Nutritional Management of Pediatric Nephrotic Syndrome

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Presentation Roadmap

- What is Nephrotic Syndrome?
- Causes of Nephrotic Syndrome
- Diagnosis and Treatment of Nephrotic Syndrome
- Dietary Management of Nephrotic Syndrome
- Helping the Patient to Have a Normal Childhood
- Conclusion
What is Nephrotic Syndrome

Nephrotic Syndrome is a group of symptoms that indicate that malfunctioning of the kidneys -

- Too much protein in the urine
- Low levels of albumin in the serum
- Edema in various parts of the body
- High levels of cholesterol and other lipids in the body
Types of Nephrotic Disease

Primary Nephrotic Syndrome

- Minimal Change Disease - Most common. Of unknown origin, thought to be caused by an immune disorder
- Focal Segmental Glomerulosclerosis - Some glomeruli become scarred. May be due to genetic variants
- Membranous nephropathy - due to an autoimmune disease causing protein build up in the basement membrane of the kidney, affecting its function

Secondary Nephrotic Syndrome -

- Diseases that involve the whole body - eg, lupus
- Infections such as Hepatitis B & C, HIV and malaria
- Blood disease such as sickle cell anaemia and leukemia
- Medicines such as NSAIDs, others used for treating cancer, bone loss and mood disorders

Congenital Nephrotic Syndrome

- Genetic variants
- Infections present at or before birth such as syphilis, and toxoplasmosis
Complications of Nephrotic Syndrome

- Protein loss in the urine - foamy urine
- Higher risk of infection
- Blood clots
- Hypertension
- High cholesterol
- Kidney problems
- Blood in the urine
- Fatigue
- Loss of appetite
- Muscle cramps
- Diarrhoea or nausea
Treatment of Nephrotic Syndrome

Primary NS -
- Corticosteroids
- Immune suppressives
- ACE (angiotensin converting enzyme) inhibitors & ARB (angiotensin receptor blockers) to reduce HTN and protein loss
- Diuretics - to reduce extra fluid
- Statins - for hyperlipidemia
- Blood thinners to treat blood clots

Secondary NS -
- Antibiotics
- Change or reduce any medicines for other disease that could worsen or cause NS

Congenital NS - depends on the type of variation
- Perhaps eventually a transplant
- Albumin injections
- Medications to reduce swelling, HTN, protein loss
- Dialysis
Dietary Management of Nephrotic Syndrome

- KDOQI Practice Group Guidelines for Dietary Management
- Energy and Protein requirements in Nephrotic Syndrome
- Control of Sodium Intake
- Limiting Fluid Intake
- Limiting Saturated Fats and Dietary Cholesterol
- Controlling calcium, potassium and other nutrients as required
- Managing the Dietary Intervention - Other aspects
Malnutrition, growth delay, and nutrition related metabolic abnormalities are common in children with CKD. They are associated with a greater risk of morbidity and mortality.

Studies of infants and young children show that energy intakes less than 80% of recommendations cause weight and growth impairment. Both weight loss and growth deficit improve when nutritional recommendations are met.
KDOQI Clinical Practice Guideline for Nutrition in Children with CKD

Indications for Nutritional Intervention

- Impaired ability to ingest or tolerate oral feedings
- Increased metabolic requirements
- Documented inadequate provision or tolerance of nutrients
- Acute weight loss of 10% or more
- BMI value less than 5th percentile for height-age (underweight) or greater than 85th percentile (overweight)
- Inadequate weight gain, length/height more than 2 SDs below the mean (3rd percentile), or a significant decrease in usual growth percentile
- Abnormalities in nutrition-related biochemistries.

Neonates should be considered at nutritional risk if they are preterm or have low birth weight (<2,500 g) even if gastrointestinal, pulmonary, and cardiac functions are normal.
RECOMMENDATION 3: NUTRITIONAL MANAGEMENT AND COUNSELING

1 Nutrition counselling based on an individualized assessment and plan of care should be considered for children with CKD.

2 Individualized nutritional intervention should be based on the child’s age development, food preferences, cultural beliefs, and psychosocial status.

