Nutritional Care in Cirrhosis

Keerthana Kesavarapu, DO
Assistant Professor of Medicine
Gastroenterology and Hepatology
RWJ Barnabas Health
New Brunswick, New Jersey

Outline

- Etiologies of Malnutrition
- Nutritional Screening
- Caloric intake considerations
- Protein intake considerations
- Micronutrient intake considerations
- Hepatic Encephalopathy

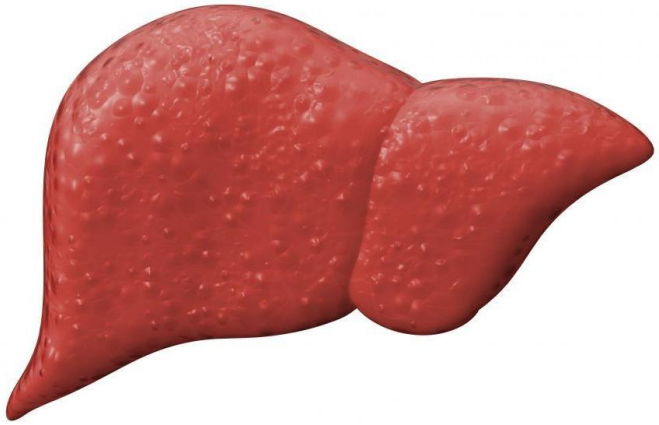
Liver Nutrition 101

- Carries out vital nutrition functions
  - Carbohydrate Metabolism/Storage → gluconeogenesis, glycogen storage
  - Protein Metabolism → protein, aa, and urea synthesis
  - Fat Metabolism → bile production/storage
  - Vitamin and Mineral Storage → Vitamins A, D, E, K, B12, Copper
  - Iron Metabolism/Storage → ferritin production

