

The Fast-Track Program: A new Organizational Model to Enhance Living Donor and Pre-emptive Kidney Transplantation

Articoli originali

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ABSTRACT

Living donor kidney transplantation (LD KTx), especially when performed pre-emptively, remains the gold standard for treating end-stage renal disease (ESRD). In Italy, however, this resource remains underutilized due to significant organizational hurdles and protracted evaluation timelines. To overcome this limitation, a Fast-track program (FTp) was developed in our Center, aiming to perform the clinical work-up of donor and recipient candidates pairs (DR) in five consecutive days with dedicated schedules on outpatient basis.

The results so far obtained in twenty DR evaluated with the FTp indicate an important reduction in the time between the first consultation and LD KTx and a higher proportion of pre-emptive KTx compared to fifty-four DR studied with the traditional work-up protocol (Tp). By simplifying logistics for patients traveling from distant regions, this model could serve as a scalable template to improve transplant access and outcomes at both regional and inter-regional levels.

KEYWORDS: Living donor kidney transplantation, pre-transplant assessment, pre-emptive transplantation

Introduction

Kidney transplantation (KTx) is the gold standard treatment for end-stage renal disease (ESRD), as it provides superior quality of life, increased survival rates, and significant cost savings compared to dialysis [1–3]. However, major limitations of KTx remain the logistical barriers to perform recipient candidates suitability evaluation and the persistent imbalance between organ demand and the limited availability of donors.

In Italy in fact, approximately 6,000 patients, that is only 12% of all the patients on dialysis, are currently on the waiting list for a deceased donor (DD) KTx. Moreover, the average number of DD KTx in the last decade (2016–2025) was 1,697 per year, with a significant reduction to 1,487 in 2025 [4]. This imbalance translates into an average waiting time for DD KTx of 3.1 years, with increased likelihood of clinical events that may impair a patient's eligibility for transplantation.

In this challenging setting, living donor (LD) KTx represents a valuable source, offering better outcomes compared to DD KTx, both in terms of patient and graft survival [5–7]. These results were recently confirmed in our Country by the Italian National Transplant Center (CNT): according to the 2002–2022 report, the 5-year survival rate and graft survival for LD KTx were 96.8% and 94.2%, respectively, as compared to 91.5% and 88.7% for DD KTx [8]. These benefits are due to optimized donor selection, shorter ischemia times, and, in the case of related pairs, better immunological compatibility between the donor and the recipient.

Furthermore, living donation provides the ideal setting for pre-emptive transplantation, which is the most effective option for ESRD patients. Indeed, avoiding long-term dialysis is crucial: graft survival at 5 years drops to 58% for those on dialysis for over two years, compared to 78% for those treated for less than six months [9]. A recent meta-analysis showed that the relative risk of death and graft loss is significantly lower in patients who receive a LD pre-emptive KTx compared to those transplanted after starting dialysis [10].

While in some European countries LD KTx represents a high proportion of total annual KTx (45–50% in the Netherlands and 30–35% in the UK), in Italy this option is still underutilized (15–16%) [4, 11]. Besides cultural factors and regional disparities in transplant programs' availability, the main barrier to LD KTx diffusion lies in the logistical and organizational issues required to complete DR assessment. This evaluation is highly demanding, requiring numerous instrumental tests and specialist visits for both the donor and the recipient (Figure 1).

Biochemical analyses	Blood and HLA typing	Echocardiogram	ECG and Cardiological visit	Cardiac provocative test
Coronary angiography	Chest X-ray	Spirometry	Carotid ultrasound	Lower extremities ultrasound
Abdomen ultrasound	Abdominal CT angiography	Gastroscopy	Colonoscopy	Cystography
Urological evaluation	Mammography	Gyneological visit + PAP test	Thyroid and parathyroid ultrasound	Dermatological visit
Dental visit	Oculistic visit	Renal scintigraphy (donor)	Vaccinations	Psychological evaluation

Figure 1. Instrumental tests and specialist visits required for donor and recipient and candidates assessment.

Moreover, this process is lengthened by the need to fulfill multiple steps and timelines dictated by bureaucratic and legal requirements.

