

Nutritional management of overweight and obesity in adult kidney transplant recipients

Date written: June 2008

Final submission: June 2009

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GUIDELINES

No recommendations possible based on Level I or II evidence.

SUGGESTIONS FOR CLINICAL CARE

(Suggestions are based on Level III and IV evidence)

To prevent excessive weight gain

- Kidney transplant recipients should be referred to a dietitian as soon as practicable after transplantation, for written and verbal advice for preventing weight gain. (Level III)
- Regular follow-up should be arranged to prevent excessive weight gain. (Level III)
- As obesity is associated with an increased risk of steroid induced diabetes and cardiovascular disease risk factors as well as long-term graft function and poor graft survival:
 - all members of the health care team should monitor the weight of individual transplant recipients and arrange review by a dietitian if weight gain is a problem.
- Evidence from studies in the general population indicates that dietary advice should be individualized and include meal plans, exercise plan and specific goals.

To reduce body weight in overweight or obese kidney transplant recipients:

- A diet that is individually planned with a moderate energy restriction of about 30% of energy expenditure should be applied. (Level IV)
- Overweight and obese kidney transplant recipients are more likely to make dietary changes and lose weight with monthly follow-up with a dietitian. (Level IV)
- As obesity is associated with an increased risk of steroid induced diabetes and cardiovascular disease risk factors as well as long-term graft function and poor graft survival:
 - The dietitian should arrange regular follow-up for the overweight kidney transplant recipient as appropriate until the desired weight loss is achieved.
 - Referral to community-based weight management programmes may be appropriate.
- Based on studies in the general population, the initial goal of weight loss therapy should be to reduce body weight by approximately 10% from baseline, with weight loss of 1–2 kg per month. With success, further weight loss can be attempted if indicated through further assessment.

BACKGROUND

Weight gain after kidney transplantation is common and the resulting overweight and obesity is associated with serious health complications. Post-transplant weight gain has been reported at between 10 and 35 per cent, with the majority of the weight gain occurring in the first 12 months post-transplant.^{1–4} Much of the weight gained is abdominal fat.^{2,5} Steroids are known to enhance appetite and to have an adverse effect on body fat distribution and lipid metabolism thus contributing to the pattern of weight gain seen after transplantation. However, other factors, including an improved sense of wellbeing, may play an equally important role.^{1,5–9}

Among kidney transplant recipients, there is evidence that weight gains of more than 10 per cent increase the chances of steroid-induced diabetes and dyslipidaemia.¹ In addition, obese kidney transplant recipients have a higher prevalence of hypertension, coronary artery disease, chronic obstructive pulmonary disease and peripheral vascular disease, hyperlipidaemia, stroke, diabetes, coronary artery disease and mortality.^{10–12}

There is strong evidence that obesity adversely impacts upon long-term graft function and is an independent risk factor for poor graft survival.^{10,13–16}

In the general population, dietary interventions play a central role in the management of overweight and obesity. This review set out to explore and collate the evidence to support the use of particular nutrition interventions for the prevention and management of weight gain in kidney transplant recipients, based on the best evidence up to and including September 2006.

SEARCH STRATEGY

Relevant reviews and studies were obtained from the sources below and reference lists of nephrology textbooks, review articles and relevant trials were also used to locate studies. Searches were limited to studies on humans; adult kidney transplant recipients; single organ transplants and to

studies published in English. Unpublished studies were not reviewed.

Databases searched: MeSH terms and text words for kidney transplantation; MeSH terms and text words for weight, overweight and obesity; and MeSH terms and text words for nutrition interventions MEDLINE – 1966 to week 4, September 2006; EMBASE – 1980 to week 4, September 2006; the Cochrane Renal Group Specialised Register of Randomised Controlled Trials.

Date of searches: 22 September 2006.

WHAT IS THE EVIDENCE?

Few studies on the nutritional management of overweight and obesity in kidney transplant recipients have been published.

