our institution's policy, because this work met criteria for an operational improvement activity with no patient randomization, formal ethics review by the institution and informed consent from patients were not required.

Measures

Annual living kidney donation rates were determined using the Northern Ireland Kidney Transplant Database; this prospectively records all kidney transplantations performed in Northern Ireland and the clinical outcomes. Demographics of all individuals who completed the initial donor screening questionnaire were recorded prospectively in the Northern Ireland Living Donor Database. These included donor age, sex, race, relationship to recipient, date of assessment, outcome, and reason for not proceeding for those exiting the process.

All patients who donated in 2011 were invited to complete a questionnaire about their experience after recovery (Item S1).

Quality Improvement Intervention

All donors were required to self-refer to the living kidney donation program by making contact with the living donor coordinators. Following an expression of interest, information was sent to the potential donor, including a health questionnaire to complete and return if, after consideration of the material provided, they wished to proceed. To facilitate ease of completion and minimize the potential impact of low medical literacy, the questionnaire was limited to a single A4 page and comprised yes/no answers with the opportunity to add detail if necessary (Fig S2). The information pack included details about the UK Living Donor Kidney Sharing Scheme and potential donors also indicated on the questionnaire if they were willing to consider this option. Permission to access their medical records was also sought.

Figure 1 illustrates the pathway: if there were no apparent contraindications to donation following nephrology review of the completed questionnaire and health care record, the potential donor was invited to a 1-day assessment. Occasionally, further clarification was required before proceeding. For example, the answer of "yes" to the question "Have you ever had kidney stones?" may have related to an episode of abdominal pain presumptively attributed to renal colic, in which case further assessment is appropriate, or the potential donor may have required intervention for stone extraction, in which case they would not proceed further.

If more than 1 potential donor came forward for a particular recipient, ABO blood group and HLA antigen type were determined first and then 1 donor was selected to go through to the 1-day assessment. Similar determination to ensure compatibility was required before proceeding if the potential donor was unwilling to consider

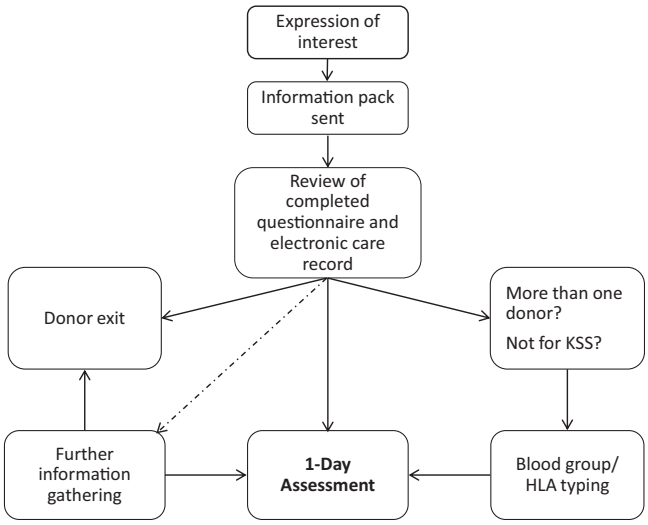

Figure 1. Quality improvement project flow diagram. Abbreviation: KSS, Kidney Sharing Scheme.

the UK Living Donor Kidney Sharing Scheme. Assessments occured on a weekly basis except during holiday periods (Christmas, New Year's, and Easter), and typically 2 potential donors were assessed per clinic.

A timeline of the various stages involved during the 1-day assessment is provided in Figure 2. Potential donors were asked to fast from midnight until they had venesection for initial blood investigations, which included lipids and glucose measurement. The assessment with a consultant nephrologist was in the afternoon, by which stage many of the results were available. Results of the assessments were reviewed at a multidisciplinary meeting involving all of the transplantation team 2 to 4 weeks later, and a decision regarding donation was made at that stage. If the donor was deemed suitable to donate, they then had a consultant surgical review, and finally the donor and

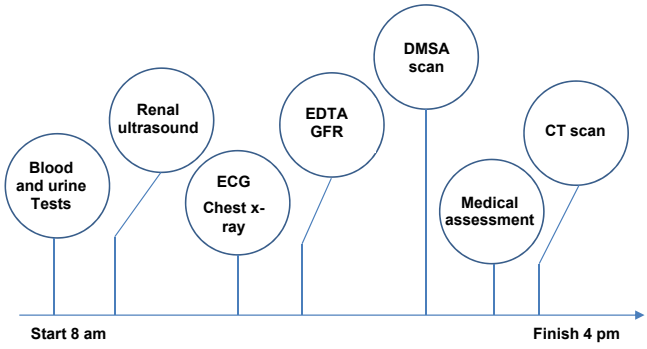

Figure 2. Timeline of events during the 1-day assessment quality improvement project for living kidney donors. This replaced the historic live donor workup process by condensing the necessary investigations into 1 day and therefore 1 hospital visit. Abbreviations: CT, computed tomography; DMSA, dimercaptocuccinic acid; ECG, electrocardiogram; EDTA, ethylenediamine tetraacetic acid; GFR, glomerular filtration rate.