

## Research Article

# Kidney Transplantation Is The Most Common Form Of Solid Organ Transplantation

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## Abstract

Kidney transplantation is the most common form of solid organ transplantation; the main indication is end-stage renal failure. Absolute contraindications include comorbidities that may threaten the survival of the graft, which can be detected by a thorough examination. Relative contraindications are poorly regulated diabetes, which leads to kidney failure. Patients over the age of 60 can be candidates for transplantation if they are otherwise healthy and functionally independent with good environmental support, if they have a realistically long life expectancy, and if transplantation would significantly improve their functionality and quality of life, and not just free them from dialysis.

## INTRODUCTION

Seventy years ago, end-stage renal disease (ESRD) was a consistently lethal illness [1]. With the coming of the primary fruitful cases of transplantation and the improvement of dialysis, end-stage renal disease was changed into a serious but manageable chronic disease. Transplantation remains the foremost fruitful restorative alternative with predominant persistent survival and quality of life. Tragically, the majority of adults, some 75 %, are never alluded for assessment for transplantation to a great extent since of progressed age and comorbidities. In expansion, holding up times for those patients in great sufficient shape to urge recorded for a transplant are long, possibly 8–10 years, and more patients pass on holding up for a kidney than for liver, heart, and lung combined.

In spite of the fact that dialysis isn't a prerequisite for transplantation posting, the larger part of patients experiencing kidney transplantation are on dialysis by the time they get a kidney. Results of kidney transplantation are contrarily influenced by drawn out periods on dialysis, and preemptive transplantation is related with moved forward persistent and unite survival. Patients can be recorded once their assessed GFR is underneath 20 ml/min/1.73 m<sup>2</sup> and/or in case they can recognize a potential living donor. The pre-transplant assessment prepare can take some time and can delay expansion to the waitlist. As such, early referral is suggested within the setting of chronic kidney disease, particularly in diabetics and those with quick clinical movement to end-stage renal disease. An evaluated GFR less than 30 ml/min/1.73 m<sup>2</sup> has been characterized as the

trigger for assessment in a few teach. A exhaustive pre-transplant assessment is at that point attempted to optimize the patient's condition earlier to transplantation and maximize join and persistent survival as well as quality of life.

Absolute contraindications for kidney transplantation are the inability to tolerate surgery due to severe cardiac or pulmonary disease, active malignancy, active infection, active drug abuse, and uncontrolled psychiatric disease [2].

Relative contraindications are more variable and may differ depending on the institution and geographic region: morbid obesity with a recommended body mass index (BMI) less than 40 kg/m, history of noncompliance with dialysis schedule or medication regimen, frailty, psychiatric problems, and limited life expectancy (defined as less than the anticipated waiting time for a kidney).

Most patients are transplanted after having been built up on support hemodialysis or peritoneal dialysis [3]. More as of late, in any case, numerous patients are being transplanted some time recently they require dialysis. In fact, in case the supply of kidneys were to extend, this alternate route would ended up an progressively common practice. Transplantation some time recently the graduation of dialysis (pre-emptive transplantation) has been convincingly appeared to progress posttransplant persistent and join survival. Since of the changed course of progressed CKD (Chronic Kidney Disease) it is troublesome to supply a exact point when referral for transplant ought to be made. Be that as it may, patients with a glomerular filtration rate

(GFR) within the 20's and patients whose course recommends they will be dialysisdependent in 1 to 2 a long time ought to be alluded.

The choice to put a persistent on the holding up list for a transplant should be made together by the nephrologist and the transplant specialist. All patients with ESRD ought to be considered for kidney transplantation, given no outright contraindications exist. Criteria for acknowledgment were more exacting within the past. Criteria for qualification ought to be straightforward and made accessible to patients and the open; qualification ought to not be based on social status, sexual orientation, race, or individual or open offer. Nowadays, there are few supreme contraindications to a kidney transplantation and numerous of these contraindications are relative.

