The role of the nurse in pre-renal transplantation

Fiona Murphy

Abstract

The following two articles explore the role of the nurse in caring for and educating the patient both pre- and post-renal transplantation. The nurse plays a pivotal role in assisting the patient facing the many challenges that are associated with transplantation. Renal transplantation is considered the optimal treatment of choice for patients with end stage renal failure (ESRF) and who are receiving dialysis. This first article will explore the role that nurses play regarding the care of the patient pre-transplant, including the physical, psychological and educational support required to assist the patient and family members deal with the many challenges associated with transplantation.

Key words: Renal ▪ Dialysis ▪ Transplantation ▪ Nursing Role

Organs for kidney transplant are from two sources: either living or deceased (cadaveric) donors. In the United Kingdom (UK) there are currently 6360 patients on the waiting list for a cadaveric kidney transplant (UK Transplant, 2006a). There is an increasing recognition of the shortage of cadaveric donors and demand continues to outstrip supply.

Organ procurement in both the UK and Ireland is based on a voluntary gifting system whereby individuals choose to donate or 'opt in' to organ donation after suffering brainstem death (Haddow, 2005). During the year 2005-2006 in the UK, 1203 individuals received a cadaveric kidney only transplant while 590 received a kidney transplant through live donation. In the Republic of Ireland 126 patients received a cadaveric kidney only transplant in 2005-2006, although there were only three transplants conducted through live donation (UK Transplant, 2006a).

A live transplant programme has been developed recently in the Republic of Ireland. It must be acknowledged that the increased numbers of living donor transplants has not compensated for the increased numbers waiting for a transplant (Trevitt, 2004), therefore patients can wait for extended period of times before being offered a transplant.

However, the Human Tissue Act 2004, which came into being at the start of September 2006, gives priority to the wishes of the 13.5 million people on the NHS organ donor register, donor card carriers and others who have said they want to help others to live in the event of their death. This new Act makes it clear that if an individual wishes to donate that their wishes should be fulfilled (UK Transplant, 2006b).

This article explores the pivotal role that nurses play regarding the care of the patient pre-transplant including the physical, psychological and educational support required to assist the patient and family members deal with the many challenges associated with transplantation.

Transplantation

Chronic kidney disease (CKD), care on dialysis and transplant care are all interdependent (Siddiqi et al., 2005). While it must be recognized that there is a wide multidisciplinary team that cares for patients, it is the nurse who is at the centre of the patients' care throughout. These include the specialist nurses who work within the dialysis and transplant units along with the out-patients departments and who share the continuum of care for patients as they move forward from dialysis treatment to transplantation and beyond this to long-term management.

Renal transplantation has the greatest potential for restoring a healthy productive life for most patients with renal failure (Goodman and Danovitch, 2005). Auer (2002) asserts that, for numerous patients, receiving dialysis is a period of marking time while awaiting transplantation. Christensen et al. (2000) identifies that a functional renal graft offers the patient the potential for freedom from numerous, time-consuming, and occasionally painful or uncomfortable dialysis treatments. While Franklin (2002) concurs with this, a successful transplant presents the patient with freedom from the psychological difficulties and physical restrictions associated with long-term dialysis, including freedom from dietary and fluid restrictions, return of sexual functioning and fertility with the potential opportunity for parenthood.

Transplantation remains the most cost-effective treatment option for end stage renal failure (ESRF). The average cost of dialysis is £30 800 per patient per year, while the cost of a transplantation including the immunosuppression needed by the patient costs on average £2 220 000. The overall savings to the NHS in dialysis costs as a result of the kidneys transplants in the year 2005-2006 was £46.1 million. However, this figure is the savings that the NHS make each year for every year that the kidney functions (UK Transplant, 2007).

