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# DIET IN CHILDREN WITH RENAL DISEASE

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CARIBBEAN TOTS TO TEENS



# CHRONIC RENAL DISEASE

is a  
major public health issue  
worldwide,  
with an increase in  
End Stage Renal Disease (ESRD)

# NUTRITION MANAGEMENT DIETARY INTERVENTION

In Jamaica, treatment of ESRD patients involves:


- ▶ Medication
- ▶ Dietary Intervention, and
- ▶ Replacement Therapy

# GOALS OF DIETARY INTERVENTION

- ▶ Promote normal growth while maintaining good nutritional status.
- ▶ Prevent or slow deterioration in renal function.
- ▶ Minimize uremic toxicity
- ▶ Control blood pressure by reducing sodium intake.
- ▶ Provide sufficient dietary freedom for the child to lead a near normal life.

# RENAL DIET

## CONTROL INTAKE OF:

- ▶ PROTEIN/ENERGY
  - ▶ POTASSIUM
  - ▶ PHOSPHORUS
  - ▶ SODIUM/FLUIDS
- 

# PROTEIN RESTRICTION

Is the major component in the nutritional management of Chronic Renal Disease.

**Too little protein** and the patient can develop malnutrition and retard growth.

**Too much protein** can result in an increase in blood urea nitrogen levels (BUN).

**Amino Acids** should be enough to support Normal nitrogen balance and encourage adequate growth without increased BUN.

# PROTEIN

- ▶ Some studies suggest that protein intake in children with chronic renal failure should not be lower than 1.0-2.0 gm/kg IBW
- ▶ Others claim that protein intake can be restricted safely to 0.8-1.1gm/kg/IBW to prevent the accumulation of nitrogenous waste and the lowering of dietary phosphorus intake
- ▶ Hemodialysis recommended intake: 1.5 to 2.0 gms/kg IBW
- ▶ Peritoneal Dialysis recommended intake:1.8 to 2.3gms/kg IBW

## **TIP**

**60% to 75% should be High Biological Value  
e.g. Eggs, Fish, Poultry, Milk & Meat.**



# ENERGY/ CARBOHYDRATES & FATS

## Carbohydrates & Fats

play a major role in energy production.

- ▶ In children the need for CHO. and Fat is greater.
- ▶ Restriction of dietary Protein requires a change in the proportion of calories contributed by CHO. & Fats.
- ▶ Complex CHO. containing Protein must be accounted for – e.g. whole grains and dried beans.
- ▶ Simple CHO. such as concentrated sweets & corn starch may be substituted.

# FATS

- ▶ Heart-healthy Unsaturated Fats are encouraged
  - ▶ E.g. Olive, Corn, Coconut (monounsaturated) oils
- ▶ Fats in the form of creams, sauces, margarine & ice cream increase calorie intake.
- ▶ Patients with CRF often develop cardiovascular complications due to increased serum LDL and decreased HDL.
- ▶ Maintain a polyunsaturated: saturated fat ratio of 2:1
- ▶ Restrict cholesterol to <200 mg/dl.

# POTASSIUM RESTRICTION

- ▶ When serum K levels exceed 5.5mEq/L and urine out-put is less than a 1000 ml/day restriction is needed.
- ▶ Pre-dialysis: *restrict to 50 -60 mEq/day*
- ▶ Dialysis: *restrict to 38-75 mEq.*
- ▶ Peritoneal Dialysis: *No restriction may be necessary*

*Many foods are high in potassium,  
close monitoring is critical.*

## **TIP:**

**Potassium contents of starchy vegetables, roots & tubers  
can be reduced by  
leaching prior to preparation**

# PHOSPHOROUS RESTRICTION

- ▶ Phosphorus control is necessary for the CRF patients mainly to prevent ***renal bone disease***.
- ▶ Recommended intake:
  - ▶ pre-dialysis -10-12mg/kg IBW
  - ▶ dialysis <17 mg/kg IBW.
- ▶ Serum Phosphorus is best controlled with the use of phosphate binders.