## Donors

The two sources of kidneys for renal transplantation are living donors and deceased donors [4]. Approximately one-third of patients who are worthy candidates for transplantation will have a willing and restoratively appropriate living donor. ABO-compatible donors are not completely required today since of the accessibility of medications that can reduce the sum of antidonor counter acting agent within the beneficiary. Be that as it may, ABO-compatible givers are enormously favored, since counter acting agent reduction treatments are costly and related with irresistible chance due to the consumption of defensive antibodies.

At one time, as it were related living donors were worthy since it was vital to have closely coordinated HLA antigens between the donor and recipient in arrange to attain worthy join survival rates. The graft survival rate for donor/recipient sets who don't share any HLA antigens is presently more prominent than 90%, driving transplant programs to acknowledge expanding numbers of donors who are not genetically related to the recipients. It is presently common hone to acknowledge volunteer donors who are companions, in-laws, companions, colleagues, and indeed members of the same community who may be as it were associates. More questionable may be a later drift for patients and givers to meet through Internet web destinations. In spite of initial hesitancy to palliate this strategy of finding a living donor, it has been troublesome for the transplant community to form esteem judgments around the relationship between living donors and recipients as long as both parties are completely educated and committed.

Recently, programs have started organizing transplants between two or more sets of living donors and recipients who participate in a paired exchange. Recipients with willing but inconsistent givers are matched with another donor/ recipient match who have the same issue. The result from matched donation transplants has been comparable to that seen with other living donor transplants.

Living donors ought to be in great health both physically and mentally. Over all, the living donor ought to be a volunteer and

must clearly get it the nature of the method so that educated assent to the operation can be given. Givers ought to by and large be of lawful age, but sensible special cases have been made in palliating circumstances, especially when an indistinguishable twin donor is accessible. In these circumstances, it is astute for the program to allot to the donor an exterior advocate who has no relationship with either the recipient or the leftover portion of the family to guarantee that the minor isn't coerced into continuing.

Numerous public entities and organisations have discussed which conditions should be part of a fair living-donor organ and tissue donation and transplant system [5]. More specifically, at the end of the nineties the Convention on Human Rights and Biomedicine established the following regulations:

- Removal of organs or tissue from a living person for transplantation purposes may be carried out solely for the therapeutic benefit of the recipient and where there is no suitable organ or tissue available from a deceased person and no other alternative therapeutic method of comparable effectiveness.

- The necessary consent must have been given expressly and specifically either in written form or before an official body. The human body and its parts shall not, as such, give rise to financial gain.

In 1991, a set of Guiding Principles on Human Organ transplantation was approved during the 44th World Health Assembly. This had an important impact on developing legislations, practices and professional codes within Member States. Almost 20 years later the WHO updated them in the 124th session due to the new challenges brought about by a shortage of organs and due to related ethical issues. The following has been established with regards living donation:

Adult living persons may donate organs as permitted by domestic regulations. In general, living donors should be genetically, legally or emotionally related to their recipients.

Live donations are acceptable when the donor's informed and voluntary consent is obtained, when professional care of donors is ensured and follow-up is well organized, and when selection criteria for donors are scrupulously applied and monitored. Live donors should be informed of the probable risks, benefits and consequences of donation in a complete and understandable fashion; they should be legally competent and capable of weighing the information; and they should be acting willingly, free of any undue influence or coercion.

More recently, given the excellent results from living-donor transplantation between two non-genetically related people and the increasing need for organs, the Committee of Ministers of the Council of Europe (CMCE) allowed kidney transplantation from living donors who are not genetically related to the recipient in their Resolution CM/Res(2008). This is permitted provided that the listed conditions are respected for the given transplant, regulations have put in place in view of prohibiting and preventing organ trafficking, and clearly defined rules have been established for non-residents.

All of the values that must be guaranteed in any type of living-organ and tissue donation programme are given implicitly within these recommendations, i.e. donor's safety, availability of information, donor's decision making ability, altruistic motivation, non-coercion or financial gain, and ensuring free, voluntary and expressed consent.