Level I and II: There are no randomized, controlled trials on this topic.

Level III: There is one comparative study supporting the use of intensive, individualized dietary and weight control advice among kidney transplant recipients.¹⁷

Level IV: There is one prospective study of satisfactory methodological quality,¹⁸ supporting the use of intensive, individualized dietary instruction to reduce body weight in overweight kidney transplant recipients.

Patel studied 33 kidney transplant recipients with stable functioning grafts over a period of 1 year post-transplant.¹⁷ Patients in Group A ($n = 11$) received intensive dietary counselling weekly for the first month then monthly until 4 months post-transplant. The advice was individualized and provided by a dietitian and each patient received information on protein, carbohydrates, fat, fibre, sodium, calcium, iron and detailed advice on weight control, including behavioural advice and exercise. They were given individualized meal and exercise plans. After 4 months they did not see the dietitian again until 12 months. The historical control group of 22 patients (Group B) had received no nutrition advice or dietetic follow-up post-transplant.

There was significantly less weight gained by patients in Group A than those in Group B in the first 4 months after transplant – 1.4 kg *versus* 7.1 kg, respectively ($P = 0.01$). In the 12-month follow-up period there was significantly less weight gained overall by patients in Group A than Group B – 5.5 kg and 11.8 kg, respectively ($P = 0.01$). After intensive dietary intervention was completed and up until 12 months, patients in Group A experienced significant weight gain (and BMI increase) from 4 months to 1 year ($P = 0.02$).

The limitations of this study were:

- small numbers of patients in each group;
- different number in intervention *versus* control group;
- non-randomized; and
- while there was no significant difference between groups with respect to sex, age and baseline weight, there was no adjustment for other confounders.

Despite the limitations, this study provides level III-3 evidence that intensive dietary interventions can pre-

vent excessive weight gain post-transplant and regular follow-up with a dietitian assists with compliance to dietary modifications.

Lopes *et al.*¹⁸ recruited 23 adult kidney transplant recipients with a body mass index of greater than 27 and stable kidney function. All patients were advised to follow the American Heart Association (AHA) Step One Diet and received monthly, individualized dietary instruction from a clinical nutritionist (dietitian) with a 30% energy restriction with respect to estimated energy expenditure.

There were significant differences between mean baseline and final intakes of energy (decreased by 632 kcal, $P < 0.001$), cholesterol (decreased by 131 mg, $P < 0.01$), carbohydrate (increased by 8.4%, $P < 0.001$), and fat (decreased by 9.2%, $P < 0.001$) with the final intakes consistent with the AHA Step One Diet guidelines. Over 6 months, the mean weight loss was 3 kg ($P < 0.001$) with a significant reduction in % fat mass.

The main limitations of this study were:

- small number in the cohort;
- no control group; and
- no information regarding levels of physical activity achieved.

However, the study provides level IV evidence that intensive dietary intervention can lead to significant changes in dietary intake and significant reductions in body weight and body fat mass among kidney transplant recipients.

EVIDENCE FROM STUDIES IN THE GENERAL POPULATION

Dietary therapy for obesity is usually effective during the period of active supervised treatment, but is then followed by a pattern of gradual weight regain during the subsequent unsupervised follow-up period.¹⁹ (Level I evidence)

In the general population, weight loss of 10% from baseline has significant favourable effects on health.^{20,21} (Level I evidence)

In the general population, a program of combined diet and exercise is more effective in maintaining weight loss than either diet alone or exercise alone.^{20,21} (Level II evidence)

SUMMARY OF THE EVIDENCE

Excessive post-transplant weight gain and obesity are associated with a number of adverse health outcomes, including delayed graft function, chronic allograft nephropathy, dyslipidaemia, hypertension, prolonged hospitalization, acute rejection and decreased graft and patient survival.^{10–16}

There is level III evidence that early intervention with regular follow-up is effective in preventing excessive weight gain¹⁷ and level IV evidence that regular dietetic intervention among overweight and obese kidney transplant recipients can lead to significant dietary changes and weight loss.¹⁸

Unfortunately, while evidence for particular dietary interventions in the general population is strong,^{19–21} the current literature does not permit definitive recommendations in this population.

