

**Special Article****Care of Elderly Renal Recipients****Semiha Akin**

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**Abstract**

The growing numbers of elderly transplant recipients reveal the need for developing multi-dimensional evidence-based strategies for the improving the success of kidney transplant procedure. This review summarizes the care needs and interventions of elderly transplant recipients that improve the quality of life and prevent complications following kidney transplantation. The risk of acute rejection among kidney transplant patients has been reported to decrease with increasing recipient age. However, the risk of developing chronic allograft nephropathy in elderly kidney transplant patients was reported higher, compared to younger kidney recipients. Elderly kidney transplant recipients encounter problems due to aging, surgical procedure and immunosuppression. Elderly transplant recipients face an increased risk of infection, malignancies, and the higher incidence of chronic rejection. Comorbidities in elderly kidney transplants contribute to high incidence of transplant-associated perioperative complications and long-term negative outcomes. Kidney transplant patients need psychological and social support and strategies for improving the adherence to medical regimen outcomes to manage with the side effects of immunosuppression and the risk of developing chronic allograft nephropathy. The monitoring and family-patient education are crucial for the prevention of graft rejection, management of infections and malignancies associated with immunosuppression and improving the transplant outcomes. Nurses are required to prioritize the care needs of elderly kidney transplant recipients and to reinforce the personalized nursing care interventions for these patients. Despite the burden of comorbidities among elderly kidney transplant recipients, the quality of life and transplant outcomes may improve through vigorous recipient selection, careful assessment, personal immunosuppression, and close monitoring.

**Keywords:** care, elderly, renal recipients, transplant.

**Transplantation in Elderly**

The older population is growing dramatically worldwide. World Health Organization reports that the proportion of the world's population over 60 years will nearly double from 12% to 22% between the years 2015 and 2050 (WHO Ageing and health, 2018). The number of older patients on the waiting lists for transplantation is increasing rapidly over the last two decades (Randall et al., 2003; Keith, 2013; Sørensen, 2015). Besides, benefits of transplantation, elderly patients are more susceptible to

transplant-associated complications due to age-related immune dysfunction and immunosuppressant agents. The growing numbers of elderly transplant recipients reveal the need for developing multi-dimensional evidence-based strategies for improving the success of the transplant procedure. This review aims to summarize the care needs of elderly transplant recipients and interventions that improve the quality of life and prevent complications following transplantation. The literature was reviewed to highlight the care needs of elderly transplant recipients.

## Benefits of Transplantation

Transplantation is a successful treatment modality in older recipients. It has been shown to be superior to symptomatic approaches. For example, kidney transplantation improves patient survival over remaining on dialysis (Heemann & Renders, 2015).

Benefits of transplantation are closely related to the selection of the recipient, donor, and management of complications. Early transplantation and reducing waiting time are critical for the success of the procedure in this age group. Living donor transplantation is the best option for elderly renal transplant recipients. Organs from younger and healthier deceased donors are associated with lower death rates. However, the number of younger and healthier deceased donors is limited (Abecassis et al., 2012; Escobedo & Seawright, 2017; Sutherland et al., 2016).

The outcomes of the transplantation are determined by some additional factors such as effective immunosuppressive medication, new technologies for improving organ quality, holistic care of transplant recipients and multidisciplinary team approach (Figure 1)

(Danovitch et al., 2007; Escobedo & Seawright, 2017).

## Selection of the elderly transplant candidate

Several factors must be considered when determining the candidacy of an elderly patient. The overall health of the patient is an important consideration when selecting elderly candidates for transplantation (Keith et al., 2013). The other determinants are the elderly patient's cognitive function, and frailty, social support system, finances, and local waiting time for deceased donor transplant. There is no absolute age cut-off for consideration of kidney transplant (Hartmann, 2009).

## Risks of Transplantation

Elderly transplant recipients encounter problems due to aging, surgical procedure, comorbidities, and immunosuppression. The adverse effects of transplantation in elderly include the higher incidence of chronic rejection, increased risk of infection, and malignancies (Abecassis et al., 2012; Sutherland et al., 2016; Escobedo & Seawright, 2017).



