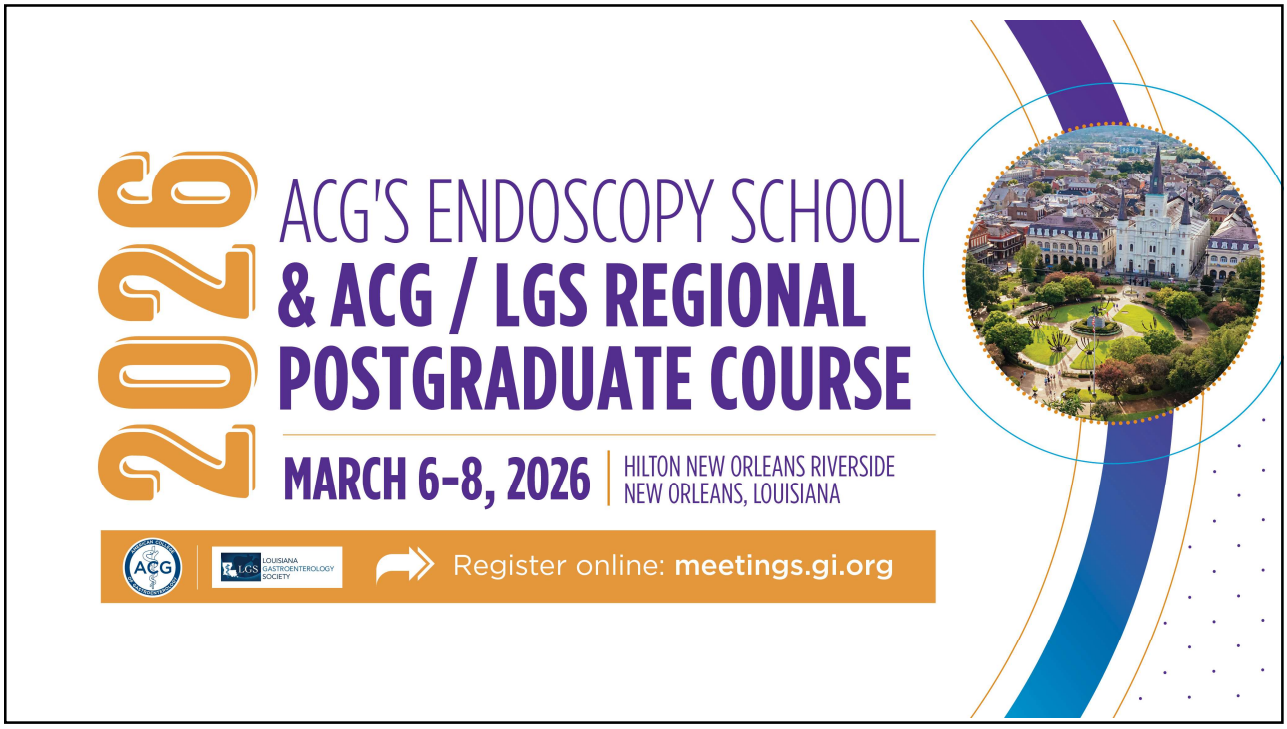

JANUARY 30 – FEBRUARY 1, 2026
2026
ACG'S IBD SCHOOL &
ACG BOARD OF GOVERNORS /
ASGE BEST PRACTICES COURSE
ACG
ASGE
LAS VEGAS

1


2026
ACG'S ENDOSCOPY SCHOOL
& ACG / LGS REGIONAL
POSTGRADUATE COURSE
MARCH 6-8, 2026
HILTON NEW ORLEANS RIVERSIDE
NEW ORLEANS, LOUISIANA
ACG
LGS LOUISIANA GASTROENTEROLOGY SOCIETY
Register online: meetings.gi.org

2

Virtual Grand Rounds

universe.gi.org

Participating in the Webinar

All attendees will be muted and will remain in "Listen Only Mode"

Type your questions here so that the moderator can see them.
Not all questions will be answered but we will get to as many as possible.

A handout with the slides and room to take notes can be downloaded from your control panel.

Moderators:
Manal F. Abdelmalek, MD, MPH, FACG

Exit

3

Virtual Grand Rounds

universe.gi.org

ACG Virtual Grand Rounds

Join us for upcoming Virtual Grand Rounds!

