NUTRITION PLANNING FOR
PRE AND POST
LIVER TRANSPLANT

DAPHNEE.D.K
SENIOR DIETITIAN
APOLLO HOSPITALS (MAIN)
CHENNAI
Prevalence of malnutrition

- 20% - Compensated liver disease
- >80% - Decompensated liver disease
- 100% - Await Liver Transplant

Antonio J. Sanchez; Mayo Clinic Foundation
Nutrition related functions of the liver

- Metabolism
- Emulsification of dietary fat
- Micronutrients

Carbohydrate
Protein
Fat
Metabolic Disturbances

**CARBOHYDRATE**
- Glucose intolerance and insulin resistance
- Prevalence of diabetes – 38%

**ENERGY**
- 34% of ESLD – Hyper metabolic

cont...
Accelerated starvation

- Fat – major substrate for energy

72hrs of Starvation Vs Overnight fast
(Normal adult) (Cirrhotic pt)

Fat and Muscle Breakdown

- Increases gluconeogenesis → muscle wasting cont...
Metabolic Disturbances

PROTEIN
• Imbalance in BCAA and aromatic amino acids
• Expected Ratio – 3.5: 1
• Decreased to 1:1
  - increased cerebral uptake of aromatic amino acids
  - promoting the synthesis of false neurotransmitters
• Muscle wasting

cont...
Metabolic Disturbances

LIPIDS

• Impaired synthesis of PUFA from EFA precursors.

• Decreased PUFA associated with severity of malnutrition
Etiology of Malnutrition in ESLD

Poor dietary intake
- Anorexia & early satiety
- Dietary restrictions (salt & protein)
- Ascites
- Encephalopathy
- Gastro paresis, nausea & vomiting

Latrogenic
- Large volume paracentesis

cont...
Etiology of Malnutrition in ESLD

Nutrient malabsorption
- Pancreatic insufficiency
- Cholestatic liver disease

Drug – induced losses
- Neomycin
- Lactulose
- Diuretics
- Antimetabolites
- Cholestyramine
Abnormalities of metabolism

MALNUTRITION

Morbidity

Mortality

Poor nutrient intake
Nutrition Assessment
Subjective global assessment

Weight change

Appetite

GI symptoms (nausea, vomiting, diarrhea, constipation)

Diet history

cont…
Nutrition Assessment

- Activity Level
- Physical exam
  - Muscle wasting
  - Fat stores
  - Presence of Ascites
- Laboratory Values

Rating
- Well nourished
- Moderate malnourished
- Severe malnourished
Guidelines for estimating fluid weight (kg)

<table>
<thead>
<tr>
<th>Category</th>
<th>Ascites</th>
<th>Odema</th>
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</thead>
<tbody>
<tr>
<td>Minimal</td>
<td>2.2</td>
<td>1.0</td>
</tr>
<tr>
<td>Moderate</td>
<td>6.0</td>
<td>5.0</td>
</tr>
<tr>
<td>Severe</td>
<td>14.0</td>
<td>10.0</td>
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</tbody>
</table>
Fluid retention in ESLD & relevance to nutrition

- Impairs food intake
- Energy expenditure increases
- Negative nitrogen balance
Pre OP Nutrition Goals

- Correct malnutrition
- Prevent metabolic complications
- Improve quality of life
- Nutrition education – Individual care plan
- Reduce Perioperative complications
Pre OP Nutrient recommendations

ENERGY

• 1.2 to 1.4 times of BEE (approx 30-35 Kcal/Kg/day)

• 60 – 70 % of calories as complex & simple CHO

cont…
Pre OP Nutrient recommendations

PROTEIN

- Minimum 1.0 – 1.2 g/kg to 1.5g/kg
- To maintain
  - Muscle mass
  - Protein levels in the blood
- Hepatic Encephalopathy
  - Limit 0.6 – 1.0g/kg
  - BCAA formula

cont...
Pre OP Nutrient recommendations

• **SALT**
  1 - 2 g / day or less

• **FLUID**
  1 – 1.5 litres / day

• **Individualized**
General recommendations

- Small frequent meals
- Monitor calorie count
- TPN - GI dysfunction is present
- Aggressive nutrition support
  - Highly Individualized
  - Minimize catabolism
  - Slow the deterioration of nutritional status
Immediate Post-operative state

Nutrition Status is affected by

- Graft function
- Pre-existing malnutrition
- The stress response to surgery
- Catabolic effects of high dose steroids

cont...
Immediate Post-operative state

- Post-operative complications
  - Bleeding
  - Renal failure
  - Sepsis
  - Rejection
# Post OP Nutrient recommendations

<table>
<thead>
<tr>
<th>NUTRIENTS</th>
<th>SHORT TERM</th>
<th>LONG TERM</th>
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<tbody>
<tr>
<td>Calories</td>
<td>120 – 130% of BEE</td>
<td>Maintenance:</td>
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<tr>
<td></td>
<td></td>
<td>120 – 130% BEE</td>
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<tr>
<td>Protein</td>
<td>1.3 – 2g / kg / day</td>
<td>Based on activity level</td>
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<tr>
<td>Carbohydrate</td>
<td>50 – 70% of calories</td>
<td>50 – 70% of calories</td>
</tr>
<tr>
<td>Fat</td>
<td>30% of calories</td>
<td>&lt;30% of total calories</td>
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<tr>
<td>Calcium</td>
<td>1200mg / day</td>
<td>1500mg / day</td>
</tr>
<tr>
<td>Vitamins &amp; Minerals</td>
<td>According to RDA levels</td>
<td>According to RDA levels</td>
</tr>
</tbody>
</table>
General recommendations

- Small frequent meals
- High calorie and protein diet with supplements
- Daily calorie count
- Strict glycemic control for diabetes
Long Term Management

- Calorie to maintain Desirable Body Weight (DBW)

- Protein - 1 g/kg body weight

- Salt - Low salt
Aims of Nutritional modifications

- To prevent health problems
  - Diabetes
  - Hypertension
  - Hyperlipidemia
  - Excessive weight gain
Guidelines for food hygiene

• Foods should be cooked thoroughly and eaten

• Meals should be served hot and never reheated

• Do not use leftovers

• Food should be eaten fresh and well within the “use by date”

• Individual small packets of foods and drinks should be used
Guidelines for food hygiene

- Hand wash - Emphasized
- Only thick-skinned fruits are permitted
- Use of separate cutting board - prevent cross-contamination
- Non-vegetarian foods should be very well cooked
Guidelines for food hygiene

• When eating out, avoid salads, raita, fresh fruits etc.

• Avoid eating in unclean eat outs

• Drink boiled cooled water.
Foods that cause problems

AVOID

• Opened packets / cans of food

• Raw or soft egg (half boiled / scrambled)

• Hard cheese / blue cheese / cream cheese

• Ready to eat unsealed savory / sweets
Foods that cause problems

AVOID

• Shell fish
• Raw vegetables / fruits
• Dry fruits
• Adding sauces & pepper to food after cooking
Thank You