Clinical Practice Guidelines for the Care of Transplant Patients

UK Renal Association Clinical Practice Guidelines

4th Edition 2007

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DRAFT VERSION

Posted at **www.renal.org/guidelines** in May 2007

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RENAL ASSOCIATION: DRAFT STANDARDS FOR RENAL TRANSPLANTATION DECEMBER 2006

In these guidelines Chronic Kidney Disease Stage 5 (CKD 5) includes pre-dialysis and transplant patients with eGFR < 15 mls/min/1.73m^2 as well as patients on dialysis i.e. CKD 5, CKD 5T and CKD 5D

SUMMARY OF CLINICAL PRACTICE GUIDELINES

TX 1 Access to renal transplantation

1.1   Kidney transplantation should be considered the renal replacement therapy of choice for most patients with chronic kidney disease stage 5. All patients predicted to have an increased life expectancy post-transplantation should be assessed for suitability for transplantation. Placement on the transplant waiting list will be limited by individual co-morbidity and prognosis.

1.2   Living donor transplantation should be considered the treatment of choice for most patients suitable for renal transplantation.

1.3   Patients with progressive deterioration in renal function suitable for transplantation should be placed on the national transplant list within six months of their anticipated dialysis start date. Pre-emptive transplantation should be the treatment of choice for all suitable patients whenever a living donor is available.

1.4   There must be demonstrable equity of access to deceased donor kidney transplantation irrespective of gender, ethnicity or district of residence.

1.5   Age is not a contra-indication to transplantation but age related co-morbidity is an important limiting factor.

1.6   All transplant units should have written criteria for acceptance on to the waiting list. The benefits and potential risks associated with transplantation should be fully explained both verbally and in writing. Potential transplant recipients should be informed of all donor options including living related and unrelated donation.

1.7   All CKD 5 patients and CKD 4 patients with progressive disease should have their suitability for transplantation assessed annually and appropriate patients should be referred to a transplant centre. When transplantation is considered inappropriate the reason(s) should be documented. Patients should be placed on, or removed from the waiting list only after discussion and agreement with the nephrologist, transplant surgeon and the patient themselves.

1.8   The care of the renal transplant recipient is best undertaken by a multi-disciplinary team.

1.9   Simultaneous kidney-pancreas transplantation or living donor renal transplantation is the treatment of choice for patients with Type 1 diabetes mellitus.

TX 2 Evaluation, selection and preparation of the potential transplant recipient

2.1   The object of pre-transplant assessment is: a) to ensure transplantation is technically possible b) to ensure the recipient's chances of survival are not compromised by transplantation c) to ensure that graft survival is not limited by premature death (maximum benefit obtained from a limited resource) d) to ensure pre-existing conditions are not exacerbated by transplantation e) to identify measures to be taken to minimise peri- and post-operative complications.

2.2   All patients should have a cardiac stress test performed as part of their assessment for suitability for transplantation if: 1) they are more than 49 years old, 2) they have diabetes mellitus, 3) they have an abnormal ECG (other than LVH), 4) they have a history of ischaemic heart disease, CCF, peripheral vascular disease or ischaemic cerebrovascular disease. Patients unable/unlikely to achieve their maximum predicted work load on exercise ECG should have dipyridamole-thallium imaging (or similar) or stress echocardiography. Where possible this testing should be performed without concurrent b-blocker therapy. Patients with a positive cardiac stress test should be considered high risk for a cardiac event and should not be offered transplantation until further cardiac evaluation and treatment has been undertaken.

2.3   The use of pre-operative beta-blockers is recommended in patients at high cardiovascular risk undergoing renal transplantation. Low dose aspirin therapy is not a contraindication to transplantation and can be continued peri-operatively.

2.4   Patients should be strongly encouraged to stop smoking before and after transplantation. Formal smoking cessation programmes should be offered and accessed in primary care.

2.5   Obese patients (BMI >30) present technical difficulties and are at increased risk of peri-operative complications. They should be screened rigorously for cardiovascular disease and each case considered individually. Although obesity is not an absolute contra-indication to transplantation, individuals with a BMI >40 kg/m^2 are unlikely to benefit.

