

Patient Questions About Transplantation: A Resource Guide



Clara D. Neyhart

Nurses and other staff in dialysis units are often the primary resource for patients on dialysis to obtain their healthcare information. Kidney transplantation is the preferred renal replacement therapy for many patients, but dialysis staff members are often uncomfortable or unable to answer questions related to transplant evaluation, surgery, medications, potential complications, and patient responsibility. Dialysis units are usually physically removed from transplant centers, and patients may not understand how to obtain information regarding transplantation. Nurses and other staff in dialysis units should be able to address general questions related to transplantation so patients receive consistent information that is repeated over the course of time.

The commitment to transplantation is significant for the potential recipient in terms of time, education, and self-care behavior. Continuous, consistent pre-transplant education will best prepare the patient for a successful transplant experience. Patients who are referred for transplantation receive a high volume of information in visits to the transplant center, which is compressed into a short time and may be forgotten or misunderstood. Patients on the transplant waiting list and/or preparing for live kidney donor transplantation have limited interaction with the transplant center prior to transplant. Optimal pre-transplant education therefore requires a collaborative effort between staff members of the dialysis unit and the transplant clinic.

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Patients with chronic kidney disease who are on dialysis may ask questions related to kidney transplantation. Comprehensive patient education prior to transplantation empowers patients with knowledge about all aspects of care that are crucial to the success of the transplant. Patients who receive extensive education about medications, monitoring, and responsibilities related to kidney transplantation are more likely to succeed with self-management after transplantation. Nurses and other staff in dialysis units do not always have the resources to answer questions about transplantation. This article is designed to serve as a resource guide to assist them in answering patient questions related to transplant evaluation, transplant medications, complications of transplantation, and the responsibilities of the kidney transplant recipient.

Goal

To provide a resource guide to assist nurses and other dialysis staff in answering patient questions relating to transplant evaluation, transplant medications, complications of transplantation, and responsibilities of the kidney transplant recipient.

Objectives

1. Explain how transplant candidates are medically evaluated and chosen for kidney transplant.
2. Describe the process of how donor kidneys are selected.
3. Discuss the various immunosuppressant medications used for post-transplant kidney patients and their side effects.
4. Define rejection of a transplanted organ.
5. Explain the overall long-term care of the transplanted kidney.

The purpose of this article is to provide answers to a variety of frequently asked questions about transplantation from patients on dialysis. The goal is to provide a basis for conversations that will be continued in more detail with the transplant team. Included in this discussion are components of the pre-transplant recipient evaluation; medication purpose, side effects, and cost; acute and chronic rejection diagnosis and treatment; and patient commitment for successful transplantation.

Who Is a Transplant Candidate?

The question of who is eligible for transplantation requires consideration of physical, psychological, and financial components. Insurance companies vary in their coverage regulations, but patients are generally eligible for activation on the waiting list and/or to receive a live donor transplant at a creatinine clearance of 20 ml/minute. When patients are referred for transplantation, the first step at the transplant center is to determine the financial coverage reg-

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ulations that apply for the individual. The point at which insurance companies allow the evaluation to start may vary, as well as when donors may be evaluated. Patients who are already on dialysis simply need a referral to the transplant center, and the transplant center will start the evaluation as soon as financial coverage for transplantation and immunosuppressive medications is established.

The majority of transplant centers require a plan for how the patient will obtain the medications, which can cost over \$1000/month. Medicare covers 80% of the cost of medications, but Medicare coverage for immunosuppressive medications currently expires after 3 years. Secondary insurance will often cover the 20% left to the patient and will become primary when Medicare benefits expire (Morrison, 2008). However, if the patient has no secondary insurance, thought must be given to how the patient will cover the 20% co-pay for medications. Medication non-adherence is a frequent cause of graft loss, so the patient really needs to think ahead about how to cover the cost of medications over the long term.

Physically, patients must be free of any major medical or psychological contraindications for elective surgery. Active infection or cancer, severe cardiovascular disease that greatly increases the risk of morbidity or mortality, and significant psychological disorders that inhibit the patient's ability to care for and monitor the transplanted organ are some of the relative contraindications to transplantation. However, many of these problems may resolve or improve over time to the point that a patient may once again become a candidate for transplantation. There is no particular age limit for kidney transplantation because the physiologic age is more pertinent than chronological age (Kahan & Ponticelli, 2000; Steinman et al., 2001). The transplant center's responsibility is to evaluate the patient as a potential transplant recipient and determine if the patient is presently a candidate, possibly a candidate in the future, or if there are

any absolute contraindications that preclude transplantation.