**Figure 1: The health professional involved in the holistic care of elderly recipients**

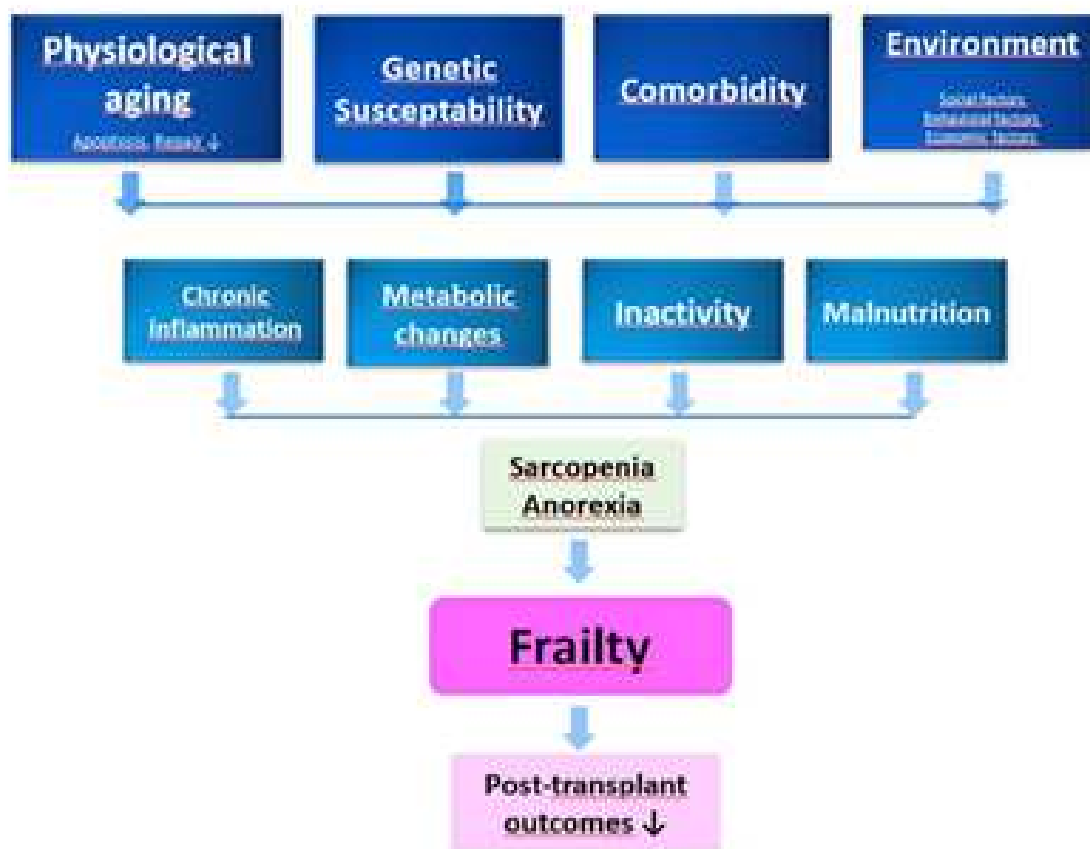


Figure 2: Risk factors, pathophysiological changes, clinical symptoms effects on posttransplant outcomes.

Kimble et al., Frailty and Transplantation. Transplantation 2016; 101(10): 207-11. doi: 10.1097/TP.0000000000001011

### ***Aging and immune changes***

The immune system of the elderly people undergoes complex and continuous remodeling with age. Aging is associated with inflammation, altered innate immunity, and cell-mediated immunity. The most striking alteration in the elderly is changing phenotypes and functions of T-cell components (Hartmann, 2009; Keith et al., 2013; Shetty & Friedewald, 2015). It is critical to understand the effect of aging and the immune response to organ transplantation. Understanding the effect of aging and the immune response to graft will optimize the outcomes of the transplantation procedure.

Older transplant recipients exhibit the reduced frequency of acute allograft rejection but an

increased prevalence of infections and malignancies due to the consequences of immunosenescence (Colvin et al., 2017). The incidence of acute rejection tends to fall with age, while the consequences of acute rejection seem more serious (Saxena et al., 2009). The risk of developing chronic allograft nephropathy in elderly kidney transplant patients was reported higher, compared to younger kidney transplant patients (Hartmann, 2009).

Infection in this age group is associated with a higher rate of postoperative mortality. Surreptitious comorbidities have been related to the increased risk of infections in older patients (vascular insufficiency, new-onset of diabetes, urinary tract abnormalities etc.). Therefore, infection management strategies are vital for this

group of patients (Hartmann, 2009; Escobedo & Seawright, 2017; Włodarczyk et al., 2018).

Immunosuppression in transplant recipients is a strong and independent risk factor for many cancers. The decrease in immune functions increases the risk of over-immunosuppression and cancer. It has been reported that there is a 2-20-fold increase in cancer incidence (Saxena et al., 2009). There is also an increased risk of interactions/reaction with drugs and increased bone disease in the elderly population due to immunological changes and immunosuppressive drugs (Abecassis et al., 2012; Hartmann, 2009).

### **Care for Elderly Transplant Recipients**

#### **Evaluation before Transplantation**

The comprehensive assessment is required to evaluate risk versus benefit of transplantation for older recipient candidates. It is vital for appropriate recipient selection and improving adherence with immunosuppressant therapy following transplantation, and transplant outcomes.

