Nutrition and Renal Disease

Teaching handout

Aims of Session

• Understand the importance of nutrition in renal disease
• Understand the rationale for dietary modification
• Raise awareness of the dietitian's role in the management of renal disease

Background of Renal Dietetic Service

4 Senior Dietitians working in Renal Medicine

- Cover Edinburgh and West Lothian
  o Inpatients at RIE:
    High Dependency Unit, Renal Ward and Transplant Unit
  o Dialysis Units (RIE, WGH, SJH)
  o Low Clearance Clinics (RIE, WGH, SJH)
  o Home Dialysis/ PD Clinics (RIE, WGH, SJH)

Dietary Intervention in Renal Disease

Can include both:

- Dietary education
  o Sodium
  o Protein
  o Energy
  o Phosphate
  o Potassium
  o Fluid
  o Post Transplant

- Nutrition Support
  o Incidence of malnutrition
  o Causes
  o Assessment
  o Management

• Intervention is individualised to each patient's needs
• Can change according to stage of renal disease
  (i.e.: pre-dialysis, conservative management, haemodialysis, peritoneal dialysis or post transplant)
1. Sodium

- Plays vital role in regulation of fluid balance and blood pressure
- Restriction aids compliance in fluid restricted patients
- Guidelines for general population= max 6g NaCl per day
- An estimated 75% of salt intake comes from processed foods
- All renal patients advised on a No Added Salt (NAS) diet: 80-100mmols/day.
  o Avoid adding salt at the table
  o Use small amount in cooking or none at all
  o Reduce intake of salty foods (e.g., cheese, smoked food, savoury snacks)
  o Limit intake of packet, processed & convenience foods
  o Avoid salt replacements (e.g. Lo salt)
  o Encourage use of pepper, herbs and spices as alternative flavourings

2. Protein

- Essential for the growth and repair of body tissues
- Protein-rich foods include:
  o Meat, chicken, fish, eggs, cheese, yoghurts, nuts, pulses, meat substitutes (Note: some high protein foods contain high levels of phosphate and potassium)
- Recommendation for protein varies according to stage of renal disease/ type of renal replacement therapy
  o Pre dialysis/ Conservative Management
    →Controlled protein intake (0.8-1g/kg/IBW)
    ▪ Helps to reduce phosphate load
    ▪ Prevents acidosis
    ▪ May reduce ureamic symptoms
    ▪ But must maintain nutritional status
    ▪ Use of low protein diets is controversial
  o Haemodialysis
    →Moderate protein requirements (1-1.2g/kg/IBW)
    ▪ Haemodialysis is a catabolic process
    ▪ Aim to replace protein lost during dialysis (~4g per session)
  o Peritoneal Dialysis
    →High protein requirements (1.1-1.5g/kg/IBW)
    ▪ Average peritoneal losses of 5-15g protein per day
    ▪ Increased losses in peritonitis
3. Energy

- Adequate energy intake essential to optimise nutritional status
  
  o Pre dialysis/ Conservative Management
    → High energy requirements (30-35 kcal/kg/IBW)
    ▪ Can have raised metabolic rate
  
  o Haemodialysis
    → High-energy requirements (30-35 kcal/kg/IBW)
    ▪ Catabolic process raises metabolic rate
  
  o Peritoneal Dialysis
    → Moderate energy requirements (25-30/kg/IBW)
    ▪ Account for calories absorbed from dialysis fluid (can be 70-270kcal/day)

4. Phosphate

- Phosphate control essential for prevention and management of renal bone disease, arterial stiffening and vascular calcification

- Phosphate in the diet generally associated with intake of protein:
  o Meat, fish, chicken, eggs, yoghurts, cheese, milk

- Typical UK intakes of phosphate:
  - Men: 47mmol/day
  - Women: 36mmol/day

- When GFR deteriorates to 25-30ml/min, phosphate retention can occur.

- Level of restriction depends on treatment mode, residual renal function, dietary intake, and biochemistry. (Phosphate not very well dialysed)

- Aim to maintain serum phosphate <1.8mmol/l.