## Evaluation

Candidates for renal transplantation are assessed broadly to distinguish any restorative or psychosocial variables that will result in an antagonistic result [1]. Patients with ESRD regularly have related comorbidities such as frailty and platelet dysfunction, bone and joint disease, gastritis, gastrointestinal bleeding, ileus, aspiratory edema, pleural emissions, hepatic disorders, and cardiovascular anomalies. Of specific noteworthiness is the impact of ESRD on the cardiovascular framework. Patients experiencing hemodialysis have a cardiovascular mortality rate 30 times that of non-uremic patients. This expanded hazard is credited to expanded atherosclerosis, myocardial infarction, congestive heart failure, dysrhythmias, pericardial effusions, and cardiomyopathy. The nearness of hypertension, hyperlipidemia, and diabetes is additionally common inside this understanding populace. The reason of the pretransplant assessment is to recognize and treat coexisting restorative issues that would increment a patient's morbidity and mortality after transplantation. It moreover distinguishes any psychosocial variables which will have a negative impact on results. These components incorporate any budgetary troubles, uncontrolled mental issues, need of social bolster, and history of therapeutic noncompliance.

The assessment handle starts with a exhaustive history of the patient's renal disease. The etiology and pathology of ESRD can decide the hazard of repeat as well as characterize the related comorbidities that will require advance examination. Other germane data incorporates dialysis status and dialysis get to, urine production, any complications related with dialysis get to, thrombotic events, blood transfusions, and diseases. Besides, it is critical to decide on the off chance that the quiet features a history of earlier transplantation, dismissal scenes, allograft diseases, or noncompliance. Knowing the result of a earlier transplant may be predictive of the result of the ensuing transplant.

Recipient assessment proceeds with an broad survey of the patient's therapeutic history. Usually to recognize advance any chance variables that would anticipate expanded horribleness and mortality as well as any contraindications to transplantation. Of specific significance are cardiopulmonary indications, such as angina, history of myocardial localized necrosis, pericarditis, pericardial effusion, valve disease, and congestive heart failure. Identification of these chance variables will decide the degree of workup vital for cardiac clearance. Cardiac testing incorporates an electrocardiogram, echocardiogram, stretch test, and conceivable coronary angiogram. A history of sort I diabetes would moreover lead to the require for an forceful cardiac workup, given the expanded hazard of noiseless coronary disease. Besides, the

assessment will too incorporate an evaluation of pneumonic, neurologic, psychologic, and urologic side effects. This data will direct the require for additional testing such as aspiratory work testing, voiding cystourethrogram, carotid duplex, and neurovascular imaging. Screening for mysterious danger and asking approximately a history of danger are moreover portion of the method. An irresistible disease profile is gotten to decide introduction and hazard components for tuberculosis, HIV, and hepatitis B and C. Earlier surgeries, drugs, hypersensitivities, and social history are moreover related. By and large, this prepare serves to recognize any conditions that would require encourage examination.

## Surgery

Once the transplant recipient has been chosen, the quiet is conceded and experiences a re-evaluation earlier to continuing with transplantation [1]. The accentuation is to identify any infectious infection or other therapeutic conditions that would ruin goingforward with the transplant. The understanding is additionally assessed for require for dialysis earlier to surgery. Hyperkalemia more prominent than 5.5 mmol/L ought to be adjusted.

Earlier to the patient entering the working room, the kidney must experience a last review and back table preparation to affirm that there's no unreported harm that will influence the reasonableness of the kidney for transplantation. The renal supply route and vein are carefully freed from retroperitoneal fat. Polar supply routes are recognized and reproduced to the primary supply route. Care is taken not to skeletonize the ureter, which may result in urethral ischemia.

This strategy requires common anesthesia, central venous access, and arterial line observing. Preoperative antibiotics are given routinely. After acceptance of anesthesia, a huge Foley catheter is embedded into the urethra. Earlier to cut, immunosuppression acceptance specialists are started. Particular acceptance operators change depending on center inclination but continuously incorporate corticosteroids and frequently an counter acting agent acceptance operator.

The transplant location within the iliac fossa is gotten to through a curvilinear entry point amplifying from the midline suprapubic region to the level of the front predominant iliac spine. The angled muscles are partitioned, clearing out the rectus muscle intaglio. Second rate epigastric vessels are recognized and as a rule partitioned. The peritoneum is at that point mobilized medially to uncover the iliac vessels. The circular tendon in females is ordinarily isolated, whereas the spermatic cord in males is retracted and preserved. The outside iliac supply route and vein are dissected free from the encompassing delicate tissue with ligation of the overlying lymphatics. Once the vessels are completely mobilized, systemic heparin is given in planning for the vascular anastomosis.

