Nutritional Support in Patients with Cirrhosis

2020 AASLD Transplant Hepatology Board Review Course

Jennifer C. Lai, MD, MBA
University of California, San Francisco

Major sources for guidance on nutritional support in patients with cirrhosis

- AASLD Practice Guidelines / Guidance
  - Evaluation for Liver Transplantation in Adults
- EASL Clinical Practice Guidelines on nutrition in chronic liver disease (2018)
- European Society for Parenteral and Enteral Nutrition (ESPEN) guideline on clinical nutrition in liver disease (2019)

AASLD
AMERICAN ASSOCIATION FOR THE STUDY OF LIVER DISEASES

NUTRITIONAL ASSESSMENT

Nutritional assessment should be performed in every patient with cirrhosis and every LT candidate.

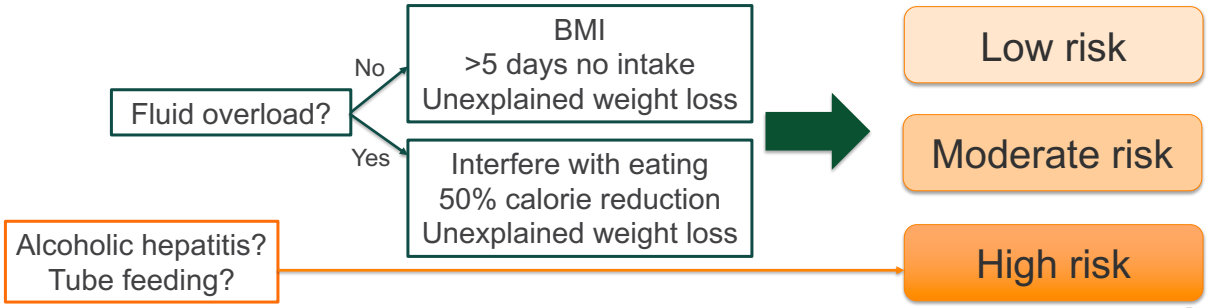
- Malnutrition is present in up to 70% of patients on the LT waitlist
- Malnutrition is associated with poorer outcomes following LT
- AASLD : “nutritional assessment”
- EASL : “rapid nutritional screen in all patients with cirrhosis and a complete detailed assessment in those at risk for malnutrition”

Nutrition screening: stratifying *risk* for malnutrition

- Body mass index ≤ 18.5 kg/m2
- Child C cirrhosis

} High risk for malnutrition → proceed with detailed nutritional assessment

For everyone else, use the Royal Free Hospital Nutrition Prioritizing Tool:



ESPEN and EASL guidelines. Amodio, Hepatology 2013.

Low BMI <18.5 kg/m^2 is associated with poor post-LT outcomes.

- Compared to normal weight LT recipients, low BMI at transplant is associated with:
  - ↑ risk of death and graft loss
  - ↑ risk of hemorrhagic complications and CVA

Bambha K, Liver Transpl 2015. Dick AAS, Liver Transpl 2009.

High BMI >40 kg/m² is associated with poor pre-LT mortality; data re: associations with post-LT mortality are conflicting.

- Obesity is associated with ↑ waitlist mortality
- High BMI and post-LT outcomes:
  - Not consistently associated with post-LT mortality
    - Except in patients with NASH where obesity →. ↑ post-LT mortality
  - Associated with wound infections, possible association with overall infections

Spengler E, Transplantation 2017. Satapathy S, Liver Transpl 2020.

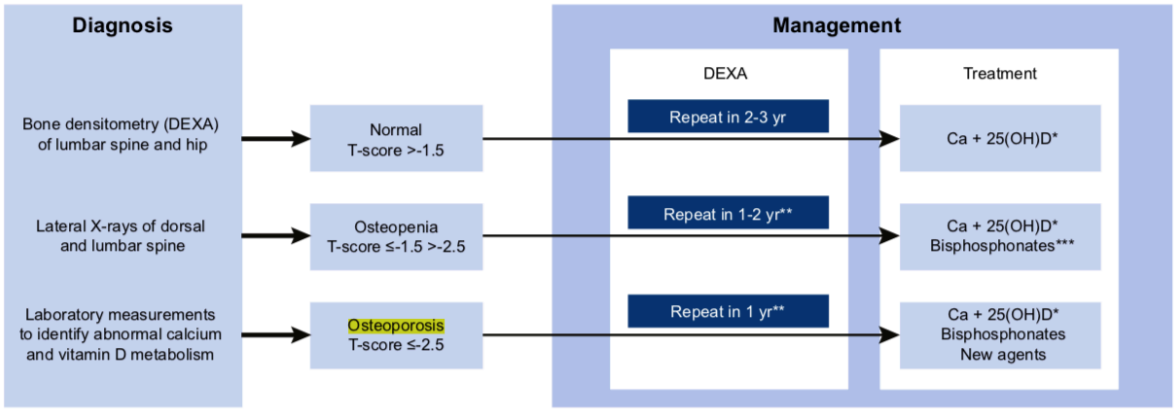
3 components of a detailed nutritional assessment

Component	Resources needed
Detailed dietary intake	Referral to a registered dietician
Muscle mass measurement*	CT/MRI of L3 vertebra DXA scan Bioelectrical Impedance Assay
Global assessment / assessment of muscle function*	Subjective Global Assessment (SGA), Royal Free Hospital-GA hand grip, physical frailty, 6-minute walk test

* Options for tools. There is currently no formal consensus on a single tool.