3 Frequent re-evaluation and modification of the nutrition plan of care is suggested for:
   - infants and children with advanced disease,
   - comorbidities influencing growth or nutrient intake,
   - evidence of inadequate intake or malnutrition,
   - or if acute illness/adverse events occur that may negatively impact nutritional status.

4 Nutritional management should be coordinated by a competent dietitian in collaboration with the child, caregiver, and other members of the multidisciplinary pediatric nephrology team (ie, nurses, social workers, therapists, and nephrologists).
Dietary counselling should be positive in nature, providing information about foods the child can eat to replace foods that they must limit or avoid.

Primary caregivers should be involved in education to ensure availability of appropriate food.

They should provide support and encouragement for adequate consumption of allowed food and fluids.

Counselling must be targeted at the appropriate education level of the child and family member.
Overall Healthy Eating Pattern

Consume a variety of -

- Fruits and vegetables
- Grain products including whole grains
- Skim and low fat dairy products
- Fish, poultry and lean meats
- Legumes, lentils, dhals
Proteins

- Protein foods are an essential part of the diet.
- Proteins are needed not only for growth, strength and repair but also for normal development and functioning of the body.
- Good sources of proteins are dhals, nuts, channas, meat, fish, chicken, eggs, milk and its products.
- Normal requirement of protein:
  - 0-6m: 2.2g/kg/d
  - 6m-1y: 1.6g
  - 1-3y: 1.2g
  - 4-6y: 1.1g
  - 7-8y: 1.0g
  - 11-14y: 1.0g
- Proteins are limited in kidney disease. (0.8 - 1g/kg/day) but losses may be added back.
Providing Adequate Energy

- Almost all foods provide energy, some more than others
- However some foods such as bananas and coconut, are also high in potassium
- There are other fruits such as grapes, apples, pears, etc. which can be eaten
- More energy can be added by adding fats such oils, ghee and butter to food. These also add to the flavour. However saturated fats also increase blood lipids. Olive oil would be a good choice.
- Simple carbohydrate foods such as rava, sago and rice provide energy too
- The dietitian can provide a list of safe foods to be eaten more frequently than others
- Energy needs for children:
  
<table>
<thead>
<tr>
<th>Age</th>
<th>Energy Requirement (kcal/kg/d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6m</td>
<td>108</td>
</tr>
<tr>
<td>1-3y</td>
<td>102</td>
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<tr>
<td>7-10y</td>
<td>70</td>
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<tr>
<td>6m-1y</td>
<td>98</td>
</tr>
<tr>
<td>4-6y</td>
<td>90</td>
</tr>
<tr>
<td>11-14y</td>
<td>47-55</td>
</tr>
</tbody>
</table>
Limiting Fluid Intake

- Normal fluid requirements would be
  - 1st 10 kg body weight = 100 ml/kg
  - 2nd 10 kg = 50 ml/kg
  - Beyond this = 20 ml/kg

- But in certain disease conditions, the fluid status is assessed by the Physician and intake prescribed accordingly. Eg, in adults, it could be urine output + 500 ml.

- In children, the rule of thumb could be
  - 0-5 y 500 ml/day
  - 5-10 y 750 ml/day
  - >10 y 1000 ml/day

- Anything liquid at room temperature is considered a fluid including jelly and ice.
Controlling Potassium Intake

- In kidney disease, sometimes potassium can be increased in the blood
- This value needs to be monitored and controlled closely
- Instead of a blanket ban on all potassium containing foods, it is possible to allow them in limited quantities or frequency.
- This helps to keep the food varied and interesting.

Some foods high in potassium are -

- Bananas, dry fruits, dates, oranges, orange juice, mangos, papaya,, potatoes, greens, tomatoes, oats, milk, coconut, bran cereals
Desirable Lipid Profile

Types of Dietary Fats

Dietary fats are divided into two groups:

- Invisible Fats
- Visible Fats
Types of Dietary Fats

**DIETARY FATS**

- **Saturated Fats** - butter, ghee, dalda, coconut, palm oil, lard & animal fats
- **Unsaturated Fats**
  - **PUFA** - Sunflower, safflower, corn, soybean oils
  - **MUFA (omega 9)**
- **Omega 3**
- **Omega 6**
Mono- Unsaturated Fats