Kidney transplantation is not a permanent cure for patients with ESRF (Starzomski and Hilton, 2000). Anecdotally, television soap operas in the past have highlighted actors playing individuals receiving kidney transplantsations and miraculously they appear to recover within a few days post-surgery. However, realistically in order for patients to maintain their renal graft function they will require medical care for the rest of their lives and will need to acquire new self-care skills to recognize for example the signs and symptoms associated with infection and rejection (Luk, 2004).
Transplantation should be offered to all suitable patients. Unfortunately not all patients with ESRF are medically or surgically fit for a kidney transplant, and there are a number of contraindications (Table 1). All of these contraindications may require modifications in situations that alter the balance of risks between dialysis and transplantation (UK Transplant, 2003). The survival rate for transplant patients is over 95% for the first year and that of the kidney is around 90%. The average lifespan of a transplanted kidney from a cadaver is 12 years while organs from live donors average 15 years; however, these figures are related to the characteristics of both recipients and donors (Force and Andreu, 2005).

**Preparation of the patient pre-transplantation**

Transplantation should be discussed as a treatment option ideally when patients are diagnosed with CKD or chronic renal failure. CKD patients that are better managed both before and after commencing dialysis make better transplant candidates (Siddqui et al, 2005). Patients will be added to the UK transplant national list by their transplant centre following individual pre-transplant assessment, the process of which will be discussed later. It is established by a computer protocol the best matched patient for an allocated kidney which is based mainly on blood group, degree of tissue matching and time spent on the waiting list. This database will also identify the transplant centre to which the organ is to be offered if the best matched patient is not found.

Over the past 20 years the transplant national allocation scheme has evolved progressively to improve outcomes, ensure equity of access to transplantation and also to maximize the number of transplants performed. Live donor kidneys and non-heartbeating donor kidneys are not allocated through the national scheme and are utilised by local transplant units (UK Transplant, 2006c).

One of the standards set by the National Service Framework for Renal Services (Department of Health, 2004) is that all patients likely to benefit from a kidney transplant are to receive a high quality service which supports them in managing their transplant and facilitates them to achieve the best possible quality of life.

There are three key stages in the patients’ pathway to transplantation according to The Renal Association (2002):
- Psychological and physical preparation
- Pre- and postoperative care
- Long-term follow up.

Both the potential risks as well as the benefits of transplantation must be fully explained to patients as these factors might influence their quality of life post-transplantation. If patients are well informed they may also demonstrate adherence with their treatment regime (Farmer et al, 2004).

**Psychological preparation**

Patients undertaking dialysis can experience a variety of emotions trying to cope with the everyday reality of living with a chronic illness. Denial, guilt, depression, fear, regression, resentment and disbelief are common defence mechanisms that patients may present with. They may feel that their hopes for the future are altered and may demonstrate hostility or helplessness. Nurses can assist patients by discussing their feelings with them and allowing them to grieve for what they have potentially lost. They should determine the patients’ attitudes towards their condition and its meaning for them. They should build up a positive relationship with patients while on dialysis and assist them to begin to adapt and cope with their dialysis treatment while supporting them make an informed choice regarding the issue of transplantation.

Murphy (2005) maintains that the extent to which patients became familiar to medical treatment before the onset of ESRF is an important variable which affects their psychological response to transplantation. While patients await a transplant they may experience feelings of anxiety, fear of the unknown, not obtaining a donor, pain from surgery, and possible long-term health problems (Wallace, 2003). Other specific pre-transplant anxieties and fears include: acceptance of the transplant as part of the patients’ ‘self’ and guilt over benefiting from traumatic death (Franklin, 2002), rejection and body image changes due to the effects of the immunosuppressive therapy (Starzomski and Hilton, 2000). It must be recognized that patients who receive a transplant are facing a life-changing event and it is important that they have the support systems in place to cope. The nurse should assess the patients’ coping abilities and what support systems they have in place, which include the renal counsellor, family members and friends (Wallace, 2003).