2.6   All potential transplant recipients should be tested for prior exposure to viral infections including: cytomegalovirus (CMV), Epstein-Barr virus (EBV), varicella zoster virus (HZV), hepatitis B and C and human

immunodeficiency virus (HIV-1). Vaccination should be offered to all hepatitis B (if not already vaccinated) and VZ antibody negative patients before transplantation. Patients otherwise suitable for renal transplantation with evidence of chronic hepatitis B and/or C or HIV infection should be managed according to British Transplantation Society and European Best Practice Guidelines prior to transplantation.

2.7   In potential recipients with previous malignancy (excluding non-melanoma skin cancer), renal transplantation should only be considered if there is no evidence of persistent cancer. It is recommended that the waiting time between successful tumour treatment/remission and transplantation be at least 2 years. For certain malignancies the waiting time may need to be extended to more than 5 years. The Israel Penn International Transplant Tumor Registry should be consulted for tumour specific advice (www.ipittr.uc.edu/Home.cfm).

2.8   Patients who are at risk of developing recurrence of original renal disease should be managed according to the European Best Practice Guidelines (EBPG).

2.9   Patients with symptomatic diverticular disease should undergo surgical assessment and consideration should be given to resection of extensive disease before transplantation. There is no evidence that asymptomatic potential transplant recipients require screening for peptic ulceration. There is no consensus on the management of asymptomatic gall bladder stones before transplantation.

SUMMARY OF AUDIT MEASURES FOR RENAL TRANSPLANTATION
1. The proportion of patients with and without diabetes mellitus < 65 years old with CKD stage 5 listed for transplantation
2. The proportion of transplant patients who receive a living donor transplant

3. The time to placement on the UK Transplant national transplant list in relation to start date of dialysis

4. The proportion of living donor transplant recipients transplanted before starting dialysis

5. A comparison between renal units of the proportion of dialysis patients placed on the national transplant list corrected for differences in identified unit and patient specific variables including co-morbidity.

6. The proportion of CKD stage 5 patients with a transplant status recorded.

7. The proportion of CKD stage 5 dialysis patients with Type 1 diabetes mellitus listed for simultaneous kidney-pancreas transplantation

8. The proportion of patients >49 years old or with diabetes mellitus listed for transplantation who have had a cardiac assessment

9. The proportion of patients at high cardiovascular risk who are taking beta-blockers at the time of renal transplantation

10. The proportion of patients who smoke (or have given up within the last year) a) whilst listed for transplantation b) one year after renal transplantation

11. The proportion of obese patients (BMI >30) on the transplant waiting list who have had a cardiac assessment.

12. The number of patients with BMI >40 kg/m^2 who are on the transplant waiting list and the reason for their inclusion.

13. The proportion of patients on the transplant waiting list whose viral status is known for CMV, EBV, VZV, hepatitis B and C and HIV.

14. The proportion of VZ and HBc antibody negative patients on the transplant waiting list who have been vaccinated against these viruses.

SECTION 1: ACCESS TO RENAL TRANSPLANTATION

Guideline TX 1.1 Kidney transplantation should be considered the renal replacement therapy of choice for most patients with chronic kidney disease stage 5. All patients predicted to have an increased life expectancy post-transplantation

should be assessed for suitability for transplantation. Placement on the transplant waiting list will be limited by individual co-morbidity and prognosis. (Good practice)

Audit measure: The proportion of patients with and without diabetes mellitus < 65 years old with CKD stage 5 listed for transplantation

Rationale

Survival following renal transplantation is better compared to age-matched individuals remaining on the transplant waiting list[1]. In a series of 46,164 patients on the transplant waiting list in the USA between 1991-1997 mortality was 68% lower for transplant recipients than for those remaining on the transplant waiting list for >3 yrs follow-up.[1] This resulted in a mean increase in projected survival of 10 years maximized in the 20-39 year old age group who were predicted to live 17 years longer than their counterparts remaining on the transplant waiting list. The increased survival benefit was seen in both sexes and was even more marked in diabetics. This analysis was, of course, confined to those patients admitted to the waiting list using the criteria for fitness for transplantation in use at the time of the study in the USA, and therefore cannot safely be extrapolated to higher risk potential transplant candidates. Although a smaller study from Scotland replicated these findings, a similar more recent analysis from the UK showed that patients over the age of 65 years did not experience any survival advantage compared with matched patients who were listed but not transplanted[2,3].