A critical concern is that prolonged assessment times often force candidates to start dialysis before the transplant can occur. According to Habbous S. et al [12], among 478 LD KTx candidates, more than one third of patients had to start dialysis during the evaluation process, that took a mean time of 22 months to be completed, as compared to 10 months in patients who were transplanted pre-emptively.

Consequently, implementing organizational models that shorten the time required to complete the clinical work-up of DR represents an urgent need.

In this scenario, our Center developed a Fast-track program (FTp) in 2023, aiming to simplify and uniform the multidisciplinary LD KTx suitability assessment and promote pre-emptive LD KTx.

First, we will describe the entire evaluation process; subsequently, we will focus on the FTp structure and outcomes.

The organizational model for LD KTx suitability assessment

The multidisciplinary team dedicated to LD KTx program is led by a transplant nephrologist and surgeon supported by two transplant nurse managers and administrative staff.

The process starts after receiving via email the proposal for a DR from nephrologists working in the ESRD office or dialysis unit within our facility or external hospitals. After documentation review (medical history, biochemical profiles, donor abdomen ultrasound) within a week, an appointment is provided for a joint nephrological and surgical consultation.

These evaluations are conducted during dedicated clinic days (2-3 per month), which involve 2-3 DR per session, and which are always conducted by the same transplant nephrologist and surgeon. The day begins with a detailed informational session on KTx and LD KTx program, followed by individual visits of each DR for medical history collection, physical examination, and signing of informed consent forms. If no contraindications are found, a first-level immunological compatibility assessment (HLA typing, anti-HLA antibody testing), blood group confirmation, and baseline biochemical and urinary screening are scheduled within a week.

Once initial results are available (3-4 weeks), and if permissive, comprehensive instrumental exams, specialist consultations, and the psychological evaluation of DR are organized. Before the implementation of the FTp, the completion time for these steps at our Centre – without a dedicated schedule – was approximately 2-3 months (traditional protocol).

After obtaining medical, surgical, and psychological eligibilities to LD KTx, second-level immunological testing is repeated. Once results are available (2-3 weeks) and immunological compatibility is confirmed, the evaluation of DR by an independent third-party committee is organized to obtain medical clearance for the transplant. The evaluation sessions take place once a month, and the response is virtually immediate. Following committee approval, the donor candidate must appear before a judge to obtain the necessary legal authorization.

The final step before LD KTx is the anesthesiologic assessment of DR. Transplantation is typically performed in the following days. Figure 2 summarizes all the steps of LD KTx evaluation process.

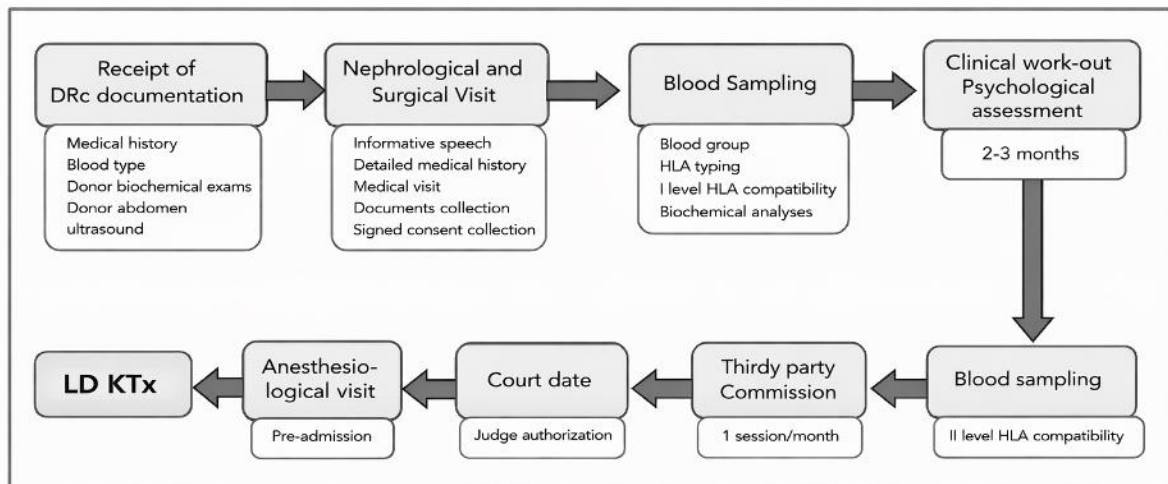


Figure 2. Organizational model for LD KTx suitability assessment.