Week 04 – Thursday, January 22, 2026
TNFα Inhibitors for the Treatment of IBD: Therapeutic Advances and Innovative Delivery Methods
Faculty: David T. Rubin, MD, FACG
Moderator: Gil Y. Melmed, MD, MS, FACG
At Noon and 8pm Eastern

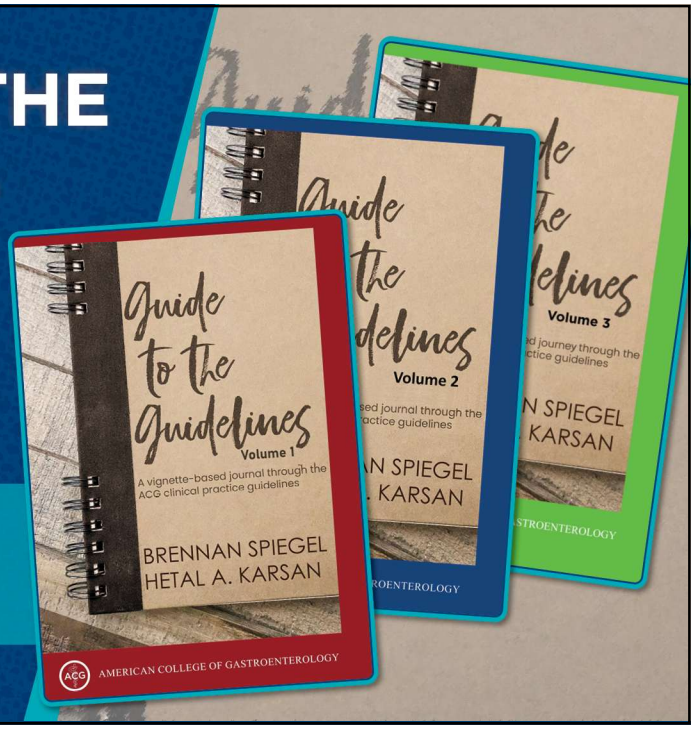
Week 05 – Thursday, January 29, 2026
Alpha-gal Syndrome: How to Detect and Manage GI's Newest Diagnosis
Faculty: Sarah K. McGill, MC, MSc, FACG
Moderator: Amit Gupta, MD, MHPE
At Noon and 8pm Eastern

Visit **gi.org/ACGVGR** to Register

4

GUIDE TO THE GUIDELINES

Book Series with New Volume



Visit
https://members.gi.org/store/
to purchase your copies!

5

Virtual Grand Rounds
GI Nutrition Series

universe.gi.org

2025 ACG GI Nutrition Care Series


Co-Directors
Lindsey Russell, MD, MSc, CNSC, FRCPC, and
Neha Dilip Shah, MPH, RD, CNSC, CHES

Welcome to the fourth webinar in the ACG GI Nutrition Series .
This new ACG GI Nutrition Series has been developed to provide a strong foundation in nutrition for all members of the GI and hepatology care team.

Visit gi.org/ACGVGR to watch for future talks in this series.

Up Next: Nutrition in Specific Patients - Dysmotility/Disorders of Gut Brain Axis


Week 07– Thursday February 12, 2026
GI Nutrition Care Series: Nutrition in Specific Patients - Dysmotility/Disorders of Gut Brain Axis
Faculty: Laura Manning, RD, and Stephanie L. Gold, MD

6

Virtual Grand Rounds
GI Nutrition Series

universe.gi.org

2025-26 ACG GI Nutrition Care Series

- Micronutrient Deficiencies- Malabsorption
- Nutrition in Specific Patients- Dysmotility/Disorders of Gut Brain Axis
- ACG Clinical Guideline: Malnutrition and Nutritional Recommendations in Liver Disease
- Nutrition in Specific Patients- Mucosal Diseases
- Nutrition in Specific Patients- Surgical Resections
- Nutrition Applications for a GI Practice
- Nutrition Strategies for Patients with Mucosal Diseases; From Celiac, to IBD and Eosinophilic Disorders

7

Virtual Grand Rounds

universe.gi.org

Disclosures

Craig J. McClain, MD, FACG:
Allergan: Grant/Research Support; Diapharma: Consultant; Federal Trade Commission: Consultant; Gilead: Grant/Research Support; Intercept: Grant/Research Support; Merck: Grant/Research Support; Nestle: Consultant; NIH: Grant/Research Support; Novartis: Speakers Bureau; Target NASH: Grant/Research Support; Veterans Administration: Grant/Research Support.

Manal F. Abdelmalek, MD, MPH, FACG :
89Bio: Advisory Board, Consultant; Boehringer Ingelheim: Advisory Board, Consultant; Chronic Liver Disease Foundation: Speaker Honorarium; Clinical Care Options: Speaker Honorarium; Fishawack LLC, Inc: Speaker Honorarium; Hanmi: Advisory Board, Consultant; Hepatology: Editorial Board; Intercept: Advisory Board, Consultant; Inventiva: Advisory Board, Consultant; Madrigal: Advisory Board, Consultant; Medscape: Advisory Board, Consultant, Speaker Honorarium; Novo Nordisk: Advisory Board, Consultant; Regeneron: Advisory Board, Consultant; Up-to-Date: Royalties.