Corley et al (2000) assert that although there may be possible conflict or stress associated with live donation, the majority of both potential donors and recipients are very comfortable with the selected donors and that relationships can improve following transplantation. It is the role of the nurse to ensure that the potential donor has made an educated and informed choice without coercion about donating a kidney to a loved one. The donor should feel able to discuss any issues without fear or embarrassment and needs to have emotional support with regards making the difficult decision to donate (Fisher et al, 2005).

**Physical preparation**

There are various physical assessments that a patient must have established before being considered for transplantation (see Table 2). It

### Table 1. Contraindications to renal transplantation

<table>
<thead>
<tr>
<th>Predicted patient survival of less than 5 years</th>
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<tr>
<td>- Malignant disease not amenable to curative treatment, or remission for greater than 5 years.</td>
</tr>
<tr>
<td>- HIV infection not treated with highly active antiretroviral therapy or already progressed to AIDS.</td>
</tr>
<tr>
<td>- Cardiovascular disease - ischaemic heart disease, the prognosis of which cannot be improved by revascularization and/or cardiac failure with a predicted risk of death greater than 50% at 5 years</td>
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<tr>
<th>Predicted risk of graft loss greater than 50% at 1 year</th>
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<tr>
<td>- Anti-glomerular basement membrane (GBM) disease with circulating antibody or in patients with Alport’s syndrome following first graft failure</td>
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<tr>
<th>Patients unable to comply with immunosuppressant therapy</th>
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<tr>
<td>- A history of non-compliance and, in particular, graft loss from non-compliance. Reasons for non-compliance should be investigated</td>
</tr>
<tr>
<td>- Patients with poorly controlled psychosis or regular use of class A drugs</td>
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<table>
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<tr>
<th>Immunosuppressant predicted to cause life-threatening complications</th>
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<tbody>
<tr>
<td>- Unresolved chronic bacterial infection</td>
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<tr>
<td>- Persistent viral infection</td>
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*Source: UK Transplant (2003)*
is important to ascertain the patient's primary renal disease as with some cases they can recur and destroy the new kidney, an example being focal segmental glomerulosclerosis which cause massive proteinuria and scarring of the glomeruli of the kidney. Vasculitic illnesses need to be completely treated before progressing ahead with transplantation (Franklin, 2002).

One of the leading causes of ESRF is diabetes mellitus, particularly type 2, and the treatment of choice for end-stage diabetic nephropathy is kidney transplantation alone, or combined with pancreas transplantation. As cardiovascular disease is the leading cause of death following renal transplantation, patients with ESRF are at high cardiac risk. However, diabetic patients are a higher risk and should therefore have assessed pre-transplantation including being reviewed by a cardiologist. They may undertake further cardiac investigations, including an assessment of vessel patency to exclude severe atherosclerosis (Franklin, 2002; Pirsch et al, 2005, Siddqi et al, 2005).

The upper age limit for a transplant patient must be considered and can be viewed as a potential risk coupled with other increased risk factors associated with older adults. These risk factors include: advanced cardiovascular disease, longer initial hospitalization post-surgery, the metabolism of immunosuppressive drugs may be slower along with increased risk of infection and malignancy related to immunosuppression. Older adults should be assessed regarding their cognitive abilities along with their ability to care for themselves and mobilize post-transplant (Siddqi et al, 2005). The revised UK transplant national allocation scheme slightly reduces the chances of receiving a kidney for patients over the age of 60 (UK Transplant, 2006b). However, the nurse, along with the rest of the transplant team, must discuss the issue of transplantation and its potential risks and benefits with the older patient and their family members as each case must be looked at on an individual basis.

The issue of obesity must also be considered as a potential risk post-transplantation, including higher risk of delayed graft function, potentially more surgical complications including more wound infections (Siddqi et al, 2005). It must be recognized that for many patients the renal diet can be highly restrictive and adding on additional restrictions to lose weight can seem overwhelming for patients. They should be encouraged and provided with assistance and support to lose weight through tailored weight loss programmes (Parisi, 2002) supervised by the renal dietician and the nurse.