The Fast-track program (FTp)

Launched in 2023, the FTp optimizes the DR evaluation by concentrating all instrumental tests and specialist visits into a single five-day outpatient window.

Based on the prescriptions provided by the nephrologist, the administrative office schedules all the examinations, Monday through Friday of the same week. For dialysis patients, peritoneal dialysis exchanges or hemodialysis sessions are planned directly in our dialysis unit when needed.

Of note, the couple's psychological evaluation begins during the *fast-track* week, where two meetings are scheduled for the donor and recipient (both as a couple and individually). The psychologist will then assess whether further meetings are necessary before determining the couple's psychological suitability to KTx.

Each DR receives a detailed list indicating the time, location, and contact information for each appointment. Table 1 shows an example of FTp.

Importantly, the nursing and administrative staff are always available to assist the DR during the *fast-track* days. At the end of the week, a "check-out" meeting allows the DR to directly book any additional tests, required in almost 50% of cases, that the various specialists may need, and that will be planned in the next 1-2 weeks. In particular, there are specific schedules dedicated to the transplant evaluation, that permit to obtain additional assessments. This organization gives the DR the opportunity to conclude the program in no more than 3 weeks.

During the *fast-track* week and in the following days, the nephrologist and the surgeon, coadiuvated by the nursing staff, can easily collect all the reports and evaluate together the clinical suitability for LD KTx.

At the moment, potentially all the DR might access to the FTp. Unfortunately, for logistic reasons only two DR per month can be evaluated through this pathway. The priorities are mostly related to the clinical status (pre-emptive first), and to the geographical provenance of the DR (origin outside Lombardy first).

Day of the Week	Time	Medical Service / Procedure	Facility / Location
MONDAY	09:00	Gynecological Visit + Transvaginal Ultrasound + PAP Test	Pad. Mangiagalli
	10:30	Dermatological Visit	Via Pace
	12:00	First Psychological Consultation	Pad. Alfieri (Psychiatry Clinic)
	14:00	First Ophthalmological Visit	Pad. Regina Elena
TUESDAY	10:30	Chest X-ray	Pad. Sacco
	11:40	Upper Abdomen CT Scan (with/without contrast)	Pad. Sacco
	12:30	Thyroid Color Doppler Ultrasound	Pad. Frigerio
	14:00	Simple Spirometry	Pad. De Palo
WEDNESDAY	08:40	Full Abdomen Ultrasound	Pad. Sacco
	11:40	Arterial/Venous Lower Limb & Carotid Color Doppler	Pad. Croff
	11:00	Esophagogastroduodenoscopy & Colonoscopy (with biopsy if needed)	Pad. Ponti
	THURSDAY	09:30	Echocardiogram
10:00		First Cardiological Visit + ECG	Pad. Sacco
12:00		Second Psychological Consultation	Pad. Alfieri (Psychiatry Clinic)
14:00		Bilateral Mammography	Pad. Mangiagalli
15:00		Check-out Meeting	Pad. Mangiagalli
FRIDAY	09:15	Sequential Renal Scintigraphy	Pad. Granelli

Table 1. Example of an FTp for a female kidney donor candidate. The brochure, provided to DR in advance, provides a detailed schedule for each day, including the facility of Policlinico Hospital where the exam is performed and the contact information for the referring physicians.

Fast-track program results

Since its implementation in March 2023, the FTp has significantly optimized the evaluation process for LD KTx at our Center. Between March 2023 and January 2026, twenty-three DR were evaluated using this streamlined protocol. Notably, five of these pairs (22%) came from outside the Lombardy region, highlighting the program's accessibility and regional impact.

