

Sodium in pre-dialysis patients

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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)

- **Patients with hypertension and progressive chronic kidney disease (CKD) should limit their sodium intake to below 100 mmol per day. (Opinion)**

Low sodium diets may be unpalatable initially. Persistence with the diet by both patient, doctor and dietician is usually rewarding. The early use of diuretics (especially loop diuretics) is often required. Thiazide diuretics often fail to have a clinically significant natriuretic or hypotensive effect once there is moderate reduction in the GFR (30 – 60 mL/min). In refractory oedema, however, thiazides in combination with loop diuretics may have a synergistic effect (Mailloux & Levey 1998). The hypotensive effect of salt restriction is less as the GFR falls with progressive kidney disease.

People with a salt-losing nephropathy may have a high obligatory sodium loss, and sodium restriction may be harmful for them.

The introduction of acidosis correction therapy (e.g. sodium bicarbonate tablets) will increase the daily sodium intake and needs to be accounted for in the dietary advice.

Each 4 g Ural® sachet (Sigma, Clayton, Victoria) contains 28 mmol of sodium. Each sodium bicarbonate tablet contains 10 mmol of sodium/tablet.

1 teaspoon (approximately 5 g) of baking soda in 60 mL of water contains 60 mmol of Sodium (see 'Acidosis in pre-dialysis patients' guideline for bicarbonate content).

Many salt-substitute compounds contain potassium.

The DASH study looked at varying sodium diet content and hypertension (Sacks et al 2001) and excluded subjects with renal impairment. There is an abundance of lower salt/sodium diets and improved hypertension control, however, these studies all exclude CKD subjects (De Nicola et al 2004).

One review article (Mailloux & Levey 1998) discusses the benefits of sodium restriction in CKD. It summarises the improved control of hypertension in the patient with reduced sodium intake. Salt restriction alone is not adequate to control hypertension in the CKD patient, and anti-hypertensive agents are required (often in combination) to achieve desired levels. In early renal impairment, sodium restriction alone may adequately manage oedema, however, diuretics are needed in oedematous states with more advanced renal failure.

Sodium restriction, in combination with appropriate anti-hypertensive medication, assists in the control of extracellular volume and hypertension in CKD.

Background

Sodium retention in CKD is associated with secondary water retention, and aggravates hypertension. The hypertension increases the risk of further renal damage and cardiovascular disease (Laville 2004). Reduction in dietary salt, and therefore sodium intake, will reduce water retention and the subsequent hypertension. Diuretic use, in particular loop diuretics, can reduce blood pressure in clinical practice by reducing the sodium and water retention of CKD.

The objective of this guideline is to evaluate whether there are differences in morbidity with varying daily dietary intake of sodium. In particular, it aims to assess the effect of the amount of dietary sodium on hypertension.

Search strategy

Databases searched: MeSH terms and text words for kidney disease were combined with MeSH terms and text words for dietary sodium then combined with the Cochrane highly sensitive search strategy for randomised controlled trials and search filters for identifying prognosis and aetiology studies. The search was carried out in Medline (1996 – November Week 2 2003). The Cochrane Renal Group Trials Register was also searched for trials not indexed in Medline.

Date of searches: 27 November 2003.

What is the evidence?

No randomised controlled trials (RCTs) are available which address this issue.

Summary of the evidence

There are no RCTs on this topic.

What do the other guidelines say?

Kidney Disease Outcomes Quality Initiative:

No recommendation.

British Renal Association:

No recommendation.

Canadian Society of Nephrology: No recommendation.

European Dialysis & Transplant Nurses Association/ European Renal Care Association:

The dietician/nutrition advisor will advise the pre-dialysis patient on a sodium intake of 80–110 mmol/day.

Implementation and audit

Low sodium diets may be unpalatable initially. A gradual introduction of the low salt diet is recommended to maximise tolerance and acceptance. A useful stepwise introduction of such a diet is to stop adding salt to food at the time of eating (i.e. remove salt from the table). When this adjustment is tolerated, then a gradual reduction in the salt added in the cooking should be made, with eventually no salt in cooking. Altering the manner in which food is cooked – e.g. microwave cooking often does not require the addition of salt (when compared with cooking in the pot or wok), and still the food retains taste. Finally, a review of the patient's diet should be conducted by a renal dietician. This is particularly important to identify the 'hidden salt' in foods – e.g. flavourings, ready-made meals, preserved meats and breads, and their spreads (e.g. Marmite and Vegemite).

A useful way to clinically assess sodium intake is to measure the sodium in a 24-hour urine collection. Random 24-hour urinary excretion analysis for sodium can give an indication of the excess of sodium in the diet. Therapy should aim to keep the 24-hour excretion below 100 mmol/24-hour period.

Suggestions for future research

Examine the effect of a salt-restricted diet in hypertensive CKD patients.

References

De Nicola L, Minutolo R, Bellizzi V et al; Investigators of the TArget Blood Pressure LEvels in Chronic Kidney Disease (TABLE in CKD) Study Group. Achievement of target blood pressure levels in chronic kidney disease: a salty question? *Am J Kidney Dis* 2004; 43: 782–95.

Laville M. Hypertension in patients with chronic renal disease. *Rev Prat* 2004; 54: 641–45.

Mailloux LU, Levey AS. Hypertension in patients with chronic renal disease. *Am J Kidney Dis* 1998; 32(5 Suppl 3): S120–S141.

Sacks FM, Svetkey LP, Vollmer WM et al. DASH-Sodium Collaborative Research Group. Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. *N Engl J Med* 2001; 344: 3–10.