EASL Guidelines. Tandon P, Hepatology 2017.

Evaluate bone mineral density in patients with cirrhosis, cholestatic liver disease, and prior to LT.



EASL Guidelines.

Evaluate bone mineral density in patients with cirrhosis, cholestatic liver disease, and prior to LT.

- Osteoporosis is found in up to 30% of patients with cirrhosis.
- Bone mass diminishes in the first 3 months after LT
  - Fracture risk is elevated *for up to 2 years*

The presence of esophageal varices are <u>not</u> a contraindication to oral bisphosphonates
("exercise caution in patients with recent EV therapy")

MD.

- **Bisphosphonates can be safely used in patients with cirrhosis.**

AASLD & EASL Guidelines.

AASLD
AMERICAN ASSOCIATION FOR THE STUDY OF LIVER DISEASES

NUTRITIONAL MANAGEMENT

AASLD

General Strategy

Enough

Of the right stuff

At the right time

Strategy #1: Enough

AASLD

Recommended caloric intake

35 kcal/kg body weight/day

In obese patients with cirrhosis in whom weight loss is recommended:

Tailored diet
-500-800 kcal/day
Maintaining adequate
(1.5 g/kg body weight/day)
protein intake

Strategy #1: Enough

AASLD

Oral nutritional supplements should be used as first-line therapy when feeding goals cannot be attained by oral diet alone.

Use enteral feeding when caloric intake cannot be achieved with oral supplementation alone.

- Naso-gastric tubes are not contra-indicated in patients with non-bleeding esophageal varices.

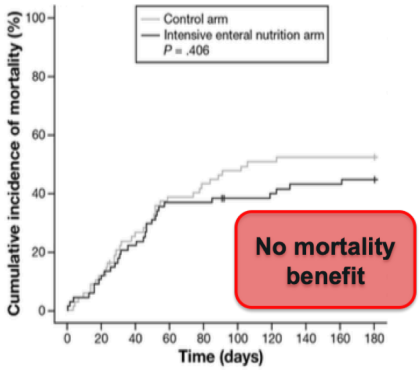
Use parenteral nutrition when energy needs cannot be maintained by oral/enteral methods.

- Consider parenteral nutrition with unprotected airways and HE when cough and swallow reflexes are compromised. (EASL)

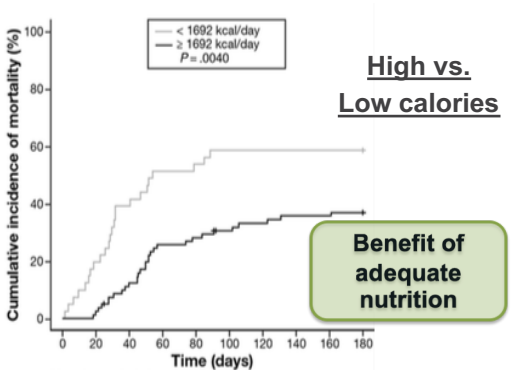
Strategy #1: Enough

In an RCT of patients hospitalized with severe alcoholic hepatitis:

Enteral vs. Non-enteral



High vs. Low calories



Moreno C, Gastroenterology 2016.

Parenteral nutrition should be used in whom oral or enteral nutrition is not effective, feasible, or tolerated.

Strategy #2: Of the right stuff

Recommended protein intake

1.2-1.5 g/kg body weight/day

Without evidence of malnutrition

With evidence of malnutrition

Protein should NOT be restricted in patients with cirrhosis, including those with HE.

Strategy #2: Of the right stuff

AASLD

RCT shows that low protein diet does not prevent/reduce HE, results in ↑ protein breakdown

30 patients with cirrhosis presenting to emergency room with HE, randomized to 14 days:

Low protein (0.5 g/kg/day) n=15

Normal protein (1.2 g/kg/day) n=15

→

No difference in evolution of HE

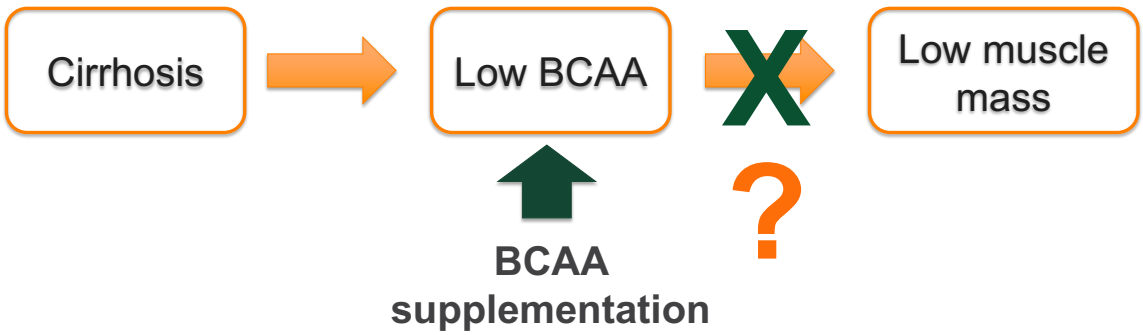
Increased early protein breakdown in low protein group

Cordoba J, J Hep 2004.