*Dairy products & some high protein foods may be **high** in phosphorus*

TIP

For normal growth & healthy bones in children give oral **calcium** & **Vitamin D** supplements

# SODIUM/FLUIDS

- ▶ Sodium intake is based on the child's weight, BP, and expected losses.
- ▶ Normotensive 2 mEq kg/day
- ▶ Hypertensive 1mEq/kg/day


*The average meal of a 12 year old child contains **approx. 500 mls of water** in food **not** included in the fluid allowance.*

## **TIP**

**Fruits & vegetables contain 99% water, Fish, poultry, & meats contain about 50%**

- ▶ Avoid foods that are cured, smoked, & salted.

# RENAL REPLACEMENT THERAPY

- ▶ HEMODIALYSIS
  - ▶ PERITONEAL DIALYSIS
  - ▶ RENAL TRANSPLANTATION
- 

# HEMODIALYSIS INCREASED NUTRITIONAL REQUIREMENTS

- ▶ Requirements should be increased as soon as the patient starts dialysis.
- ▶ Increase protein to at least 1.2gm./kg IBW
  - ▶ high biological value protein
- ▶ Increase Carbohydrates and Fats to ensure positive nitrogen balance, adequate growth, and prevent malnutrition.
- ▶ Other important nutrients - Vit B6, Vit C, Iron & Zinc.
  - ▶ Iron deficiency anemia (frequent) can be treated with iron supplements
  - ▶ erythropoietin (EPO) used to stimulate bone marrow in CKD when iron stores are normal
  - ▶ Zinc supplement improve taste sensitivity and appetite

# PERITONEAL DIALYSIS

- ▶ Peritoneal dialysis is simple, safe, & easily adapted for children.
- ▶ Residual renal function is better preserved, allowing a more liberal diet, and better fluid balance.
- ▶ Typically patients lose 6-12gms of protein per treatment via the dialysis so protein needs are generally in the range of 1.5-2.5gm/kg IBW
- ▶ Patients often suffer nausea, satiety, and anorexia due to the presence of dialysate in the abdomen, so small frequent meals are recommended



# RENAL TRANSPLANTATION

- ▶ Kidney transplants are particularly desirable for children because they can restore kidney function & normal growth.
- ▶ High protein intake 1.5-2.5gm/kg IBW post-transplantation is recommended to maintain nitrogen balance, wound healing, and prevent infection.
- ▶ Carbohydrates and fats provide calories for energy. Emphasis polyunsaturated and monounsaturated fats not saturated.
- ▶ Sodium intake is often limited to 87-130mEq /day in the acute post-transplant period, to control the sodium and fluid retention experienced with corticosteroid treatment.

# NUTRITIONAL CHALLENGES

**DIET** is an important part of the *treatment plan* for children with CRD.

These patients face many nutritional challenges:

- ▶ Altered metabolism
- ▶ Poor nutrition intake
- ▶ Uremia
- ▶ Dialysis related loss of nutrients
- ▶ Anorexia
- ▶ Lethargy/tiredness.

# NUTRITIONAL SUPPLEMENTS

Nutritional supplements are available for renal patients.

1. Suplena - recommended for pre-dialysis patients.
2. Nepro - high in protein (19.1g per 8 fl oz) high in calories, low in phosphorus, potassium, and sodium; nutrient dense and low volume

In some cases **tube feeding** is often the best way to ensure a child gets the full supply of fluids and nutrients needed to promote growth and development

# CONCLUSION

**Diet Therapy** remains a vital tool in the treatment of patients with various degrees of Renal Disease.

**Protein restriction** has been shown to be beneficial in preventing renal deterioration in CRF, however some studies suggest this therapy may negatively affect pediatric patients.

The **mobility and mortality rate** for ESRD patients remains relatively high. **Malnutrition** is one of the major causes. Mortality rates remain significantly lower for pediatric ESRD patients when compared to adults.

There is a need for increased research in the use of early dietary intervention.

QUESTIONS AND COMMENTS ARE  
WELCOME

THANK YOU!

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