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2. Oniscu GC, Brown H, Forsythe, JLR. Impact of cadaveric renal transplantation on survival in patients listed for transplantation. J Am Soc Nephrol 2005; 16: 1859-65
3. Dudley C, Start S, Johnson R, O'Neill J, Collett D, Ansell D. BTS Congress 2007.

Guideline TX 1.2 Living donor transplantation should be considered the treatment of choice for most patients suitable for renal transplantation (Good practice)

Audit measure: The proportion of transplant patients who receive a living donor transplant

Rationale

The demand for renal transplantation has consistently and increasingly outstripped the number of available deceased donor organs for the last 20 years. In 2005 this shortfall had increased to almost 6000 patients[1]. Donation of a kidney from a live donor is the most realistic option to expand organ donation[2]. Living donor kidney transplantation provides most patients with the best chance of long-term rehabilitation. It also facilitates access to deceased donor transplantation for those without a living donor. The opportunity for planned transplantation before dialysis is required is an attractive option for patients and evidence suggests that there is improved graft survival of transplants performed pre-emptively[3]. During the last 5 years there has been substantial increase in living donor kidney transplantation in the UK with almost 1 in 3 of all renal transplant being performed from living donors in 2005 (living donor kidney transplantation rate 9.2 per million population pmp). However, there is still considerable room for expansion in comparison with activity in Scandinavia (12.9 pmp) and the USA. Living kidney donation also enables scheduling of transplantation at a time when the recipient is in optimal medical and psychological condition.

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Guideline TX 1.3 Patients with progressive deterioration in renal function suitable for transplantation should be placed on the national transplant list within six months of their anticipated dialysis start date. Pre-emptive transplantation should be the treatment of choice for all suitable patients whenever a living donor is available. (Evidence)

Audit measure a): The time to placement on national transplant list in relation to start date of dialysis b): The proportion of living donor transplant recipients transplanted before starting dialysis

Rationale

In a series of 38,836 first kidney transplants in the USA between 1995-8, pre-emptive transplantation was associated with 25% reduction in graft failure and 16% reduction in mortality in recipients of deceased donor kidneys[1]. In pre-emptive living related transplant recipients there was a 31% reduction in mortality and a 27% reduction in graft failure compared to recipients receiving a transplant when already established on dialysis[1]. Transplant survival is negatively influenced by duration of dialysis before transplantation, with a 5 year allograft survival of approximately 85% in pre-emptive transplantation compared with 75% in those receiving dialysis for 3-4 years before transplantation[2]. Patients with advanced CKD should receive a renal transplant as soon as possible to optimize clinical outcomes. Under Standard Two of The National Service Framework for Renal Services (Part One) a marker of good practice is the placement of patients on the national transplant list within six months of their anticipated dialysis start date if clinically appropriate[3].

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2. Meier-Kriesche HU, Port FK, Ojo AO, Rudich SM, Hanson JA, Cirik DM, Leichtman AB, Kaplan B. Effect of waiting time on renal transplant outcome. Kidney Int 2000; 58: 1311-7.

3. The National Service Framework for Renal Services (Part One: Dialysis and Transplantation), Department of Health, January 2005.

Guideline TX 1.4 There must be demonstrable equity of access to deceased donor kidney transplantation irrespective of gender, ethnicity or district of residence. (Good practice)

Audit measure: A comparison between renal units of the proportion of dialysis patients placed on the national transplant list corrected for differences in identified unit and patient specific variables including co-morbidity.

