

**NUTRITION PLANNING FOR
PRE AND POST
LIVER TRANSPLANT**



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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 
 - Carbohydrate
 - Protein
 - Fat
- Emulsification of dietary fat
- Micronutrients

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

Poor nutrient
intake



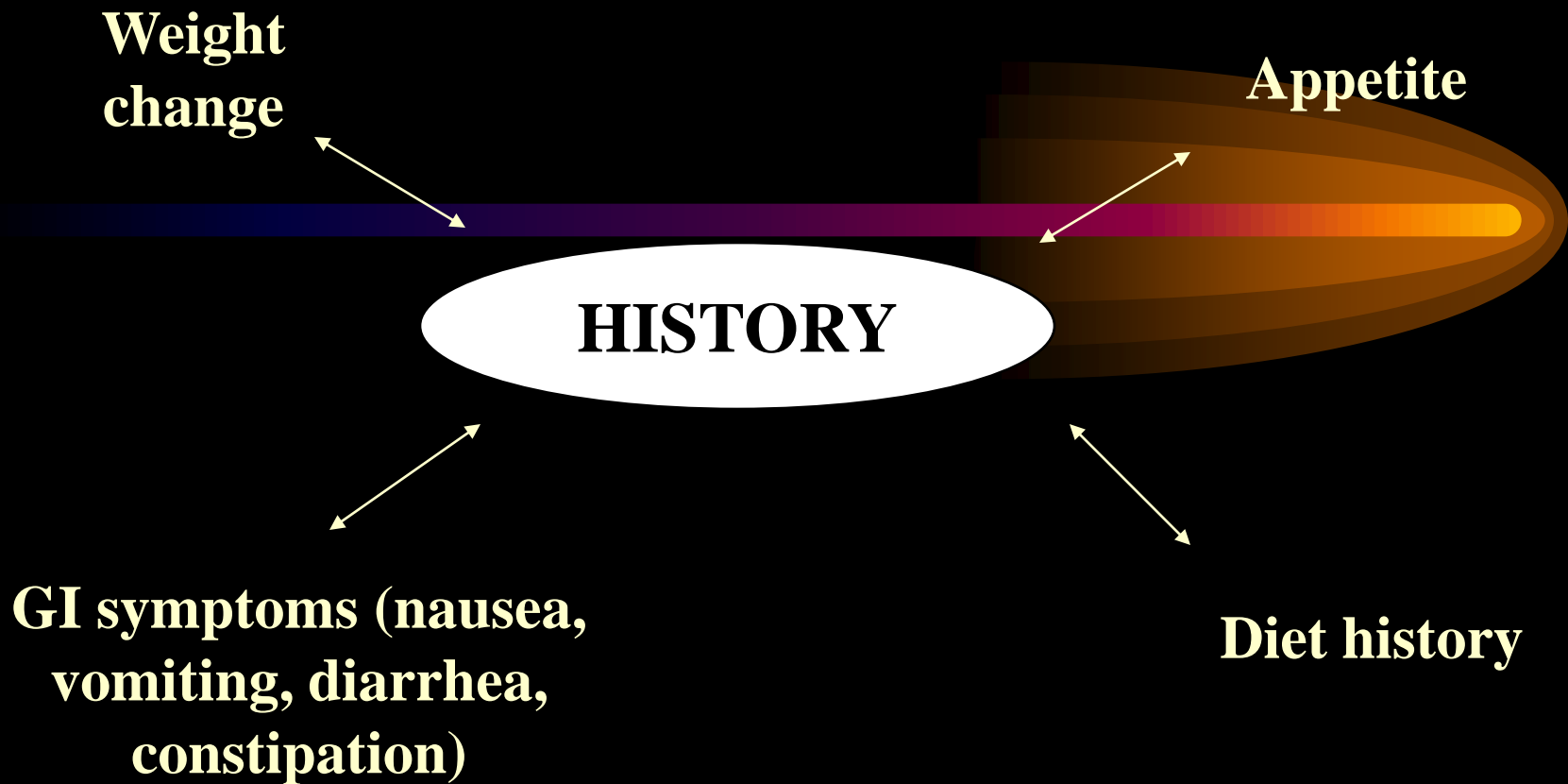
MALNUTRITION

↑ **Morbidity**

↑ **Mortality**

Nutrition Assessment

Subjective global assessment



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)



Category	Ascites	Odema
Minimal	2.2	1.0
Moderate	6.0	5.0
Severe	14.0	10.0

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

NUTRIENTS	SHORT TERM	LONG TERM
Calories	120 – 130% of BEE	Maintenance: 120 – 130% BEE
Protein	1.3 – 2g / kg / day	Based on activity level
Carbohydrate	50 – 70% of calories	50 – 70% of calories
Fat	30% of calories	<30% of total calories
Calcium	1200mg / day	1500mg / day
Vitamins & Minerals	According to RDA levels	According to RDA levels

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

cont...

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

cont...

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