With regard to the immunological aspects of transplantation, the major obstacle to a successful renal transplantation is the body's ability to recognize and reject foreign tissue. Each individual has at least six important human leukocyte antigens (HLA) which are complex proteins located on the surface of immune system cells and are used to ascertain compatibility between a kidney donor and the recipient. When the donor's six antigens match those of the recipients this results in a perfect match. This is established through tissue typing. With living donors such as siblings, since they have the same parents, they would have the greatest chance of being a perfect match (Wallace, 2003).

It is important to regularly screen patients on the transplant waiting list in order to maintain knowledge of their current antibody status as antibodies can be induced to blood transfusions, pregnancies or previous transplants (Franklin, 2002). The cross-match test is the final pre-transplant immunological screening step whereby the potential donor's lymphocytes serve as the target cells for the patient's serum. A strong contraindication to transplantation is the presence of cytotoxic IgG antidonor HLA (Cecka and Reed, 2005) whereby there is a positive cross-match and the recipient is sensitized to the donor and therefore the transplant cannot proceed as it will be rejected (Franklin, 2002).

### Educational preparation

It must be acknowledged that the educational preparation of potential transplant candidates is just as important as the physical and psychological preparation (Terrill, 2002). The purpose of patient education is to increase the competence and confidence of patients for self-management with the most important goal being to prepare patients and their families for independence (Bastable, 2006).

Patient education is not simply a matter of repeating directions to patients or handing out printed materials. It is a process involving the health professional's precise clinical skills in terms of data gathering, individualization of instructions, prompting and support, and evaluation and follow-up of the patient's success in implementing the treatment plan (Falvo, 2004).

The transplant team, including the nurse, will meet up with the transplant recipients and their families to discuss the surgery and what to expect both pre and post the actual operation, the issues surrounding rejection and the complications that can occur postoperatively. The immunosuppressive medication must be explored and it must be explained that patients will remain on this medication for the remainder of their lives. It can be difficult for patients to grasp all of the information regarding transplantation, and during the various educational sessions it is important that these sessions are tailored to their individual needs. The nurse should attempt to ascertain the patients' thoughts and

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### Table 2. General medical and physical examination pre-transplantation

<table>
<thead>
<tr>
<th>Test</th>
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<tr>
<td>- Complete history and full assessment of cardiovascular, respiratory, gastrointestinal symptoms if present</td>
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<tr>
<td>- History of chronic or recurrent infections</td>
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<tr>
<td>- Ascertain if the patient smokes, amount of alcohol intake or drug taking</td>
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<tr>
<td>- Serum biochemistry</td>
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<tr>
<td>- Tissue typing</td>
</tr>
<tr>
<td>- Full blood examination (FBE), blood type and coagulation profile</td>
</tr>
<tr>
<td>- Serological examinations, including Hepatitis A, B, C and human Immunodeficiency virus (HIV) status, cytomegalovirus (CMV) titres and the presence of sexually-transmitted diseases and herpes simplex virus (HSV)</td>
</tr>
<tr>
<td>- Chest X-ray</td>
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<tr>
<td>- Electrocardiogram</td>
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<tr>
<td>- Dental evaluation</td>
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<tr>
<td>- Smear test for women</td>
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<tr>
<td>- Ascertain if any problems with the bladder and urethra, or if history of urinary tract infections</td>
</tr>
<tr>
<td>- Abdominal assessment to ascertain if previous surgery, Tenckhoff site</td>
</tr>
<tr>
<td>- Vascular assessment to assess pulses</td>
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<tr>
<td>- History of polycystic kidney disease</td>
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From: Franklin (2002); Terrill (2002)
feelings concerning transplantation and to reassure them and reiterate educational advice as necessary. Through good communication and a thorough assessment of the patients’ learning needs the nurse can establish what educational tools can assist patients further, for example, the use of transplantation DVDs, various patient education leaflets, authorized vetted internet sites, and possibly meeting transplant patients who have gone through the experience.