- Control can be achieved via combination of:
  1) Low phosphate diet
     ▪ Limit high phosphate foods (Cheese, yoghurt, eggs, nuts, milk, oily fish)
     ▪ May have to restrict their phosphate intake to approx 30mmol/day.
     ▪ However, must maintain adequate protein intake

  2) Phosphate binding medication:
     ▪ Works in the stomach
     ▪ Binds the phosphate in foods
     ▪ Should not be taken without food as will have no benefit
     ▪ Examples:
       • Calcichew, Phosex (Calcium containing)
       • Renegel, Alucap, Fosrenol (Non-calcium containing)
5. Potassium
- Average intakes in the UK:
  - Men 84mmol/day
  - Women 66mmol/day
- Restriction often required in renal patients for prevention and management of hyperkalaemia.
- Level of restriction based on treatment mode, dietary intake and biochemistry.
  - Aim approx 1mmol per kg/IBW (e.g. 5ft 8in male ~68mmol)
  - Often no restriction required in peritoneal dialysis

- MUST RULE OUT NON-DIETARY CAUSES
  - Acidosis, ACE inhibitors, NSAID, K+ supplements, K+ sparing diuretics, salt substitute, uncontrolled diabetes

- High Potassium Foods

<table>
<thead>
<tr>
<th>Milk</th>
<th>Miscellaneous</th>
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<tbody>
<tr>
<td>Potatoes (boiling reduces K+ content)</td>
<td>Coffee</td>
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<tr>
<td>Potato crisps (Maize/corn better)</td>
<td>Milk Chocolate</td>
</tr>
<tr>
<td>Fruit (limit all fruit, fruit juice, dried fruit)</td>
<td>Toffee, liquorice</td>
</tr>
<tr>
<td>Vegetables (boiling reduces K+ content)</td>
<td>Nuts</td>
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<td></td>
<td>Salt substitutes</td>
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<tr>
<td></td>
<td>Wine, beer, cider</td>
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<td>(spirits low in K+)</td>
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6. Fluid
- Restriction may be needed to prevent excessive fluid retention, depending on urine output.
- Must count foods with a high fluid content. E.g: soup, ice cream, custard, gravy, jelly.
- Recommendations:
  - Pre-dialysis
    - Ensure adequate fluid intake (2-2.5L per day)
    - May require restriction when nearing ESRF
  - Haemodialysis
    - Varies depending on residual renal function
    - Usually 500mls + PDUO
    - Intradialytic weight gains of >2kg indicate excessive fluid intakes
  - Peritoneal Dialysis
    - Varies depending on residual renal function and ultra filtration
    - Tends to be less restricted than in haemodialysis
- Aim to give practical tips: using smaller cups, sucking ice-cubes
7. **Dietary Intervention Post Renal Transplantation**

- Ensure adequate nutritional intake post-op
- Ensure adequate intake of fluid and electrolytes during polyuric phase
- Dietary restrictions can usually be discontinued
- Education on discharge
  - Healthy eating
  - Food safety, drug interactions
  - Adequate calcium for bone preservation
- Potential to develop obesity, hyperlipideamia and steroid induced diabetes.

**Malnutrition**

- **40-50% of HD and PD patients are malnourished**
- Affects morbidity and mortality rates
- Very difficult to reverse once evident

**Causes:**

- Increased hospital admissions
- Infections
- Inadequate dialysis/ acidosis
- High nutritional requirement
- Limited fluid intake
- Intra-abdominal pressure in CAPD
- Social/ lifestyle
- Concurrent illness
- Uremia
- Drugs
- Anaemia
- Restrictive diets
- Depression
- Economic factors

**Assessment:**

- Consider all factors that relate to nutritional status
  - Diet history and any changes in dietary intake
  - Weight history
  - Anthropometric measurements
  - Underlying medical condition & treatment
  - Biochemistry
  - GI symptoms
  - Social and psychological factors

**Management:**

- Oral Diet
- Oral diet + extra snacks
- Oral diet, extra snacks + supplements
- Oral diet + supplementary NG/ PEG feeding
- Exclusive NG/ PEG feeding
- TPN

*Must also optimise medical management (dialysis adequacy, acidosis, infection)*