Rationale

Renal transplantation remains the most successful and cost effective treatment for suitable patients with end stage renal disease (ESRD). Not all patients receiving dialysis are suitable for kidney transplantation and there is evidence that selection criteria vary widely throughout the UK[1,2,3]. At the beginning of 2004, 23.3% of all patients treated with dialysis were active on the national transplant waiting list. UK Transplant (UKT) coordinates deceased-donor kidney allocation according to a nationally agreed algorithm. In 2004, the UK Transplant Kidney and Pancreas Advisory Group commissioned an Equity of Access Task Force to identify factors that may lead to inequity of access to renal transplant waiting lists, to recommend methods through which unjustified inequity may be removed and to determine methods through which this could be identified. The report from this Task Force contributed in part to the development and implementation of a new national renal allocation algorithm in 2006. A key recommendation from this group was the above audit measure[4].

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Guideline TX 1.5 Age is not a contra-indication to transplantation but age related co-morbidity is an important limiting factor (Good practice)

Rationale

There is an imbalance between the availability of donor organs and demand for renal transplantation in the UK[1]. The shortfall of deceased donor organs has resulted in the national allocation scheme -coordinated by UK Transplant. New allocation criteria are being introduced in a phased manner (2006-8) to minimize racial and geographical inequities [2] Population studies have shown reduced rates of access to transplantation for African Americans in the USA and British Asians in the UK[3,4].

There is evidence that selection criteria for placement on the transplant waiting list vary significantly throughout the UK[5]. It is important that centres managing patients with Stage 4 and 5 CKD follow standardized procedures for evaluation of suitability for transplantation. Each transplant centre should have written protocols for transplant assessment consistent with European and North American Guidelines[6,7]. Improved life expectancy of first deceased donor transplant recipients over patients remaining on the waiting list is seen in all age groups in a US study[8]. Transplant recipients between age 60-74 had a 61% reduction in mortality and increased predicted survival of 4.3 years over matched patients remaining on the transplant waiting list[8]. In contrast, in a recent UK analysis, patients over the age of 65 years did not experience any survival advantage compared with matched patients who were listed but not transplanted over 5 years of follow-up[9]. Quality of life, however, may be improved. Potential recipients >age 50 should have a careful evaluation of cardiovascular co-morbidity.

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Guideline TX 1.6 All transplant units should have written criteria for acceptance on to the waiting list. The benefits and potential risks associated with transplantation should be fully explained both verbally and in writing. Potential transplant recipients should be informed of all donor options including living related and unrelated donation. (Good practice).

Rationale

It is important that all potential transplant recipients should receive comprehensive information on the risks of transplantation, the results compared with dialysis and the options in terms of different types of donor. All patients should receive education about all forms of living donor transplantation.

Guideline TX 1.7 All CKD 5 patients and CKD 4 patients with progressive disease should have their suitability for transplantation assessed annually and appropriate patients should be referred to a transplant centre. When transplantation is considered inappropriate the reason(s) should be documented. Patients should be placed on, or removed from the waiting list only after discussion and agreement with the nephrologist, transplant surgeon and the patient themselves. (Good practice)

Audit measure: The proportion of CKD stage 5 patients with a transplant status recorded.

Rationale

Clinical practice differs from centre to centre with regard to selection for transplantation[1]. It is important to review all patients with stage 4 and 5 CKD as potential transplant recipients according to local protocols following national and European Guidelines[2]. Limitation of access to transplantation by age, gender, social and ethnic background is unacceptable and must be prevented by a standardized assessment mechanism.

The current median waiting time to transplantation in the UK is 836 days[3]. CKD is associated with accelerated cardiovascular disease[4] requiring regular review of patients on the waiting list for > 2 years to detect emerging co-morbidities which may compromise outcomes of renal transplantation. Surveillance for cardiovascular disease may need to be more frequent in high risk groups such as individuals with previous cardiac intervention or re-transplantation candidates.

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Guideline TX 1.8 The care of the renal transplant recipient is best undertaken by a multi-disciplinary team with input from both nephrologists and transplant surgeons. The supporting role of transplant nurse specialists in living donor/recipient preparation and recipient care is highly desirable. (Good practice)

Rationale

Optimal early and maintenance care post-transplantation requires close co-operation between medical practitioners of different disciplines: transplant surgeon, nephrologists, anaesthetist, radiologist and specialist in infectious disease. Nurse practitioners are increasingly providing a pivotal role in transplant assessment and subsequent co-ordination of maintenance transplant recipients[1,2].