Liver Disease = Major Nutritional Implications

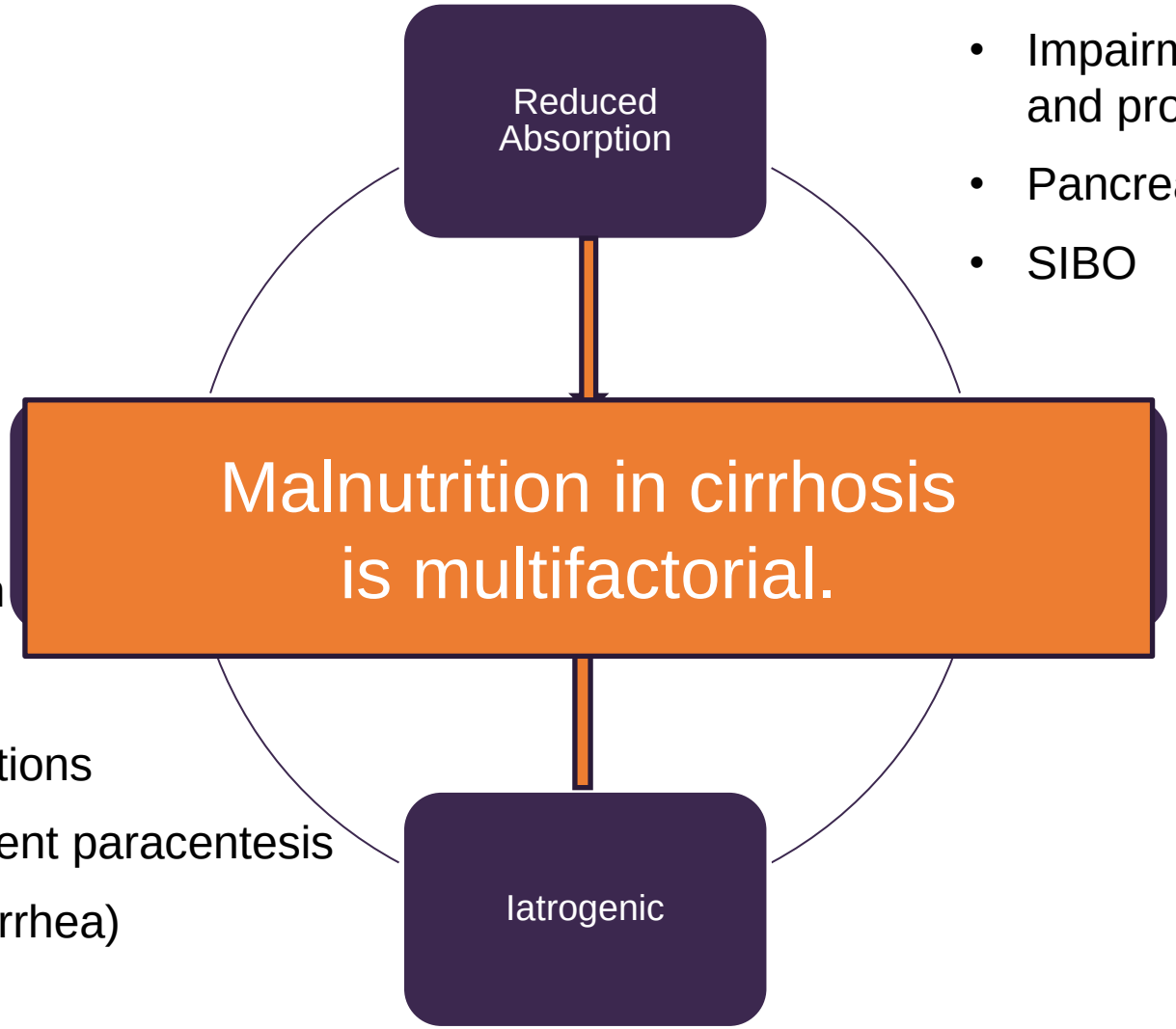
Malnutrition in Liver Disease

- Up to 80% of patients with decompensated cirrhosis may screen positive for malnutrition
  - Child-Pugh class A and B : Protein-calorie malnutrition 21% and 40%
  - Child-Pugh class C : Protein-calorie malnutrition 70-80%
- Malnutrition is highest in those with alcohol-related cirrhosis
- NAFLD/NASH provides an interesting nutrition paradox (overweight, undernourished)



Krenitsky. *Nutrition Update in Hepatic Failure*. April 2014.

Etiologies of Malnutrition



- Impairment of bile flow and production
- Pancreatic insufficiency (alcoholic)
- SIBO

- Poor appetite
- Early satiety (ascites, gastroparesis)
- AMS (HE)
- Frequent hospitalization

- Altered impaired glucose metabolism
- Enhanced protein catabolism
- Chronic inflammation

- Dietary restrictions
- Diuresis/frequent paracentesis
- Lactulose (diarrhea)

Krenitsky. *Nutrition Issues in GI*. June 2003.

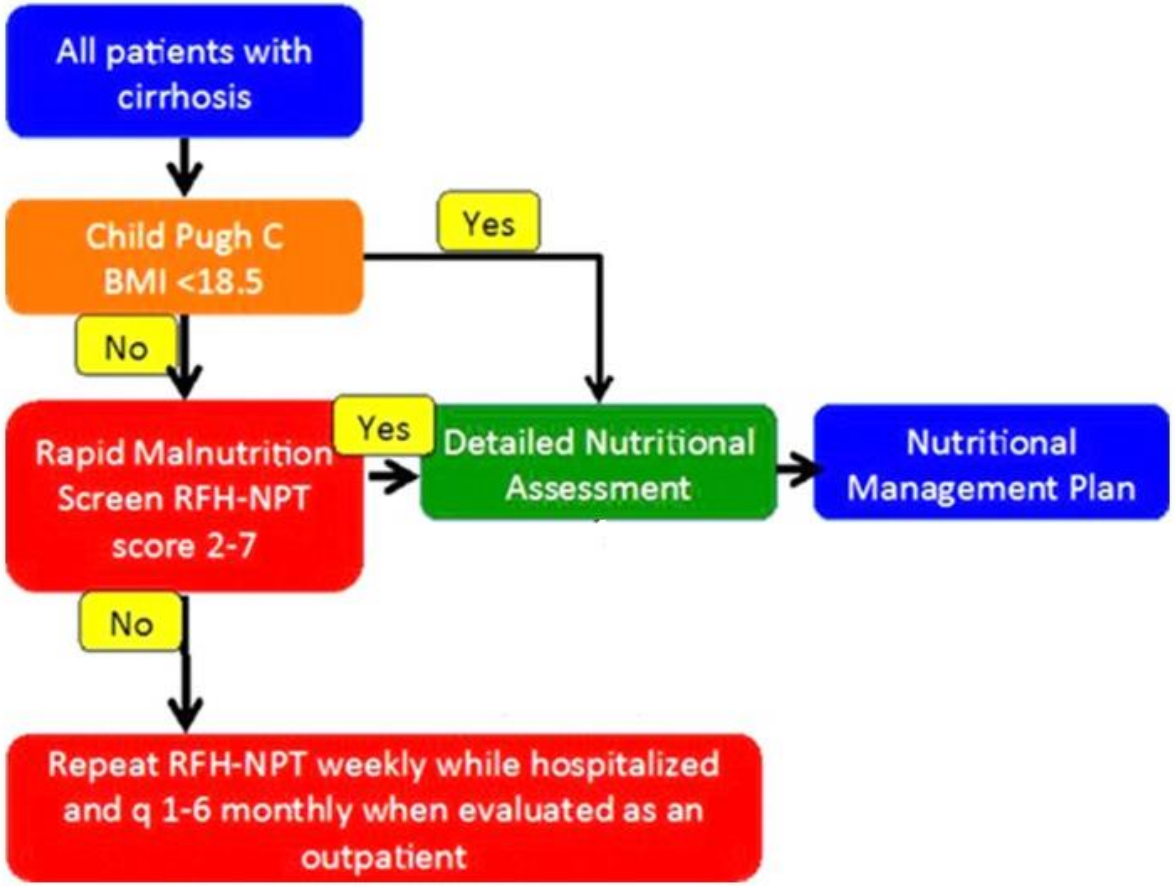
JR, 62 Yo Man With Refractory Ascitesm Paracentesis Record