#### ***Psychosocial assessment***

#### ***Physical assessment***

The care of elderly recipients is more complicated because of pre-existing comorbidities, frailty, changes in the pharmacokinetics of immunosuppressive drugs, polypharmacy, and changes in immunoreactivity (Figure 2). The common pre-existing comorbidities in elderly that interfere with transplant procedure are diabetes mellitus, heart failure, chronic obstructive pulmonary disease, history of cancer, coronary artery disease, hyperlipidemia, and osteoporosis. Immune functions and risk of infection should also be assessed prior to surgery (Danovitch et al., 2007; Keith et al., 2013; Le Meur, 2015; Shetty & Friedewald, 2015; Exterkate et al., 2016).

The aging process itself and some additional conditions (liver functions, chronic organ failure) impact the absorption, distribution, and metabolism of immunosuppressive medications. Absorption of medication can be reduced with increasing age (Danovitch et al., 2007). Comorbid conditions contribute to polypharmacy and consequently, it may result in drug-drug interactions (Le Meur, 2015; Escobedo & Seawright, 2017).

Elderly are prone to age-related cognitive impairment. Since chronic organ failure has been found to be associated with encephalopathy and dementia (Abecassis et al., 2012), evaluation of the cognitive functions is required for these group of patients. These functions affect the ability to adhere to a complex post-transplant regimen (Kumnig & Jowsey-Gregoire, 2007; Escobedo & Seawright, 2017).

Elderly recipients encounter emotional distress, various psychiatric disorders, and social problems. The psychological evaluation includes the assessment of the patient's psychiatric state, stressors, coping skills, body image, quality of life, substance abuse, medication self-management, posttraumatic reactions, and faith. Nurses need to gather information about patient expectations from surgery and goals (Kumnig & Jowsey-Gregoire, 2007; Escobedo & Seawright, 2017). Psychosocial support influences the elderly patients' adherence and postoperative outcomes. Nurses should gather information about available social support (Kumnig & Jowsey-Gregoire, 2007; Escobedo & Seawright, 2017).

Frailty is a predictor of poor outcomes such as poor graft function, increased hospitalization, and perioperative complications. It is hard to diagnose because of symptoms overlapping with an overall decline in bodily systems in the elderly. The common symptoms of frailty are unintentional weight loss; feelings of exhaustion; weakness and low levels of physical activity. Therefore, the elderly should be assessed in terms of activities of daily living and nutrition (Keith et al., 2013; Shetty & Friedewald, 2015; Peeters et al., 2018).

#### **Post-Transplant Care: Monitoring and Maintenance**

Transplant team for long-term care includes the transplant surgeon, transplant nurse, geriatrician, geriatric nurse, community nurse, social worker, dietitian, physiotherapist, and general practitioners. Constant cooperation with a geriatrician will improve the quality of life of the recipients.

The close monitoring and care are crucial for the prevention of graft rejection, management of infections and malignancies associated with immunosuppression and improving the transplant outcomes. Therefore, the common nursing diagnoses among elderly transplant recipients are

high risk of infection, impaired urinary elimination, self-care deficits, impaired tissue integrity, and pain. Following the surgical procedure, the patients' vital signs, laboratory/blood work, and hemodynamic status are assessed. Assessment of fluid balance, pulmonary, neurological, gastrointestinal and hematologic status is evaluated. Wound and drainage assessment are conducted. Patients should be encouraged for early mobilization and self-care (Escobedo & Seawright, 2017).

### **Immunosuppression**

Triple-drug therapy is the commonly used approach for the prevention of acute or chronic graft rejection. Patients take an antimetabolite (mycophenolate mofetil [CellCept], azathioprine), a corticosteroid (Prednisone), a calcineurin inhibitor (tacrolimus [Prograf] or cyclosporine [Neoral/Gengraf] or a mammalian target of rapamycin (mTOR) inhibitors (Caring for patients with solid organ transplants, 2015; Escobedo & Seawright, 2017).

### **An approach to immunosuppression in the elderly**

Physicians tend to use less aggressive immunosuppressive strategies in older patients due to higher rates of infections, and an exaggerated malignancy (Hartmann, 2009). Individualized immunosuppressive therapy is critical for the management of elderly patients. Immunosuppressants are given at their lowest effective dosage during the maintenance period (Caring for patients with solid organ transplants, 2015).

Elderly patients are at high risk of adverse drug interactions (Abecassis et al., 2012). If patients suffer from gastrointestinal problems, such as nausea, vomiting, and diarrhea, the dosage of mycophenolic acid can be readjusted. Therapeutic toxicity blood levels may be different for older recipients. The blood concentration needs to be measured for maintaining the therapeutic level of cyclosporine (5 to 20 ng/mL) or tacrolimus (100 to 400 ng/mL) (Caring for patients with solid organ transplants, 2015; Escobedo & Seawright, 2017). Azathioprine (antimetabolites) may lead to bone marrow suppression, alopecia, and pancreatitis. Platelet and white blood counts should be monitored for the possible side effects of Azathioprine (antimetabolites). The most common side effects of calcineurin inhibitors are

nephrotoxicity, hyperkalemia, hyperglycemia and hyperlipidemia (Caring for patients with solid organ transplants, 2015).