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Guideline TX 1.9 Simultaneous kidney-pancreas transplantation or living donor renal transplantation are the treatments of choice for patients with Type 1 diabetes mellitus. (Good practice)

Audit measure: The proportion of CKD stage 5 dialysis patients with Type 1 diabetes mellitus listed for simultaneous kidney-pancreas transplantation

Rationale

In diabetic patients, kidney transplantation leads to a marked improvement in patient and graft survival over continued dialysis[1] . A number of studies have demonstrated improved survival for diabetic recipients of simultaneous kidney-pancreas (SPK) transplants compared with deceased donor kidney transplants alone (KA)[2,3]. Furthermore, US Registry data suggest that diabetic recipients of deceased donor SPK and living donor KA transplants have similar 5 year mortality risks that are significantly better than that of diabetic recipients of deceased donor KA transplants[4]. All these studies are potentially flawed by selection bias and re-analysis of the UNOS database after correction for differences in donor and recipient risk factors gives similar patient and graft survival between recipients of SPK and KA transplants[5]. However, several studies have shown that recipients of SPK transplants report better physical health and quality of life in areas that are diabetes specific compared with recipients of KA transplants[6,7], Furthermore, there is accumulating, but as yet inconclusive, evidence that pancreas transplantation may halt and potentially improve some of the long-term complications of diabetes mellitus including retinopathy[4], nephropathy[5] and neuropathy[6].

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SECTION 2: EVALUATION, SELECTION AND PREPARATION OF THE POTENTIAL TRANSPLANT RECIPIENT

Guideline TX 2.1 The object of pre-transplant assessment is: a) to ensure transplantation is technically possible b) to ensure the recipient's chances of survival are not compromised by transplantation c) to ensure that graft survival is not limited by premature death (maximum benefit obtained from a limited resource) d) to ensure pre-existing conditions are not exacerbated by transplantation e) to identify measures to be taken to minimise peri- and post-operative complications. (Good practice)

Rationale

The main goal of renal transplantation is to improve the life expectancy and quality of life of patients with ERF. It follows therefore, that patients who are predicted to have their lives shortened by transplantation or to experience a worsening quality of life should be excluded from the transplant waiting list. It is acknowledged that making such predictions is often difficult and imprecise and that the quality of data to support rational decision making is generally inadequate. There is evidence that selection criteria vary widely throughout the UK as reflected by variation in the proportion of patients who are on the transplant waiting list at different renal units[1]. The British Transplantation Society and Renal Association published in July 2003 waiting list criteria for potential renal transplant recipients based, with some minor modifications, on the European Best Practice Guidelines (2000)[2]. The major difference was in the exclusion of patients with a predicted survival of less than 5 years compared with 2 years in the EBPG. The general principles of the pre-transplant assessment listed above are not controversial and constitute best practice. However, the exact mechanism by which some of the individual objectives may be met remain unclear and inevitably results in an element of subjectivity.

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Guideline TX 2.2 All patients should have a cardiac stress test performed as part of their assessment for suitability for transplantation if: 1) they are more than 49 years old, 2) they have diabetes mellitus, 3) they have an abnormal ECG (other than LVH), 4) they have a history of ischaemic heart disease, CCF, peripheral vascular disease or ischaemic cerebrovascular disease. Patients unable/unlikely to achieve their maximum predicted work load on exercise ECG should have dipyridamole-thallium imaging (or similar) or stress echocardiography. Where possible this testing should be performed without concurrent b-blocker therapy. Patients with a positive cardiac stress test should be considered high risk for a cardiac event and should not be offered transplantation until further cardiac evaluation and treatment has been undertaken. (Good practice)

Audit measure: The proportion of patients >49 years old or with diabetes mellitus listed for transplantation who have had a cardiac assessment