What Do I Have to Do to Get a Kidney?

The purpose of the medical evaluation is to search for any evidence of medical conditions that will increase the risk of adverse events or complications during surgery or post-operatively. A kidney transplantation is an elective procedure; the goal is to determine, as much as possible, that the patient is likely to survive general anesthesia without cardiovascular, pulmonary, or other life-threatening event. Maximizing physical condition pre-transplant is likely to decrease complications post-transplant.

Infections should be resolved prior to transplantation. Patients are usually deferred for transplant if they are receiving intravenous antibiotics at the time of surgery. Chronic infections require evaluation by an infectious disease specialist to avoid exacerbation of the infection with use of potent immunosuppressive medications (Alleman & Longton, 2008; Steinman et al., 2001).

Malignancies require individual consideration. Metastatic cancer is always a contraindication to transplantation. Recommendations vary from transplant center to transplant center, but patients must usually be cancer-free for 5 years following major organ cancers, such as breast cancer, colon cancer, or melanoma. Patients with skin cancer that is easily treated may only require dermatology clearance. Renal cell cancers will require removal of the affected native kidney. The goal is to avoid progression of cancer due to immunosuppression (Kahan & Ponticelli, 2000; Steinman et al., 2001).

Cardiovascular disease is fairly universal among patients on dialysis, and there is variability in the cardiac evaluation among transplant centers. Most centers will require cardiac stress tests for patients who have diabetes, have longstanding hypertension, or are over 50 years of age. Younger patients with hypertension

often undergo an echocardiogram but not necessarily a stress test. Patients should understand that control of blood pressure and diabetes is very important to maximize the potential for successful transplant. The goal of the cardiovascular evaluation is minimizing cardiac risk during and after surgery, and to maximize cardiac health prior to surgery. Heart disease is a concern for any patient with end stage renal disease (ESRD) interested in transplantation, but particularly for patients with diabetes. At most transplant centers, all patients with diabetes undergo some sort of stress testing, usually an adenosine or other chemical stress test, to rule out ischemic heart disease. Stress echocardiograms are also performed in many patients as a screening test during transplant evaluation. Some patients may even require coronary artery bypass graft surgery prior to kidney transplantation. The transplant center will often request a cardiology evaluation to help determine the risk-benefit ratio of kidney transplantation for an individual patient (Aalten et al., 2008; Danovitch, 2005; Steinman et al., 2001).

In addition to coronary vessels, some patients will have evaluation of other vasculature, such as the iliac vessels, where the transplanted organ will be anastomosed. In particular, patients with diabetes may have significant vascular disease that precludes transplantation. Previous amputation of a limb does not preclude transplant, but it does suggest further study of the vessels used in transplantation is warranted (Alleman & Longton, 2008; Kahan & Ponticelli, 2000).

Pulmonary disease is not usually a contraindication unless it is so severe that intubation and general anesthesia present a significant risk. Extremely severe chronic obstructive pulmonary disease or severe pulmonary hypertension may be barriers to transplantation. Smoking cessation is greatly encouraged to decrease complications. Some transplant centers require smoking cessation prior to transplantation (Steinman et al., 2001).

Gastrointestinal disease is a barri-

er to transplantation if medication absorption is greatly affected, or the patient is malnourished or has chronic and severe gastrointestinal bleeding. In addition, liver disease, such as hepatitis B, may preclude kidney transplantation. Patients with hepatitis C may require liver biopsy to determine the severity of liver disease, particularly if combined liver-kidney transplant is being considered. Any patient with liver disease will require hepatology evaluation to determine the extent of the disease and the risk associated with significant immunosuppression (Danovitch, 2005; Steinman, et al., 2001).

Any medical condition that may affect the success of the surgery, increase the risk of complications, or cause increased risk to the recipient in the setting of potent immunosuppression is examined carefully. Kidney transplantation is an elective procedure, so the transplant team evaluates the likely benefit and risk to the patient's medical condition and quality of life. Once a patient is considered a transplant candidate, attention turns to the potential kidney donors for the patient.

Where Will My Kidney Come From?