The renal vessels are another anastomosed to the outside iliac vessels. Once the anastomoses are completed, the renal

vessels are clamped and blood stream returned to the leg (not each specialist does this). Typically an opportunity for the anastomosis to be tried for spills, permitting the zones to be repaired or changed without comprising the kidney circulation by hindering reperfusion. Once the anastomoses are decided to be palatable, the kidney is at that point reperfused. Satisfactory renal perfusion is accomplished by actuating a mild hypervolemia and hypertension. The objective systolic blood weight is around 120–140 mmHg; this may require the utilize of dopamine and liquid boluses to attain the specified level. Lasix and mannitol are routinely managed to advance pee generation.

After completion of the vascular anastomoses, care is taken to confirm adequate hemostasis. The ureter is at that point arranged for implantation. For the most part, the ureter is spatulated and straightforwardly sutured to the bladder mucosa. This can be taken after by guess of the bladder muscle divider to form a burrow over the distal ureter. Ureteral stents are commonly utilized with the conviction that they may minimize the frequency of pee spills or ureteral stenosis. In spite of the fact that not continuously vital, a retroperitoneal closed suction deplete is set. Hemostasis is once once more affirmed. The wound is carefully closed in layers. The persistent is ordinarily extubated within the operating room and exchanged to the recuperation room or to the ICU (Intensive Care Unit).

## Complications

Patients with low output within the setting of euvolementia, a ordinary ultrasound, and no sign of mechanical hindrance may be showing signs of postponed graft function [1]. Amid this early postoperative period, it is vital to screen for low urine output. Postponed unite work is characterized as the need for dialysis inside the primary week of renal transplantation. This complication is unordinary within the setting of living donor kidney transplantation, with an frequency of 0–5 %. In expired donor transplantation, the rate is detailed to run from 10 to 50 %. In gift after cardiac death, the frequency can extend from 50 to 80 %. Renal function regularly recuperates in most patients but may take as long as a few weeks. The administration requires cautious consideration to fluid adjust and evasion of extra kidney damage, particularly medicate harmfulness. A few creators advocate biopsies to be performed on postoperative day 5 and repeated every 7–10 days until onset of graft function to guarantee that there's no basic dismissal. A longterm impact of deferred join work is an expanded hazard of intense dismissal and higher serum creatinine at 1 year. It has also been related with reduced long-term unite survival.

Wound complications are related with critical dismalness, particularly within the setting of profound wound contaminations. This can be regularly related with boil arrangement and can advance to fascial rot and dehiscence. Wound complications regularly display as seepage. Once distinguished, the wound ought to be open and assessed to run the show out a profound wound contamination. Shallow wound diseases are overseen with local care. Wound dehiscence and profound wound

contaminations will require operating room intervention and surgical administration, as well as intravenous antibiotics on the off chance that signs of sepsis develop.

Acute arterial thrombosis ordinarily happens in less than 1 % of all kidney transplants and amid the primary 24 h posttransplantation. This is often regularly due to a specialized issue or a little embolus coming about in cessation of arterial flow to the unite. Arterial thrombosis ought to be suspected during the quick postoperative assessment when there's an unexpected cessation of urine output in a kidney with an beginning brisk diuresis. The renal allograft can (once in a while) be rescued with quick acknowledgment and reoperation.

Venous thrombosis is thought to happen in 2–4 % of renal transplantations. As a rule the kidney is incapable to be rescued. The thrombosis can (rarely) expand to the outside and common iliac veins and result in profound vein thrombosis and indeed aspiratory embolism. This regularly shows as sudden onset of grisly pee with one-sided swelling of the ipsilateral lower limit. In spite of the fact that it can be analyzed with a Doppler ultrasound illustrating a nonappearance of venous stream and turned around arterial diastolic flow, doubt of venous thrombosis ought to incite a critical return to the working room to endeavor graft salvage. The persistent ought to be made mindful of the probability of a unite nephrectomy in this setting.