- A diet high in this type of fat lowers total cholesterol LDL-C & triglycerides
- It does not lower HDL-C
- Heart disease risk is reduced
- Found in canola oil, Olive oil, Groundnut oil, sesame oil, mustard oil

Omega 3 Fats

- These are found in fish oils, canola, soy bean oil, some seeds, and nuts.
- Omega 3 fatty acids reduce heart rhythm problems, serum triglycerides, LDL cholesterol, blood clotting tendency, heart disease and heart attack in women.
- They also increase HDL cholesterol
Trans-Fatty Acids

- These are formed during hydrogenation.
- They increase LDL-C and reduce HDL-C.
- Limit or avoid foods containing trans-fatty acids.

Dietary Cholesterol

- Cholesterol is found only in animal foods.
- It increases LDL-C but not as much as saturated fats.
- Its effect varies between individuals.
- Allowance - 150 mg - 300 mg /day.
Limit the amount of cooking oil - use no more than 4-5 teaspoons per day per person.

Not more than 25% of the energy intake (calories) should come from fat.

This means 40-50 g fat per day on a 1800 kcal diet.

But don’t forget the hidden fats!
Blood Pressure and Sodium

**SODIUM**

- Blood pressure may be reduced with reduction in sodium intake in some people.
- Limit salt intake to the allowed amount/day
- Reduce salt in cooking.
- Do not add salt at the table.
- Avoid salty foods.
Foods to Avoid or Limit in Sodium Restriction

- Table salt / cooking salt
- Salted snacks, chips
- Papads, vadakams
- Cheese
- Baked goods
- Salted nuts
- Pickles
- Commercial soups
- Processed meats
- Bottled sauces
- Convenience foods
- Salt-preserved meats
- Monosodium glutamate (Ajinomoto)
- Canned foods
- Dry fish
- Instant noodles
Calcium is an important mineral in good nutrition for health and wellness.

- It is a major part of the structure of bones and teeth.
- It also plays an important part in blood clotting, muscle contraction, nerve transmission and other functions.
- Good dietary sources of calcium are milk and milk products, fish if eaten with bones, soy beans, dhals, seeds and greens.
- Calcium metabolism may be deranged in NS, in which case it may need to be controlled.
Blood Clots and Medications

- In case there are complications of blood clots, medications such as Heparin or Warfarin may be used.

- It should be ascertained whether vitamin K is contraindicated for the medicine prescribed.

- If so, foods containing vitamin K such as greens, soya, soybean oil, cruciferous vegetables (such as cabbage, cauliflower and broccoli), egg yolk, etc. should be avoided.
Food Safety

- If the child is in danger of easily contracting infections, care should be taken with food and the surroundings.
- Wash hands with soap and water before handling food or baby feed.
- The size of the pieces and texture of the food should be appropriate for the age of the child, to avoid danger of choking.
- Care must be taken to see that there is no spoilage of food.
- Do not leave cooked food at room temperature more than two hours.
- Do not refrigerate and reheat repeatedly.
- Reheat to at least 74 degrees C.
- Wash fruits and salads with potable water before consuming.
Keep Meal Times Happy

- Give the child sufficient time to finish the meal. Do not hurry him/her up unduly.
- Serve appropriate serving sizes to the child.
- Do not force the child beyond his/ her natural inclination to eat.
- Avoid showing anger and saying things that will produce feelings of guilt.
- Regular timings are best for meals and snacks.
- To stimulate the appetite, encourage quiet activities such as colouring or reading before meals.
- Food should not be used as a reward or punishment.
- Remove uneaten food with a reasonable time. (35 - 40 minutes)
- Recognize that all children may have a few dislikes and respect these.
- Be consistent in what you say or allow.
Summary & Conclusions

- Pediatric Nephrotic Syndrome could be of different origins. Accordingly, the treatment varies.
- Some common features such as proteinuria, growth abnormalities, fluid restriction and susceptibility for blood clots make it imperative for a dietitian to be involved in the care of these children.
- The well-trained dietitian is a vital part of the medical team and caregivers in the care of the child.
- The aim is to alleviate or reduce the complications and provide the child with as normal a life as possible.
Thank You!