Kidneys for transplantation come from either live or deceased donors. Live donors may include family, friends, in-laws, and unrelated people. The importance of tissue matching has diminished over time as more potent and reliable immunosuppressive medications have been developed. Any healthy person who is willing to donate a kidney without compensation or coercion is a potential donor. Kidney donors may not have any history of renal disease, hypertension, diabetes, or other major medical or psychological conditions. Most transplant centers prefer donors over 21 years of age and able to be absent from work for 6 to 8 weeks following surgery. Transplant centers are careful to protect the health of the donor and avoid a conflict of interest by having different physicians evaluate the donor and recipient. Donors are evaluated by a healthcare

provider who is trained in psychological evaluation. The purpose of the psychological evaluation is to determine that the donor truly desires to donate a kidney and that there are no underlying psychological conditions that will affect the donor's response to surgery, possible complications, home life, and time away from work.

Anonymous donation and donor exchange programs are gaining popularity among transplant centers. Anonymous donors are screened as carefully as donors who have a relationship with the recipient. Donor exchange programs involve a situation where an otherwise acceptable donor #1 has a blood type discrepancy with the donor's intended recipient and a second donor-recipient pair has the same discrepancy. If donor #1 has an acceptable blood type for recipient #2, and vice versa, the donors can be exchanged between recipients. These are two more recent strategies used to increase live donation (Alleman & Longton, 2008; Delmonico et al., 2004).

The wait for a deceased donor kidney from the waiting list is increasingly long. Most centers have a waiting time of 3 to 5 years or longer. There is not an "order" to kidney transplant waiting lists. Kidneys are offered to transplant centers through organ procurement agencies at the direction of the United Network for Organ Sharing (UNOS). The offers are based on complex algorithms that take many factors into consideration, including waiting time. The algorithms are designed to maintain fairness of kidney distribution (UNOS, 2008). With waiting times for deceased donor kidneys as long as they are, patients should be encouraged to consider as many potential live donors as possible. It is helpful for patients to discuss how they might go about wording a request from a friend or relative for a kidney.

How Will I Pay for a Transplant?

The cost of transplantation includes more than many patients realize, and Medicare and/or private

insurance do not cover all expenses. There are costs associated with transplant evaluation, surgery, and post-operative care; outpatient clinic and laboratory fees; medications; and readmissions to the hospital. At most transplant centers, patients visit a financial counselor before the transplant evaluation begins to determine the plan for covering all costs associated with transplantation. Before accepting a deceased donor kidney or having a live kidney donor undergo major surgery, it is important to have a plan for caring for the kidney. Covering costs such as medications is part of maintaining a transplant, and patients need to understand this commitment. Medicare will cover 80% of the cost of immunosuppressant medications for 3 years. Most transplant centers have a financial assistance program for indigent patients, and some help is available based on income from pharmaceutical companies with assistance programs. Some patients participate in fund raising before transplantation, but for other patients, transplantation may mean a lifestyle change or looking carefully at their budget. The goal is for patients to return to work if at all possible and to pay for the medications through insurance from employment (Morrison, 2008; Steinman et al., 2001).

What If I Have Diabetes or a Bad Heart?

Diabetes is currently the leading cause of kidney disease, and having diabetes does not preclude transplantation. However, poorly controlled diabetes can lead to vascular disease, which may rule out transplantation for a patient who has no healthy vessels to perfuse a transplanted kidney. In addition, patients with poorly controlled diabetes are far more likely to become infected, which may also rule out a transplant. Therefore, the best advice for patients with diabetes and ESRD is to maintain controlled blood sugar as well as possible (Alleman & Longton, 2008; Lerner, 2008; Steinman et al., 2001).

Patients who have significant heart

disease will be evaluated by a cardiologist who will help determine the risk of transplant surgery. A cardiologist will also consider whether medications or other therapy would be useful in maximizing heart function prior to transplantation.

Who Is Not a Candidate for Kidney Transplantation?

Transplant centers vary with regard to absolute contraindications to transplantation. Generally speaking, the usual contraindications to kidney transplantation include:

- Ongoing, recurrent infection.
- Metastatic cancer.
- Cardiac or pulmonary conditions that put the patient at serious risk from general anesthesia.
- Medical conditions where quality of life is unlikely to be improved with transplantation.
- A long pattern of non-adherence to the medical regimen.
- Active substance abuse.
- Morbid obesity (Alleman & Longton, 2008; Kahan & Ponticelli, 2000; Steinman et al., 2001).

What New Medicines Will I Take In the Hospital When I Have My Transplant?