WHAT DO THE OTHER GUIDELINES SAY?

Kidney Disease Outcomes Quality Initiative: No recommendation.

UK Renal Association: No recommendation.

Canadian Society of Nephrology: No recommendation.

European Best Practice Guidelines:²² Obesity (BMI > 30) and weight gain are associated with increased prevalence of cardiovascular disease after transplantation. Appropriate dietary and lifestyle measures should be recommended to these patients.

International Guidelines: No recommendation.

Relevant guidelines for non-transplant populations

1 National Health and Medical Research Council. *Clinical Practice Guidelines for the Management of Overweight and Obesity in Adults*. Canberra: National Health and Medical Research Council; 2003.

2 Dietitians Association of Australia. *Best Practice Guidelines for the Treatment of Overweight and Obesity in Adults*. Canberra: Dietitians Association of Australia; 2005.

IMPLEMENTATION AND AUDIT

No recommendations.

SUGGESTIONS FOR FUTURE RESEARCH

Long-term follow-up studies examining the effects of different dietary interventions among the adult kidney transplant population are needed to confirm the most effective methods for preventing and/or managing weight gain post-transplant. Such research would determine whether or not current guidelines for the management of overweight and obesity in the general population are appropriate for kidney transplant recipients.

CONFLICT OF INTEREST

All the above authors have no relevant financial affiliations that would cause a conflict of interest according to the conflict of interest statement set down by CARI.

ACKNOWLEDGEMENTS

These guidelines were developed under a project funded by the Greater Metropolitan Clinical Taskforce, New South Wales.

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APPENDIX

Table A1 Characteristics of included studies

Study ID	n	Study design and setting	Participants	Intervention	Follow up	Comments and results
Patel (1998) ¹⁷	Intervention (Group A) 11 (9 male) Historical control (Group B) 22 (14 male)	Non-randomized comparative study. Single US hospital transplant unit.	Adult kidney transplant recipients with stable functioning grafts, immediate post-transplant. No record of exclusions.	Intensive, individualized verbal and written dietary advice including detailed weight control advice. Weekly follow-up weekly for the first month then monthly to 4 months. ^{vs} Historic control that had received no dietary advice or follow-up.	1 year	Both groups had similar immunosuppressive regimen; no difference between baseline weight, BMI, age, sex. There was significantly less weight gained by patients in Group A than those in Group B in the first 4 months after transplant – 1.4 kg versus 7.1 kg respectively ($P=0.01$). In the 12-month follow-up period there was significantly less weight gained overall by patients in Group A than Group B – 5.5 kg and 11.8 kg respectively, ($P=0.01$). After intensive dietary intervention was completed and up until 12 months, patients in Group A experienced significant weight gain (and BMI increase) from 4 months to 1 year ($P=0.02$).
Lopes <i>et al.</i> (1999) ¹⁸	23 (7 male) Age 42 ± 14 years	Before and after study. Single centre (Spain).	Kidney transplant recipients with stable kidney function and BMI > 27. Exclusions: Diabetes, myxedema, nephrotic syndrome, hyperlipidemia due to thyroid or liver disease, cholesterol or weight-lowering agents.	AHA Step One Diet (<10% saturated fat, <300 mg cholesterol/day) with an energy restriction of ~30% of TEE. Monthly individualized dietary instruction provided by a clinical nutritionist.	6 months	There were significant differences between mean baseline and final intakes of energy (decreased by 632 kcal, $P<0.001$), cholesterol (decreased by 131 mg, $P<0.01$), carbohydrate (increased by 8.4%, $P<0.001$), and fat (decreased by 9.2%, $P<0.001$) with the final intakes consistent with the AHA Step One Diet guidelines.