### **Assessment of non-adherence**

Age-related physiological and psychological changes pose the elderly patients at high risk of non-adherence and toxicities (Abecassis et al., 2012). The effectiveness of immunosuppressant therapy depends on adherence to medication and patients' comorbid conditions. During outpatient visits, nurses should collect information about the patient's transplant history, current immunosuppressants, and they must assess the adherence to medication. Assessment of patients' understanding of immunosuppressant medications is required for providing safe and qualified care for recipients (Caring for patients with solid organ transplants, 2015; Escobedo & Seawright, 2017).

It is critical to be aware of the side effects of drugs. Corticosteroids can cause diabetes mellitus, osteoporosis, hypertension, hyperlipidemia, cardiovascular diseases, and weight gain, cataract and/or impaired wound healing. Rapid steroid withdrawal or dose minimization strategies are carried out for the prevention of steroid-associated side-effects. Patients can refer to health professionals for the screening of bone health, hyperlipidemia, infections, arterial hypertension, and post-transplant diabetes (Escobedo & Seawright, 2017; Kendall et al., 2017).

Older adults are more susceptible to infectious diseases than young patients. Host defense mechanisms and vaccine efficacy decrease markedly with age. Infection prevention strategies will contribute to the prevention of infection-related death (Abecassis et al., 2012; Danovitch et al., 2007).

Older people tend to be more sedentary. The sedentary lifestyle and the side effects of immunosuppressant drugs increase the risk of adverse cardiac events. The elderly are also likely to be prone to important effects of age on autonomic disturbances (postural hypotension) and neuropsychiatric issues that influence drug choices (Abecassis et al., 2012). Orthostatic hypotension is a risk for falls and trauma. Elderly patients should be assessed for blood pressure alternations, sensory impairments, sleep disorders, nutritional and mental problems

(Escobedo & Seawright, 2017; Kendall et al., 2017).

Allocation of kidneys from older donors may exaggerate nephrotoxicity of immunosuppressive agents (Danovitch et al., 2007; Le Meur, 2015). Reducing poly-pharmacy, and low dose and slow medicating are critical for the prevention of nephrotoxicity and screening for drug interactions (Escobedo & Seawright, 2017). Lower concentrations of calcineurin inhibitors (cyclosporine or tacrolimus) are targeted to minimize the vasoconstrictive effect because many of the donor's kidneys already have a certain degree of vascular disease at the time of implantation (Hartmann, 2009). To minimize the risk of nephrotoxicity, the use of nephrotoxic co-medication after transplantation needs to be minimized (NSAIDs, aminoglycosides, angiotensin-converting enzyme inhibitors, antimicrobial medications) (Escobedo & Seawright, 2017; Kendall et al., 2017; Peeters et al., 2018).

Holistic care of elderly recipients requires surveillance, frequent contact with the patient in his or her environment, cooperation with primary health care facilities together with geriatrics (Wlodarczyk et al., 2018). The transplant surgeon and transplant nurse in the follow-up of elderly recipients may focus only on post-transplant health problems. The transplant surgeon and transplant nurse may neglect the age-related complaints. It is crucial to cooperate with the general practitioner, community nurse and geriatrician for the management of age-related complaints (Escobedo & Seawright, 2017; Wlodarczyk et al., 2018).

### Education of Elderly Transplant Recipients

Transplant patients need comprehensive psychological and social support throughout the transplantation. Healthcare team should develop evidence-based approaches and strategies for improving adherence to the medical regimen. Clear, concise, understandable, and structured educational sessions will help improving patient's adherence to medical treatment. The success of post-transplant management requires the active involvement of patient and family in the care and follow-up. The patients and the family need to be educated about the importance of regular activity or exercise, diet, screening for cancer, and prevention of infections and vaccinations, and vitamin supplements. It is vital to remind patients to conduct blood monitoring

for immunosuppressive agents (tacrolimus, cyclosporine, sirolimus, and mycophenolate mofetil) (Roldan, 2013; Bernardina & Phillips, 2017; Escobedo & Seawright, 2017; Kendall et al., 2017).

### Conclusion(s)

Although the multidisciplinary approach is vital for the successful management of the recipients, nurses take crucial responsibilities in the team for coordinating and prioritizing the care needs of elderly transplant recipients. Despite the burden of comorbidities among elderly transplant recipients, quality of life and transplant outcomes may improve through vigorous recipient selection, careful assessment, personal immunosuppression, and close monitoring.

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