Patients who have a kidney transplant receive many new medications while hospitalized. Immunosuppressants, designed to prevent organ rejection, are categorized as either induction or maintenance medications. Induction therapy includes powerful immunosuppressive medications given specifically at the time of transplantation to block immune pathways that lead to rejection of the transplanted organ (Kahan & Ponticelli, 2000). Transplant centers vary in the type of induction therapy used. Some examples of induction immunosuppression include Thymoglobulin[®]; basiliximab (Simulect[®]); daclizumab (Zenapax[®]), alemtuzumab (Campath[®]), and corticosteroids. Maintenance immunosuppressants are the medications taken long-term, everyday, to prevent rejection. Patients are typically prescribed

two or three maintenance immunosuppressant medications depending upon their situation. These medications include tacrolimus (Prograf[®]), cyclosporine (Neoral[®]), mycophenolate mofetil (Cellcept[®]) or mycophenolic acid (Myfortic[®]), sirolimus (Rapamune[®]), and corticosteroids. The precise protocols vary greatly between transplant centers, but usually patients take combinations of either tacrolimus or cyclosporine and mycophenolate; sirolimus and mycophenolate; sirolimus and low dose tacrolimus; or any of these combinations with the possible addition of prednisone. Immunosuppressant medications and dosages are individualized (Alleman & Longton, 2008; Danovitch, 2005; Golshayan & Pascual, 2008; Kahan & Ponticelli, 2000).

The main teaching points for patients regarding maintenance immunosuppression are:

- These medications have to be taken everyday for the life of the kidney.
- Skipping or “stretching” medications may result in rejection of the kidney.
- The dose of medications tends to decrease after the first year of transplant, so adverse effects may also decrease.
- Many transplant centers use steroid-free protocols but not for all patients. Patients who have required steroids prior to transplantation may still require them after transplantation. Patients should understand that they may be on different medications and different dosages than other patients.

What Other Medications Will I Have to Take after I Go Home From a Transplant?

In addition to immunosuppressive medications that must be taken for the life of the kidney, there are other medications commonly prescribed for patients who receive kidney transplants. Antiviral and antibiotic medications are often prescribed for the first few months post-transplant to prevent opportunistic infections during the time of highest immunosup-

pression. Many patients require anti-hypertensive medication following transplantation. In addition, medications to protect the stomach, such as proton pump inhibitors, are frequently included in the post-transplant regimen. However, many medications prescribed in the immediate post-transplant period may not be necessary for the very long term. Medications should be reviewed by the patient regularly with the transplant team to determine necessity (Alleman & Longton, 2008; Danovitch, 2005).

What Side Effects Will the Medications Cause?

It is important for patients to understand that everyone tolerates medications differently, and while adverse effects of immunosuppressive medications are common, they are not universal. Adverse effects may be grouped by medication type. Tacrolimus and cyclosporine belong to a group of medications called calcineurin inhibitors. These medications are most noted for their neurotoxicity, which may be manifested by tremors, headache, decreased ability to focus, peripheral neuropathy particularly of the feet, and feeling “jittery.” Cyclosporine is also associated with hypertension, hirsutism, hyperglycemia, and gout. Tacrolimus is associated with alopecia and hyperglycemia. Both medications may cause nephrotoxicity, and blood levels are measured on a regular basis.

Sirolimus has a different profile, with the most common adverse effects being impaired wound healing, peripheral edema, hypertension, thrombocytopenia, anemia, hyperlipidemia, and dyspnea. Corticosteroids are well known for causing Cushing’s syndrome, acne, impaired wound healing, sodium retention, hypertension, and hyperglycemia. Mycophenolate is associated with gastrointestinal distress and bone marrow suppression. Leukopenia is common (Alleman & Longton, 2008; Danovitch, 2005; Golshayan & Pascual, 2008; Kahan & Ponticelli, 2000).

How Long Will I Have to Take Medications after Transplantation?

Immunosuppressive medications must be taken for the life of the transplanted organ. Patients sometimes have the misconception that they will develop tolerance and not require immunosuppression after a period of time. One of the most common causes of organ rejection is medication non-adherence. Rejection may occur with no symptoms and not become apparent until significant renal function is lost.

What Is Rejection?