The clinical outcomes for these 23 evaluated pairs are as follows:

- Twelve pairs (52%) successfully underwent LD KTx
- Two pairs were enrolled in the National Kidney Paired Donation (“crossover”) program due to HLA incompatibility
- Two recipients received a DD KTx shortly after completing the Fast-track evaluation, while awaiting second-level immunological compatibility results
- Four pairs were deemed ineligible for LD KTx following the comprehensive assessment
- Three pairs are currently undergoing further clinical evaluation.

Table 2 shows the general basal characteristics of 54 DR who completed the pre-KTx assessment through the traditional protocol (Tp) and the 20 DR who were evaluated with the FTp in the period between March 2023 and December 2025.

Table 3 presents the results of the assessments performed with the two different pathways.

	Traditional protocol (Tp)	Fast-track program (FTp)
N. of DR	54	20
Recipient age at first visit, years	36±19	41±25
Donor age at first visit, years	51±10	53±10
ABO compatible (%)	44 (81)	20 (100)
Donor-recipient relationship (%)	Mother (26) Father (24) Wife (21) Husband (21) Other (8)	Mother (15) Father (25) Wife (40) Husband (20)
Pre-emptive at first visit, n (%)	29 (54)	11 (55)
Dialysis vintage at first visit, months	19±40	40±66
Recipient nephropathy (%)	Unknown (15) ADPKD (17) CAKUT (13) IgAN (13) Other (42)	Unknown (25) ADPKD (15) CAKUT (15) IgAN (10) Other (35)

Table 2. General features of 54 DR that were assessed with the traditional protocol and 20 DR that completed the FTp.

	Traditional protocol (Tp)	Fast-track program (FTp)
Studied DR, n.	54	20
LD KTx, n (%)	24 (45)	12 (60)
Months from 1 st visit to KTx Median (25-75 cent)	9 (7-12)	6 (3-10)
Pre-emptive at KTx, n (%)	6 (25)	5 (42)
Months from 1 st visit to LD KTx exclusion Median (25-75 cent)	6 (3-9)	3 (2-5)
DD KTx, n (%)	4 (7)	2 (10)

Table 3. Results of DR assessment with the Tp and the FTp.

At the time of initial consultation, approximately half of all LD KTx candidates in both groups were not on dialysis.

The FTp demonstrated significant logistical and clinical advantages over the Tp:

- **Reduced Time to Transplantation:** The median time from the initial nephrological and surgical consultation to KTx decreased from 9 months (Tp) to 6 months (FTp). Remarkably, 25% of the transplants performed under the FTp (3 out of 12) were completed within just 3 months of the first visit.
- **Increased Pre-emptive Rates:** The percentage of pre-emptive transplants was higher in the FTp group (42%) compared to the Tp group (25%), despite the similar proportion of pre-emptive patients at the first visit.
- **Faster Ineligibility Determination:** For pairs ultimately deemed ineligible for LD KTx, the time to reach an exclusion decision was halved – dropping from 6 months (Tp) to 3 months (FTp). This efficiency allowed eligible recipients to be placed on the deceased donor (DD) waiting list much earlier.
- **Ineligibility Rates:** 40% of DRc studied with FTp were ultimately deemed ineligible, compared to 55% in the Tp group.

Conclusions

The implementation of the Fast-track Program represents a significant paradigm shift in the management of LD KTx.

By addressing the logistical bottlenecks inherent in traditional assessment pathways, this model could achieve dramatic reduction in evaluation timeframes and costs and optimization of pre-emptive KTx.

By simplifying logistic for patients, especially for those coming from distant regions, the FTp could represent a template to improve and uniform LD KTx access. We are evaluating the possibility to offer to the extra region patients low-cost accommodations during the FTp.

Notably, the condensed work-up structure allows the transplant team to easily and rapidly collect reports and elaborate the clinical and surgical suitability judgement.

The limitation of the results presented in this paper certainly is the limited number of DR assessed with the FTp so far. It is important to underscore that the program is actually in a preliminary phase, but the aim for the next future is to increase the number of monthly fast-track assessment, extending the program to patients eligible for pre-emptive DD transplantation and implementing the FTp at a regional and inter-regional level, in order to increase the number of LD and pre-emptive KTx.

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