Rationale

As cardiovascular disease is the main cause of death after transplantation, careful evaluation for significant coronary artery disease is mandatory. Furthermore, nearly half of all deaths with a functioning graft that occur within 30 days after transplantation are due to ischaemic heart disease, mainly acute myocardial infarction[1]. Age, diabetes mellitus and pre-existing coronary artery/peripheral vascular disease are factors that identify individuals at a higher risk of cardiac mortality after transplantation[2-4]. All patients who are 50 years or older, have diabetes mellitus, an abnormal ECG (other than LVH), a history of ischaemic heart disease, CCF, peripheral vascular disease or ischaemic cerebrovascular disease should undergo an appropriate non-invasive cardiac stress test[5]. Because many patients with CKD have limited exercise capacity, achieving an adequate exercise ECG may not be possible. In these cases, stress testing with dipyridamole-thallium/sestamibi imaging or stress echocardiography is appropriate[2, 6-11]. Where possible this testing should be performed without concurrent beta-blocker therapy[12]. Some studies have suggested that thallium/sestamibi imaging may add little to other clinical information in the evaluation of surgical risk in non-ERF patients[13].

However, the use of thallium/sestamibi imaging may be reasonable in a high risk population such as ERF patients with a high pretest probability of cardiac events[14]. Local availability and expertise should be considered when selecting test modalities. Whether screening and subsequent intervention in high-risk patients is effective in preventing future cardiac events or reducing mortality after transplantation is uncertain[15-16]. Screening tests may be best used to identify high-risk patients for exclusion from the transplant waiting list.

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Guideline TX 2.3 The use of pre-operative beta-blockers is recommended in patients at high cardiovascular risk undergoing renal transplantation. Low dose aspirin therapy is not a contraindication to transplantation and can be continued peri-operatively. (Good practice)

Audit measure: The proportion of patients at high cardiovascular risk who are taking beta-blockers at the time of renal transplantation

Rationale

Despite recommendations by a number of guideline committees for the use of beta-blockers in high-risk patients undergoing non-cardiac surgery to prevent peri-operative cardiovascular events, evidence of the efficacy of this approach from randomised clinical trials is limited[1-2]. Meta-analyses that have included and excluded different trials have reached different conclusions. The most recent meta-analysis has concluded that although peri-operative beta-blockers may decrease the risk of major peri-operative cardiovascular events, their use increases the risk of bradycardia and hypotension needing treatment and that the evidence for their use was insufficient and inconclusive[3]. A large US cohort study in which the outcome of patients undergoing non-cardiac surgical procedures was analysed according to whether or not they received beta-blockers within the first 2 days of hospitalization concluded that high-risk patients who received beta-blockers were significantly less likely to die in hospital. However, low risk patients receiving beta-blockers were more likely to die[4]. The recently published guideline update from the American College of Cardiology/American Heart Association provides sensible advice on peri-operative beta-blocker use based on the current published evidence[5]. The guidelines state that beta-blockers are *probably* recommended for patients undergoing intermediate- or high-risk surgical procedures in whom pre-operative assessment identifies coronary heart disease or high cardiac risk. To avoid peri-operative bradycardia and hypotension it would be prudent to start beta-blockers at least one month prior to transplantation.

Aspirin has a major role in the primary and secondary prevention of myocardial infarction and reduces the severity of silent myocardial ischaemia in both stable and unstable angina. Perioperative aspirin therapy is associated with a significant reduction in mortality in patients undergoing coronary bypass surgery and is not associated with an increased risk of bleeding or gastritis[6]. It interferes with platelet aggregation induced by thromboxane A_2 but not by either thrombin or high concentrations of collagen. Therefore, clinically significant bleeding should not be made worse by perioperative aspirin[7]. Furthermore, the use of low dose peri-operative aspirin may reduce the risk of transplant renal vein thrombosis[8].