While a detailed explanation of rejection is not necessary prior to transplantation, patients should understand the basic elements of rejection. Rejection is the body's attempt to destroy a "foreign" tissue, in this case, a transplanted kidney, through the action of the immune system. Destruction of the renal transplant occurs through specific direct attack by cells within the immune system and production of antibodies to the foreign tissue. This process may occur in response to inadequate immunosuppression but not necessarily because the patient is not taking medications as prescribed. Rejection can occur when a patient is infected and the immune system is stimulated. Sometimes rejection occurs without obvious cause. Rejection is classified as acute or chronic. Acute rejection most commonly occurs within days or weeks of the transplant, although it may occur later. Acute rejection is often reversible. Chronic rejection occurs over a long period of time, with poorly understood causes, and is not treatable. It is one of the more common causes of long-term transplanted kidney loss. The diagnosis of rejection is confirmed by kidney biopsy, and the treatment depends upon the severity of the rejection (Alleman & Longton, 2008; Danovitch, 2005; Golshayan & Pascual, 2008; Kahan & Ponticelli, 2000).

How Will I Feel If I Have Rejection?

Some patients have no physical symptoms of rejection, which is why

regular laboratory work to evaluate kidney function is so important. Symptoms of rejection may include fever, pain over the transplanted kidney, decreased urine output, increased fluid retention, and general flu-like symptoms (Alleman & Longton, 2008; Kahan & Ponticelli, 2000).

What Medicines Would I Take to Treat Rejection?

Potent immunosuppressive medications are used to treat rejection. This may include corticosteroids, Thymoglobulin®, pooled immunoglobulin, and rarely, OKT3. There are other antibody preparations that target B-cells being used in clinical trials as well. These therapies involve a hospitalization and are all intravenous therapies. Sometimes after an acute rejection episode, a patient's maintenance immunosuppression may be altered (Alleman & Longton, 2008; Danovitch, 2005; Golshayan & Pascual, 2008).

Will I Lose the Kidney if I Have Rejection?

Some kidney transplants are lost each year to acute rejection episodes, although most episodes are treated and kidney function is preserved. The degree of recovery of kidney function varies. The concern about acute rejection episodes, even when treated successfully, is that long-term kidney survival is affected by acute rejection. Severe irreversible damage to the kidney can occur with acute rejection episodes. In addition, stimulation of the immune system from acute rejection is associated with a higher risk of chronic rejection and with poorer long-term graft survival (Kahan & Ponticelli, 2000).

How Often Will I Have to Come to Clinic after Transplant?

Frequency of post-transplant clinic visits is a center-specific protocol and is based on whether there are complications and how well the patient appears to handle self-management. However, laboratory studies are performed more

than once a week initially at most centers. Many centers begin with thrice weekly laboratory studies and then taper over many months to monthly studies. The frequency of laboratory studies depends upon whether acute rejection occurs, the presence of other complications, and how easily medication steady states are reached for the immunosuppressants. Several medications require trough levels to achieve a steady state. The purpose of clinic visits is to assess for complications and self-management skills.

What Do I Need to Do to Take Care Of My Kidney Every Day?

Patients should be taught that the three main components of caring for a kidney transplant on a day-to-day basis involve taking medications as prescribed, coming to clinic appointments, and calling the transplant team with any unusual symptoms or signs of illness. Understanding the purpose of medications, the correct dose, and when to take them is also important. Patients should also monitor and record vital signs, and monitor glucose if they have diabetes and urine output. Important self-management skills include keeping track of laboratory values and learning what the values mean. Finally, keeping track of medications and calling for refills before running out of medication is also essential.

What about Long-Term Care of the Transplant?

A large part of taking care of a kidney transplant falls under health maintenance. Adequate rest, a healthy diet, and regular exercise go a long way in preventing complications. Any patient who smokes should stop. All methods of smoking cessation are acceptable in kidney transplant recipients. Cancer prevention is important because a compromised host is more susceptible to malignancy and more difficult to treat.

Skin cancer is the most common form of cancer in transplant recipients. Sun screen and avoiding long sun exposure is essential. Transplant cen-

ters usually recommend at least annual screening by a dermatologist. Proper dental care is very important because mouth infections may lead to systemic illness, which can be very serious in patients who are immunosuppressed. Just as in the general population, pap smears and mammograms in women and prostate specific antigen measurement in men are recommended. All patients over 50 years of age should have a screening colonoscopy and then follow the individual recommendation. Transplant centers usually obtain annual bone density studies in addition to ultrasound examination of the native and transplanted kidneys. Ultrasound is used to detect cystic changes in native kidneys that may lead to malignancy. In the transplanted kidney, ultrasound is used to detect fluid collections, masses, calculi, or hydronephrosis. Resistive indices are measured in the blood vessels perfusing the kidney to detect changes suggestive of stenosis or rejection (Alleman & Longton, 2008; Danovitch, 2005; Kahan & Ponticelli, 2000).