Strategy #2: Of the right stuff

AASLD

Branched-chain amino acids (BCAAs)



Strategy #2: Of the right stuff

AASLD

Cochrane meta-analysis of BCAAs: 16 RCTs, 827 pts

- **Overall benefit of BCAAs on outcome of hepatic encephalopathy** compared to no HE meds
  - Compared to lactulose or neomycin, no effect of BCAA on HE
  - *No study compared to rifaximin*
- **No effect of BCAAs on mortality**, QOL, or nutritional parameters

Cochrane database of systematic reviews 2015.

Consider BCAA supplementation in those who are protein "intolerant" or cannot otherwise maintain nitrogen balance.

Strategy #2: Of the right stuff

AASLD

Micronutrient deficiencies

Fat-soluble vitamins ADEK

- Cholestatic liver disease can lead to fat-soluble vitamin malabsorption.[1]
- Supplement mainly fat-soluble vitamins.[2]

Zinc

- Sxs: peri-oral cheilosis, muscle cramps, neurosensory deficits, ?worsened HE
- Elemental zinc 50 mg per day x 3 months[2]

Thiamine

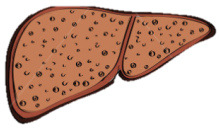
- Most commonly seen in chronic alcohol use, bariatric surgery → Wernicke enceph
- Thiamine 500 mg IV x 1d, 250 mg IV x 5d, then 100 mg PO daily

[1]AASLD 2013 Practice Guideline. [2]ASPEN Liver Disease Nutrition Support Curriculum 2017.

Strategy #3: At the right time

AASLD

Avoid long periods of fasting



↓ gluconeo-genesis → ↑ breakdown of skeletal muscle to meet amino acid needs → protein-energy malnutrition

Metabolic profile of a *patient with cirrhosis* after an **overnight fast** = Metabolic profile of a *healthy person* after **3 days starvation**

Small, frequent meals
Early breakfast & late evening snack

Owen OE, J Clin Invest 1981.

Strategy #3: At the right time

AASLD

Late evening snack: improves body composition

- But studies have not shown improvement in survival or QOL

≥210 kcal Late Evening Snack

Glucose solution

Rice Ball

Regular food

BCAA-enriched supplement

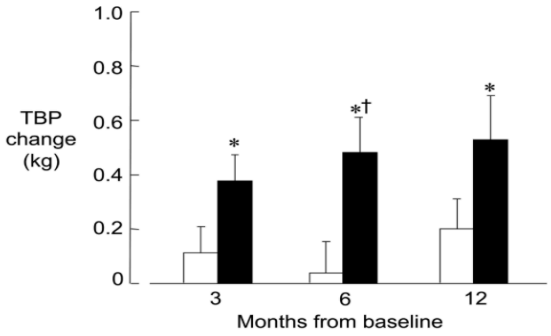
Supplemental shake

Tsien C, J Gastro Hep 2012

Strategy #3: At the right time

AASLD

Nocturnal feeding improves total body protein



Daytime feeding (between 7am-7pm), n=52

Nighttime feeding (between 9pm-7am), n=51

Plank L, Hepatology 2008

Strategy #3: At the right time

AASLD

After liver transplantation: Initiate normal food/enteral nutrition within 12-24 hours post-operatively.

- Post-operative nutrition (vs. fluid/electrolytes) in transplant recipients is associated with:
  - Less time on ventilator, shorter LOS in the ICU
  - Better nitrogen retention
- Enteral nutrition initiated at 12h post-op vs. parenteral nutrition → lower rate of infections
- Immunonutrition (omega-3 fatty acids, arginine, nucleotides) increased bleeding time in patients with cirrhosis, no benefit

Hasse, JPEN 1995. Wicks, Lancet 1994. Badalamenti, Hepatology 1997.

Key Points

- Perform rapid nutritional screen in all patients with cirrhosis
- Perform detailed nutritional assessment in those with evidence of malnutrition or moderate to high *risk* for malnutrition
- Assess bone mineral density in all patients with cirrhosis
- Management strategies:
  - Enough: Target 35 kcal per kg body weight/day
    - Can reduce daily intake by 500-800 kcal/day to achieve weight loss
    - Oral / enteral preferred; use parenteral nutrition in those intolerant to oral/enteral methods or with unprotected airway
  - Of the right stuff: Target 1.2-1.5 grams protein per kg body weight/day
    - Supplement with BCAAs if patient cannot otherwise maintain protein intake
  - At the right time: Small, frequent meals; breakfast + late evening snack

GOOD LUCK!