A urine leak may happen days or weeks after transplantation. It ordinarily happens at the ureterovesical junction due to rot of the tip of the ureter. It may moreover happen at a burst calyx within the setting of an intense ureteral obstacle. It ordinarily presents with indications of low urine output, lifted creatinine level, lower stomach torment, or suprapubic distress. Diagnosis is recommended by a fluid collection obvious by ultrasound or CT check. The fluid is examined percutaneously and sent for BUN (Blood Urea Nitrogen) and creatinine concentrations to be compared with serum levels. Administration includes situation of a Foley catheter as well as a percutaneous nephrostomy and waste with inside stenting. Spills that fall flat preservationist administration experience agent mediation with reimplantation of the ureter or an ureteroureterostomy to the ipsilateral native ureter.

Ureteral stenosis could be a late complication after transplantation. It ordinarily happens months to years after transplantation. This can be associated with ischemia of the ureter or a tight ureteroneocystostomy. Stenosis presents with raised creatinine and hydronephrosis and is at times related with pyelonephritis. Determination is suggested by the nearness of an hoisted creatinine and moderate-to-severe hydronephrosis. Percutaneous nephrostomy affirms the determination additionally gives treatment through situation of an external drain and inside stenting. This may also serve as a implies to expand the stenosis and resolve the issue; be that as it may, surgery is every so often required for tireless or repetitive stenosis. Agent administration includes either reimplantation of the transplant ureter, ureteroureterostomy to the native ureter, or ureteropyelostomy.

A lymphocele ordinarily presents weeks to months taking after transplantation. It is auxiliary to lymphatic waste from the recipient lymphatics that were dismembered amid the time of surgery. Lymphocele can cause compression of the iliac vein with leg swelling and discomfort and compression of the transplant ureter leading to hydronephrosis and renal dysfunction. Ultrasound assessment will appear a perinephric fluid collection. Percutaneous goal and examination of the fluid for white blood cell check differential, BUN, and creatinine will recognize the fluid as lymphatic in nature. Administration is by means of intraperitoneal seepage with marsupialization of the lymphocele, either laparoscopically or with an open approach. Care is taken to maintain a strategic distance from harm to the allograft renal collecting system and allograft ureter. Percutaneous waste could be a plausibility, but it is related with a lower rate of victory and a better hazard of disease.

### Graft Failure

After transplantation, prolonging kidney graft survival gets to be the objective of care [6]. Expanding long-term graft survival would diminish the number of retransplantations, decrease patients returning to dialysis, and so increment accessible kidneys to those anticipating to begin with transplantation.

Passing is the driving cause of unite failure. Specifically, cardiovascular disease is the foremost common cause of passing with a working graft. Person hazard variables such as obesity, hyperlipidemia, hypertension, and diabetes are exceedingly predominant in kidney transplant beneficiaries coming about in aggregate burden over time. In this manner, pharmacologic and nonpharmacologic intercessions such as exercise, weight misfortune, and dietary limitations are prescribed. In expansion, all adults and young people are prescribed to be screened for dyslipidemia frequently and after adjusting immunosuppressive solutions. Graft failure due to dismissal is additionally a major donor to unite disappointment, and subsequently the rummage around for more current modalities of screening and treatment is ongoing. Many immunosuppressive operators have well-described side impacts, counting cyclosporine; in any case, it isn't a major supporter to unite disappointment. BK nephropathy could be a complication due to BK infection infection in transplant patients overseen with viremia screening and immunosuppression diminishment. Be that as it may, most BK nephropathy happens ordinarily inside the primary 1–2 a long time of transplant.

Retransplanting, particularly preemptively after graft failure, encompasses a comparative survival rate compared to to begin with transplantation and less unfavorable results such as intense dismissal, deferred graft functioning, and death with functioning graft when compared to patients who experience retransplantation after a period of dialysis. Reinitiation of dialysis is an choice for patients in prompt require or those not a candidate for retransplantation. Be that as it may, restarting dialysis after unite disappointment has appeared to have the next mortality hazard compared to retransplantation. Immunosuppression

administration is challenging after allograft failure. For patients arranging on retransplantation, maintenance of low dose immunosuppression is suggested for the hazard of de novo allosensitization. Be that as it may, in patients with noteworthy comorbid conditions and ineligibility for retransplantation, immunosuppression withdrawal ought to be considered.