No: 8									
Volume:	**10,**	**4.5,**	**5.0,**	**3.0,**	**4.0,**	**5.0,**	**6.5,**	**5.5 liters**	
$Albumina_{scites}$:				**1.1 – 1.4 g/dl**					
Albumin received:	**75g**	**0**	**0**	**0**	**0**	**0**	**50g**	**0**	
Net albumin loss:	**- 55g**	**- 60g**	**- 65g**	**- 40g**	**- 52g**	**- 65g**	**- 20g**	**- 70g =**	**- 427 g**
Serum albumin:	**2.9 g/dl**				**2.4 g/dl**			**1.8 g/dl**	

S. Munoz. *AASLD*. 2017.

Nutritional Screening in ESLD

- Similar principles to general population
  - Basic Screening ➡ EVERYONE
  - Detailed Screening ➡ SCREEN POSITIVE OR WITH ADDITIONAL RISK FACTORS
  - Nutritional Planning ➡ IN THOSE WHO NEED IT



Tandon et al. *Hepatology*. 2017;65(3):1044-1057.

Screening - Royal Free Hospital Nutrition Prioritizing Tool

STEP 1:
Does the patient have alcoholic hepatitis or are they being tube fed?
No = 0 Yes = 6

STEP 2:
Does the patient have fluid overload?
No = 0 Yes = 1

STEP 3:
Risk Stratify based on score
Score = 0 : Low Risk
Score = 1 : Moderate Risk
Score = 2-6 : High Risk

Amodio et al. *Hepatology*. 2013;58(1):325-36.

Assessment for Malnutrition

Evaluation of nutritional status: Royal Free Hospital Global Assessment

Muscle mass (anthropometry, CT scan, DEXA, BIA)

Global physical performance

Understanding Energy Expenditure

Resting Energy Expenditure (REE) (55-75%)

+

Thermic Effect of Food (5-10%)

+

Growth/Stress/Disease

REE should be measured not predicted in patients with cirrhosis

Equations

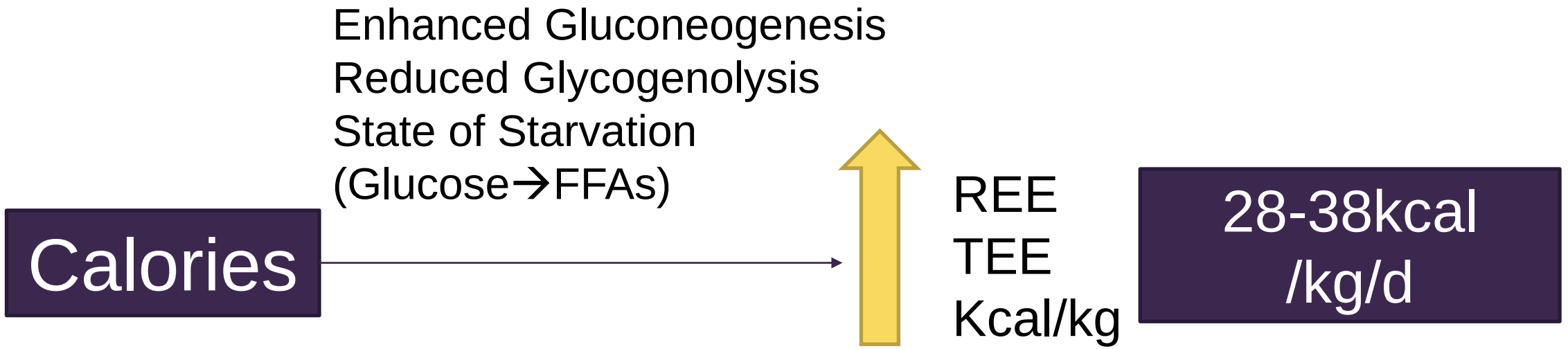
- Hospital Based:

Ireton-Jones, Penn State

sed:

n St Jeor

Nutritional Requirements in Cirrhosis



EASL Clinical Practice Guidelines on Nutrition in CLD. 2018.

Nutritional Requirements in Cirrhosis

1. Protein Catabolism

(Amino Acid → Glucose)

2. Reduced Protein Synthesis

Protein → N Losses g/kg → 1.2-1.5g/kg/d

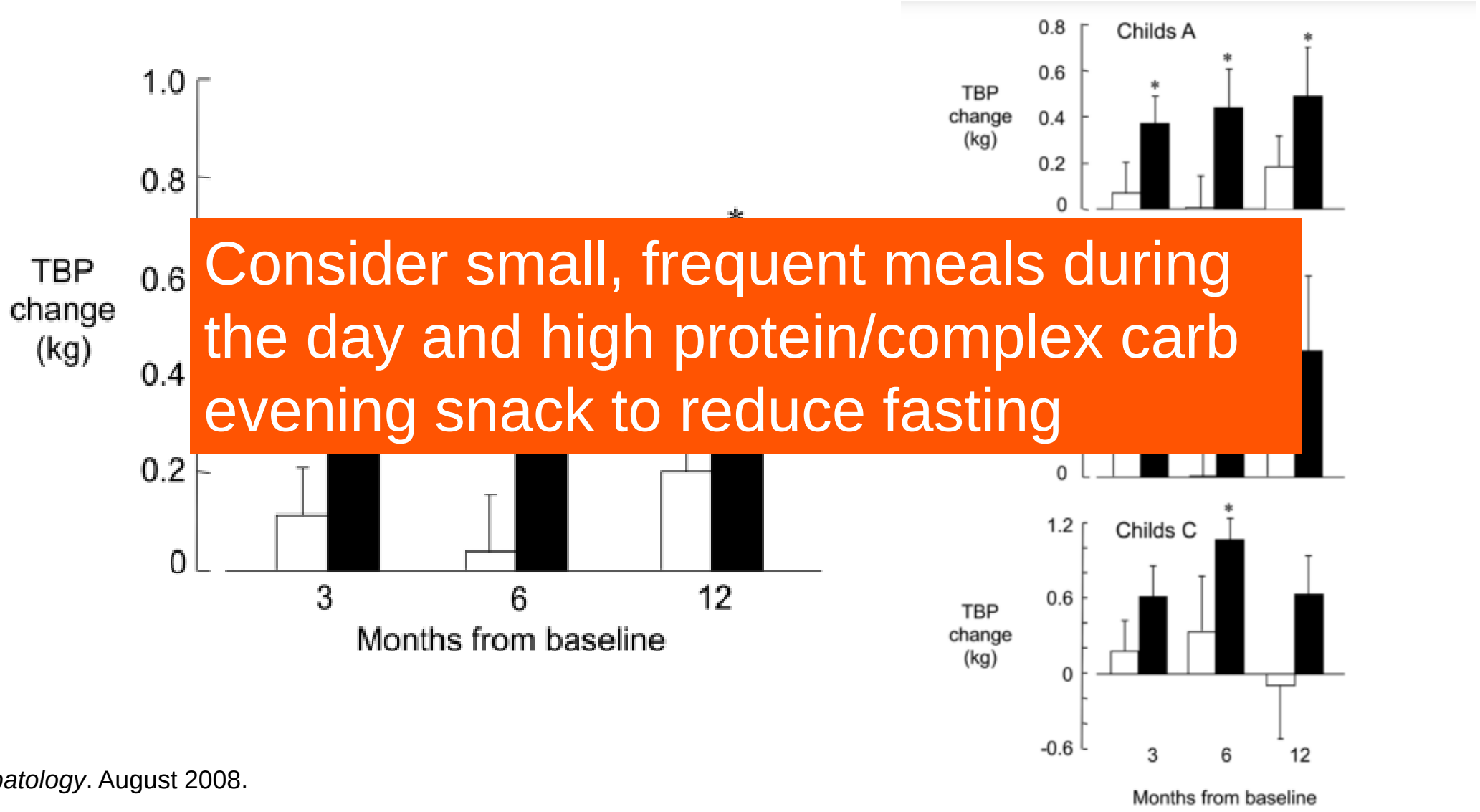
EASL Clinical Practice Guidelines on Nutrition in CLD. 2018.