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Guideline TX 2.4 Patients should be strongly encouraged to stop smoking before and after transplantation. Formal smoking cessation programmes should be offered and accessed in primary care. (Good practice)

Audit measure: The proportion of patients who smoke (or have given up within the last year) a) whilst listed for transplantation b) one year after renal transplantation

Rationale

Cigarette smoking increases the risk of cancer and cardiovascular disease in the general population. Only a few studies have examined the effect of cigarette smoking on renal transplantation but all show an association with reduced patient and graft survival. In one study of patients with a functioning graft at least one year after transplantation, cigarette smoking correlated with reduced patient survival and the magnitude was quantitatively similar to that of diabetes[1]. In a larger single centre North American study, smoking more than 25 pack-years at the time of transplantation (compared to smoking less than 25 pack-years or never having smoked) was associated with a 30% higher risk of graft failure after correcting for multiple known risk factors[2]. The increase in graft failure was largely due to an increase in deaths. Stopping smoking more than 5 years before transplantation reduced the relative risk of graft failure by 34%. The relative risks of major cardiovascular disease events and invasive malignancies were significantly increased in smokers. Similar results have been observed in another study in which pre-transplant smoking was associated with reduced transplant and death-censored graft survival although death-censored graft survival was significantly higher in patients who stopped smoking before transplant evaluation[3]. Evidence suggests that with appropriate interventions, many patients can stop smoking[4-5].

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Guideline TX 2.5 Obese patients (BMI >30) present technical difficulties and are at increased risk of peri-operative complications. They should be screened rigorously for cardiovascular disease and each case considered individually. Although obesity is not an absolute contra-indication to transplantation, individuals with a BMI >40 kg/m^2 are unlikely to benefit. (Good practice)

Audit measure: a). The proportion of obese patients (BMI >30) on the transplant waiting list who have had a cardiac assessment. b). The number of patients with BMI >40 kg/m^2 who are on the transplant waiting list and the reason for their inclusion.

Rationale

Body mass index (BMI) is the most widely used marker of obesity despite its limitations. According to the WHO classification a BMI of 30-34.9 kg/m^2 is defined as obese class I (mild), 35-39.9 kg/m^2 as obese class II (moderate) and >40 kg/m^2 as obese class III (morbid). The impact of obesity on outcome after renal transplantation has been controversial. For obese patients overall, registry data has demonstrated a significant survival advantage for recipients of both deceased and living donor transplantation compared with remaining on dialysis[1]. However, recipients of deceased donor transplants with a BMI >41 had no survival benefit. Some single centre studies have shown that wound infections, delayed graft function and weight gain are more common in moderately and morbidly obese transplant recipients although patient and graft survival are unchanged[2-3]. In a small paired kidney analysis of 28 pairs, obesity defined as a BMI >30 was associated with decreased graft survival at 5 years[4]. In another study in which patients were rigorously screened (and excluded) for cardiovascular disease before acceptance for transplantation, 5 year patient and graft survival were no different in the obese (BMI >30) group[5]. Wound breakdown was commoner. A recent analysis of 27 377 patients from the UNOS database showed that compared with normal weight patients, a BMI >35 was independently associated with an increased risk of delayed graft function, prolonged hospitalisation, acute rejection and decreased overall graft survival although a high proportion of such individuals were African Americans and had diabetes mellitus[6].

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Guideline TX 2.6 All potential transplant recipients should be tested for prior exposure to viral infections including: cytomegalovirus (CMV), Epstein-Barr virus (EBV), varicella zoster virus (HZV), hepatitis B and C and human immunodeficiency virus (HIV-1). Vaccination should be offered to all hepatitis B (if not already vaccinated) and VZ antibody negative patients before transplantation. Patients otherwise suitable for renal transplantation with evidence of chronic hepatitis B and/or C or HIV infection should be managed according to British Transplantation Society and European Best Practice Guidelines prior to transplantation. (Good practice)

Audit measure: a). The proportion of patients on the transplant waiting list whose viral status is known for CMV, EBV, VZV, hepatitis B and C and HIV. b). The proportion of VZ and HBc antibody negative patients on the transplant waiting list who have been vaccinated against these viruses.

Rationale

It is important to know if potential transplant recipients have had exposure to certain viruses , notably Epstein-Barr virus (EBV), cytomegalovirus(CMV) and varicella zoster(HZV). EBV negative recipients of an EBV positive transplant have a seven-fold increased risk of post-transplant lympho-proliferative disorder (PTLD)[1]. Knowledge of recipient CMV serology at transplantation will be essential to guide antiviral prophylactic strategies[2].