Who Do I Call If I Get Sick?

Patients should always call their transplant center for any concerns, particularly in the first year. The transplant team may redirect the patient to a primary care provider, but transplant patients require very complex care, and many primary care providers would prefer the transplant center tend to any significant illness. Not all commonly used medications are acceptable in patients with a kidney transplant, and dose adjustment must be made for renal function. For example, a patient may have a creatinine of 1.3 mg/ml but a creatinine clearance of only 50%.

Some transplant centers will relinquish all usual care to a primary provider, but any major concerns warrant a phone call to the transplant team. The transplant team will explain to patients upon discharge from the hospital who the patient should call for various concerns.

When Do I Call the Transplant Team?

Any concerns regarding illness, medications, or new symptoms should prompt a call to the transplant team. The following symptoms should be reported urgently:

- Fever, particularly with chills.
- Vomiting or diarrhea longer than 24 hours.
- Decrease in urine output.
- Sustained rise in blood pressure of more than a week.
- Persistent and/or productive cough.
- New shortness of breath or decreased exercise tolerance.
- New onset pain.
- Any other new symptoms that are affecting daily functioning.

When Do I Go to the Emergency Room?

Chest pain, sudden rise or fall in blood pressure, severe pain, or any symptom that is becoming worse or demands immediate attention requires a visit to the local emergency room. Emergency room physicians can call the transplant team for guidance if necessary.

Summary of General Points to Teach Patients on Dialysis about Transplantation

All patients with a creatinine clearance of less than or equal to 20 ml/minute may be referred for transplant, although referral does not mean that a patient is listed or ready for transplantation. A thorough evaluation will be done by the transplant center to determine if the patient is physically, psychologically, and financially cleared for transplant. Kidney donors may be live or from the deceased donor waiting list; however, live donation is always preferable because the transplant usually occurs more quickly and in a controlled setting. Transplant recipients have the primary responsibility for:

- Taking medications as prescribed, with a plan to pay for them.
- Attending clinic visits, monitoring

their own health, and calling for concerns.

- Recognizing signs and symptoms of infection and rejection, and reporting them.

The goal of transplantation is independence from dialysis, self-management, and return to work. It should be remembered that disability is for those patients unable to work, rather than those choosing not to work. Patients should expect that transplantation brings with it an expectation to be as independent as possible, which requires commitment and responsibility. Transplantation is a great treatment modality for many, but it is not a cure and can, in fact, create a new set of problems. Patients who seek transplantation should commit themselves to a positive attitude and a plan for self-management.

Conclusion

Transplantation is a good treatment option for many patients receiving dialysis. Pre-transplant patient education related to transplantation occurs over a long period of time, and patients may need to hear information more than once to be fully informed. Patients who are well informed before transplantation are likely to be successful at managing their health after transplantation. Nurses and other staff members in dialysis units are in an excellent position to address questions about transplantation, medications, possible donors, the transplant waiting list, and related topics. Patients may feel most comfortable talking with nurses in their dialysis unit about transplantation in small increments over time. This article serves as a starting point to answer frequently asked questions about transplantation. Further information can be obtained from transplant coordinators at local transplant centers, the American Nephrology Nurses' Association Transplant Special Interest Group, the International Transplant Nurses Society, the National Kidney Foundation, and the United Network for Organ Sharing.

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Patient Questions about Transplantation: A Resource Guide

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GOAL

To provide a resource guide to assist nurses and other dialysis staff in answering patient questions relating to transplant evaluation, transplant medications, complications of transplantation, and responsibilities of the kidney transplant recipient.

Please note that this continuing nursing education activity does not contain multiple-choice questions. This posttest substitutes the multiple-choice questions with an open-ended question. Simply answer the open-ended question(s) directly above the evaluation portion of the Answer/Evaluation Form and return the form, with payment, to the National Office as usual.

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2. By completing this offering, I was able to meet the stated objectives
 - a. Explain how transplant candidates are medically evaluated and chosen for kidney transplant.
 - b. Describe the process of how donor kidneys are selected.
 - c. Discuss the various immunosuppressant medications used for post-transplant kidney patients and their side effects.
 - d. Define rejection of a transplanted organ.
 - e. Explain the overall long-term care of the transplanted kidney.
3. The content was current and relevant.
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b.	1	2	3	4 5
c.	1	2	3	4 5
d.	1	2	3	4 5
e.	1	2	3	4 5
3.	1	2	3	4 5
4.	1	2	3	4 5

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