Patients with previous sensitization events against anti-human leukocyte antigens (HLA) often have circulating anti-HLA antibodies [7]. Following organ transplantation, sensitized patients have higher rates of antibody-mediated rejection (AMR) compared to those who are non-sensitized. More stringent donor matching is required for these patients, which results in a reduced donor pool and increased time on the waitlist. Current approaches for sensitized patients focus on reducing preformed antibodies that preclude transplantation; however, this type of desensitization does not modulate the primed immune response in sensitized patients. Thus, an optimized maintenance immunosuppressive regimen is necessary for highly sensitized patients, which may be distinct from non-sensitized patients.

Advancements have led to increased availability and efficacy of immunosuppressive agents, and current 1 year graft survival is 98% with living related donor and 94% for deceased donor kidney transplantation. However, patients with pretransplant positive cytotoxic crossmatch and DSA have shown as high as 70% of graft failure with acute AMR and approximately 50% of grafts loss by 1 year post-transplant. Immunosuppressive strategies for sensitized patients are largely borrowed from those used in non-sensitized patients. However, variability in outcomes reveals the insufficiency of current immunosuppressive regimens in sensitized patients. Sensitized patients with a negative crossmatch (no donor-specific antibody) showed comparable graft survival to non-sensitized patients in the current organ allocation system even though these patients might have individual center-driven immunosuppressive regimens which are different from non-sensitized patients (i.e., thymoglobulin with higher Tac trough level, etc.). However, immunologically high-risk transplants occurring in sensitized patients, particularly for crossmatch positive, incompatible transplants, require enhanced immunosuppression. Innovation in this field has largely focused on 'desensitization' prior to transplantation, or early post-transplant therapies to reduce the risks of acute antibody-mediated rejection (AMR); however, there has been little examination of the optimal maintenance regimen post-transplant. Furthermore, even with currently available desensitization therapies, both acute AMR and acute cellular rejection (ACR) rates were significantly higher in sensitized/desensitized patients compared to non-sensitized patients. Recently, changes in deceased donor allocation in the US in particular, as well as improvements to living kidney donor sharing schemes, have demonstrated that fewer sensitized patients require the need for cross-match positive living transplantation. Nonetheless, patients with pretransplant or de novo donor-specific antibody (DSA) are at greater risk of graft rejection.

## Goals

Kidney transplantation makes strides quality of life and length of life and costs less than dialysis [8]. In any case, comparing results for transplanted patients to the common dialysis or wait-listed populace isn't perfect, since there are survival and determination inclinations. Less than half of patients on dialysis are considered for transplantation; <3% of dialysis patients more than 70 years old are on the transplant holding up list, and most more seasoned patients who are on the list will either die or be removed from the list some time recently getting a transplant. The method of choice is an fundamental but tricky action. Most rules have centered on evaluation, leaving patient choice to a center's discretion.

Organ allocation approaches recognize the ought to discover a adjust between clashing objectives. Objectives of determination incorporate the taking after: 1) maximize understanding and unite survival, 2) minimize incongruities in holding up time, 3) minimize deaths while waiting, and 4) maximize opportunity. Accomplishing uniformity may diminish utility. Endeavors to minimize deaths on the list by performing transplants within the elderly will restrain the capacity to maximize survival by transplanting in more youthful patients. These competing objectives are the root of the trouble in characterizing determination criteria. One compromise is to restrain transplantation to patients with sensible life hopes who are likely to live past current waiting times.

## CONCLUSION

In the first year, the survival rate for transplants from a living donor is 98% for patients and 94% for transplants, while for transplants from a deceased donor, the survival rate is 94%

and 88%, respectively. The annual rate of graft loss after the first year ranges from 3–5% for grafts from a living donor, and 5–8% for grafts from a deceased donor. Among patients whose graft survives the first year, half die of some other cause with preserved graft function, and the other half develop chronic nephropathy with gradual loss of graft function over 1–5 years.

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