The issue surrounding the relative advantages of living donor and cadaveric donor transplantation should be compared and contrasted in the context of the prolonged wait that is expected for a cadaveric transplant in the event that a living donor is not available. The issue of live donation must be explored, this can cause stress on a family and again the nurse must support patients and their families in their informed decisions made. Patients should be strongly advised that a transplant may not last forever and there may come a time in the future whereby a return to dialysis is a possibility. The issue of compliance or adherence to treatment with regard to dialysis and dietary regimen, while waiting to be called for a transplant, as well as the importance of taking the various immunosuppressive regimen without fail post-transplant, must be explored (Siddqi et al, 2005). Franklin (2002) identifies the importance of offering extensive pre-transplant counselling to explore the rationale for not adhering with healthcare advice and to offer further support post-transplant to facilitate adherence to medications and post-transplant lifestyle.

Preoperatively
Kidney transplantation differs from that of heart and liver transplantation in that chronic dialysis allows patients to be maintained in optimal condition and provides time to address potentially complicating medical and surgical issues, whereas the condition of the patients facing both a heart and liver transplant can often deteriorate rapidly in the pre-transplant timeframe (Singer et al, 2005). There are many challenges with the actual renal transplantation procedure as there are two patients and two sets of family members that must be cared for. The approaches to surgery are varied depending on whether it is a live donation or a dying patient whose family members have opted to donate his or her organs (Wallace, 2003). Terrill (2002) also identifies that the success or failure of the transplantation process often is determined by the attention to detail that occurs throughout the perioperative period.

It can be a very stressful time for both patients and their family members awaiting that phone call from the transplant unit identifying that a suitable donor kidney has become available. Terrill (2002) asserts that when patients receive the call, they experience a mixture of emotions, including anticipation and excitement at the potential of life without dialysis, emotions such as fear of the impending surgery should the transplant not be successful, along with sadness regarding the fact that they are being provided with this opportunity through the death of another human being. Patients are informed on the phone to present to the transplant unit as soon as possible, to not eat or drink, along with a brief discussion to establish the patient's current health status to exclude any potential infection or potential problems that could exclude transplantation. Concurrently, another patient may receive a similar call advising him or her to present also to the transplant unit; some transplant units may contact two patients in case a positive cross-match is present with one of the patients, therefore the other patient is also prepared so as to reduce the cold ischaemia time (Franklin, 2002). Terrill (2002) maintains that although this method can be viewed as medically efficient, one of the patients called will leave the hospital without a transplant.

Nurses play a vital role during this immediate preoperative stage. They would usually be the first point of contact that the patient and family members would meet on admission to the unit and would therefore be able to discuss with the patient and family his or her fears and anxieties of what to expect on admission, including the various impending medical investigations and the general preoperative procedure. Throughout the nursing admission it can be established whether the patient had any recent infection or received any blood transfusions, what the current and past medical history is, including renal disease, any allergies, what the normal urine output if present, the measurement of vital signs and the patients' social history and support. The medical investigations, including blood tests, such as tissue typing cross-match, urea and electrolyte, liver function tests, viral screen and cross-match for a number of units of blood for the impending transplant surgery should be undertaken. Additionally, chest X-ray, electrocardiogram (ECG), urinalysis (including a mid-stream specimen of urine), skin, nose, throat, axilla and groin swabs, along with swabs taken from either the peritoneal dialysis or subclavian catheters exit sites for methicillin-resistant Staphylococcus aureus, viral and bacterial screening, should all be undertaken.