Potential recipients who are hepatitis B surface antigen positive will require assessment by a hepatologist with liver biopsy if circulating viral DNA is present, before placement on the waiting list[3]. Active viral replication, chronic active hepatitis or cirrhosis have a poor prognosis if untreated before transplantation[4]. In hepatitis C, survival post-transplantation is increased over remaining on dialysis[5]. It is recommended that the potential transplant recipient has a liver biopsy to assess liver damage and consideration of treatment before transplantation[6].

The advent of highly active antiviral therapy has revolutionized the prognosis of HIV, and early experience suggests similar early graft and patient survival rates between HIV –

positive and negative renal transplant recipients[7]. Guidelines for the management of potential kidney transplant recipients with HIV infection should be followed.[8]

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Guideline TX 2.7 In potential recipients with previous malignancy (excluding non-melanoma skin cancer), renal transplantation should only be considered if there is no evidence of persistent cancer. It is recommended that the waiting time between successful tumour treatment/remission and transplantation be at least 2 years. For certain malignancies the waiting time may need to be extended to more than 5 years. The Israel Penn International Transplant Tumor Registry should be consulted for tumour specific advice (www.ipittr.uc.edu/Home.cfm). (Good practice)

Rationale

The risk of several forms of malignancy is markedly increased after transplantation[1], due in part to alteration of immune surveillance mechanisms with maintenance immunosuppression. Patients with successfully treated cancer can be considered for renal transplantation however it is important to estimate the risk of cancer relapse before placement on the transplant waiting list. Relapse of solid organ tumours is dependent upon tumour type and time interval between treatment and transplantation. Overall 53% of recurrences occurred in patients transplanted within 2 years of cancer treatment, falling to 34% if the interval between treatment and transplantation was 2-5 years and 13% if the interval was more than 5years[2]. The risk of recurrence is very low for non-melanoma skin cancer and in-situ carcinoma of the cervix or bladder such that no delay in placement on the waiting list is required. The risk of recurrent colorectal cancer, melanoma, prostatic and breast cancer is higher and the disease-free interval may need to be at least 5 years before transplantation depending on cicumstances[2]. Liaison with an oncologist is advised. Although there is evidence that dialysis patients have an increased incidence of cancer over the general population[3], currently there is no evidence that dialysis patients on the transplant waiting list should have increased cancer surveillance strategies over that recommended for the general population[4].

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Guideline TX 2.8 Patients who are at risk of developing recurrence of original renal disease should be managed according to the European Best Practice Guidelines (EBPG). *Nephrol Dial Transplant* **2000;15(7):11-20 (Good practice)**

Rationale

Recurrent disease accounts for approximately 5% of all allograft loss[1]; with diabetes mellitus, primary focal segmental glomerulosclerosis and IgA nephropathy as the commonest causes. Pre-transplantation counseling should include the potential risk of recurrent disease to appropriate patients. In rare circumstances transplantation may be contraindicated because of the very high risk of recurrent disease for example in recipients who have lost their first allograft early from recurrent disease[2].

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Guideline TX 2.9 Patients with symptomatic diverticular disease should undergo surgical assessment and consideration should be given to resection of extensive disease before transplantation. There is no evidence that asymptomatic potential transplant recipients require screening for peptic ulceration. There is no consensus on the management of asymptomatic gall bladder stones before transplantation. (Good practice)

Rationale

The rate of colonic perforation post-renal transplantation is approximately 1% and most commonly associated with diverticular disease. However in a retrospective study in which all transplant candidates aged more than 50 years underwent screening, none of the patients with significant diverticular disease had symptomatic disease post-transplantation[1]. Peptic ulceration is now rarely a serious problem and there is a low morbidity rate even in patients with past peptic ulcer disease[2]. The issue of how best to manage incidentally noted cholelithiasis is not straightforward. Some series have noted an 8% rate of cholecystectomy for symptoms post-transplantation with a low complication rate[3]. This argues against the need for screening and pre-listing surgery. Others, on the basis of 14% operative morbidity and 9% death after post-transplant cholecystectomy recommend screening and prophylactic cholecystectomy[4].

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