Additional Nutrition Considerations

Ascites	Use dry weight • Post-paracentesis weight • Subtract %TBW based on severity (5%=mild, 10%=moderate, 15%=severe)
Protein restriction	Patients do NOT benefit from protein restriction
BCAA supplementation	Supplementation did not show any effect on mortality, QOL, or nutritional parameters Hepatic enteral formulas (BCAA-rich) should also only be used in refractory HE
Type of protein	Vegetable protein >> Dairy-based protein > meat-based protein for HE; but from a nutrition standpoint here is no difference

EASL Clinical Practice Guidelines on Nutrition in CLD. 2018.

Timing of Nutritional Intake



Consider small, frequent meals during the day and high protein/complex carb evening snack to reduce fasting

Plank. *Hepatology*. August 2008.

Micronutrient

At least annual assessment

- Fat soluble vitamins (ADEK)
- Water soluble vitamins (B1, B3, B6, B9, B12, vitamin C)
- Trace Metals (Zinc, Selenium, Copper)

Consider initiation of multivitamin supplement

Nutritional Intake in Hospitalized Patients

- Dietary/Nutrition consult within 24 hours of admission
- Royal Free Hospital Nutrition Prioritizing Tool by primary or consulting team
- Identify barriers to oral intake and address
- Add oral nutritional supplement if unable to meet target
- Fail oral intake and oral nutritional supplement, initiate EN within 48-72 hours
- If NPO, keep on short-term 5% dextrose IV fluid to avoid hypoglycemia

Nutrition in Refractory HE – The Proven

PROTEIN

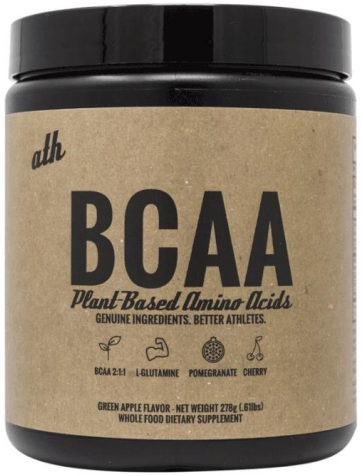
- Protein intake overall should remain high
- Favor plant-based sources >> animal

FASTING

- Avoid prolonged fasting
- Small, frequent meals + late night snack

Shaw et al. *Current Hepatol Rep*. 2020. 19:13-22.

Nutrition in Refractory HE – The Possible

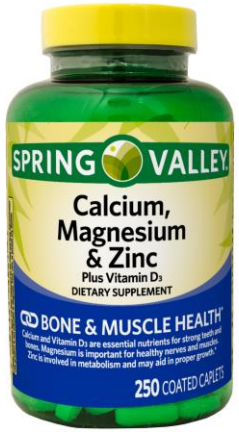


MICRONUTRIENTS

- Zinc deficiency common and possibly implicated
- Also consider MS changes associated with deficiencies in other vitamins (and replete)

BCAAs

- Reduced metabolism of BCAA with increase in AAA production
- Supplementation controversial, may be helpful in outpatient setting



PRE/PROBIOTICS

- Fiber supplementation/probiotics may alter gut flora and NH3 production

Shaw et al. *Current Hepatol Rep*. 2020. 19:13-22.

Summary

- Malnutrition is common in cirrhosis
- All patients should undergo screening
- Increased calorie and protein goals
- Small, frequent meals during the day and high protein/ complex carbohydrate evening snack
- Nutrition planning should be administered by a multi-disciplinary team including PCP, hepatologist, dietician and exercise physiologist/physical therapist.

Thank you!

kk1132@rwjms.rutgers.edu