The patient may require dialysis depending on the results from the blood tests and following medical assessment including what the patients’ dry and current weight is, the relevant dialysis history involving type of dialysis modality and the date and time of last dialysis treatment and vital signs. Issues such as electrolyte imbalances and fluid overload cause difficulties during and post-transplantation. Therefore, should haemodialysis be required, minimal heparin is used. Similarly, if the patient normally receives peritoneal dialysis, he or she would need to carry out the necessary exchanges; following which the peritoneal cavity should be drained and the catheter capped after this final exchange. A fluid specimen would need to be sent to the laboratory for microscopy, culture and sensitivity. Various members of the multidisciplinary team will visit the patient pre-surgery, including the nephrologist, the transplant surgeon and co-ordinator, the anaesthetist, the physiotherapist to assist with deep breathing and coughing exercises. Once the tissue typing cross-match comes back negative the last stage of the preoperative preparation can begin (Franklin, 2002; Terrill, 2002).

Other preoperative preparation includes consent, name badge, bath or shower, use of an enema, theatre gown, the marking and dressing to protect the arteriovenous fistula from inadvertent use of invasive monitoring, anti-thrombosis stockings along with the commencement of immunosuppressive therapy as per the applicable transplant units' policy. Other medications given preoperatively include the pre-medication (such as temazepam), and should the patient be diabetic a sliding scale of insulin would be required as prescribed (Franklin, 2002; Terrill, 2002).

Transplantation technique
The successful usage of donor tissue relies on rapid organ resection and cooling with a minimal period of time to develop ischaemia. It is therefore vital to preserve the donor graft immediately while waiting to establish a possible donor match. The patient will be catheterized before surgery, allowing the bladder to drain throughout the operation and allow the administration of antibiotic-type
solutions which will assist in the viewing of the bladder when the ureter is reimplanted. Singer et al (2005) asserts the importance of meticulous surgery techniques, attention to detail, strict aseptic technique and ideal haemostasis as essential throughout the transplant surgery. The surgeon will make a curved incision in either of the patients' lower quadrant for a first transplant (Figure 1). This retroperitoneal space is entered and a pocket is made for the donor kidney, any bleeding is managed with clamps, ties and electrocautery. The renal vein will be sewn to the recipients' external iliac vein as similar to the bladder of the recipient and a separate small incision into the perirenal space to drain blood, urine or lymph.

Following the anatomises the donor kidney usually turns pink quickly and may produce urine rapidly. The ureter can be anatomised to the bladder of the recipient and a stent may be used if the surgeon believes that the patient may be more at risk regarding urological complications. Closed drains such as the Jackson-Pratt type may be placed through a separate small incision into the perirenal space to drain blood, urine or lymph. Copious amount of sterile saline solution is used to irrigate the wound, and it is observed closely for any leaks or bleeding, the wound is closed at the end of the surgery. It is important that there is adequate perfusion of the newly transplanted kidney which is vital for the establishment of an immediate postoperative diuresis and also to avoid the delay of graft function. A large dose of methylprednisolone (an immunosuppressive corticosteroid) is usually given before the release of the vascular clamps. Verapamil, a calcium channel blocker, is directly administered into the renal artery which reduces capillary spasm and improves renal blood flow. Fluid replacement is maintained accordingly along with the administration as prescribed of Mannitol and frusemide. The patients cardiac status must be closely monitored with the central venous pressure should be maintained at around 10 mmHg with the usage of isotonic solution and infusions of albumin. The systolic blood pressure should be maintained above 120 mmHg. The patient will spend time being closely monitored in the theatre recovery area initially after this major surgery before returning back to the transplant unit (Franklin, 2002; Singer et al, 2005; Wallace, 2003).

It must be acknowledged that there are many challenges facing patients pre-transplant including the physical, psychological and educational preparation along with the wait for an actual transplant itself. Nurses can support patients to cope with this difficult process and assist them along their journeys as they wait for transplantation.

In the next article there will be a discussion of the continued challenges facing patients including the complications that can occur post-transplant along with the long-term implications of living with a kidney transplant.

KEY POINTS

- Renal transplantation has the greatest potential for restoring a healthy productive life for the majority of patients with end stage renal failure.
- There are many challenges that present for the patient and family members pre-renal transplant, including psychological, physical and educational preparation.
- The nurse plays a pivotal role in assisting the patient and family members face these challenges.

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