*There will be discussion of unapproved, off-label, or investigational uses of products/nutritional agents during this presentation. There is no FDA-approved therapy for any stage of ALD.

**All of the relevant financial relationships listed for these individuals have been mitigated*

8

Virtual Grand Rounds

universe.gi.org

ACG Clinical Guideline: Malnutrition and Nutritional Recommendations in Liver Disease

Craig J. McClain, MD, FACN, AGAF, FACG, FAASLD

Director, Gastroenterology, Robley Rex Louisville VAMC
Professor, Departments of Medicine, and Pharmacology & Toxicology
Associate Vice President for Translational Research
Associate Vice President for Health Affairs/Research
Director, Clinical Trials Unit
Director, University of Louisville Alcohol Research Center
Director, University of Louisville Hepatobiology & Toxicology Center

UNIVERSITY OF LOUISVILLE

NORTON HEALTHCARE
Department of Veterans Affairs

9

Virtual Grand Rounds

universe.gi.org

Objectives

At the conclusion of the program, you should be able to:

- Describe prevalence and implications of malnutrition in patients with liver disease
- Assess malnutrition in liver disease
- Identify causes of malnutrition in liver disease
- Provide appropriate nutrition therapy in ALD and MASLD

10

Virtual Grand Rounds

universe.gi.org

69 y.o. WF

- Cirrhosis
- 4 standard drinks/day (~500cal)
- 2 sugared colas/day (~500 cal)
- Fast food
- No exercise, has difficulty getting out of chair and climbing stairs
- Lives alone in 10,000 ft^2 house

11

Virtual Grand Rounds

universe.gi.org

Overview

Definition of Malnutrition

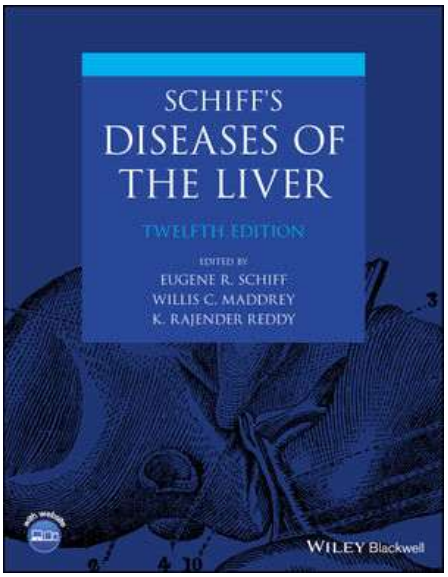
Malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients. The term malnutrition covers 2 broad groups of conditions. One is 'undernutrition'—which includes stunting (low height for age), wasting (low weight for height), underweight (low weight for age) and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals). The other is overweight, obesity and diet-related noncommunicable diseases (such as heart disease, stroke, diabetes, and cancer).

https://www.who.int/news-room/questions-and-answers/item/malnutrition

12

Virtual Grand Rounds

universe.gi.org



CHAPTER 19

Malnutrition and Liver Disease

Craig McClain,[1,2] *Irina Kirpich,*[1] *& Laura Smart*[3]

[1]Departments of Medicine and Pharmacology and Toxicology, University of Louisville, Louisville, KY, USA
[2]Robley Rex Veterans Administration Medical Center, Louisville, KY, USA
[3]Department of Medicine, University of Louisville, Louisville, KY, USA

Key concepts

Almost all patients with advanced liver disease have some evidence of malnutrition. Indeed, in a large Veterans Health Administration (VA) Cooperative Study, every patient had some degree of malnutrition. The phenotype commonly associated with advanced malnutrition in liver disease is loss of muscle mass or sarcopenia.
Major causes of malnutrition in liver disease include anorexia, nausea and vomiting, diarrhea and malabsorption, poor food availability, hormone and cytokine effects, and complications of liver disease.
Every effort should be made to correct these individual causes.
Initial assessment with simple measures such as subjective global assessment, anthropometry, or bioelectric impedance should be performed in all subjects.
In general, a balanced oral diet should be achieved (with a 2 g/day sodium restriction for patients with fluid retention). Protein intake is usually recommended at 1.2–1.5 g/kg of body weight per day.
Enteral supplements are used for patients not able to meet their needs through normal food intake. Branched-chain amino acids can be utilized for patients not responsive to standard hepatic encephalopathy therapy. A concentrated energy formula may be utilized in patients with
body weight per day is
patients.
Oral intake is optimal
hours if hospitalized pa
Frequent small feedings
utilized both on an inpa
overnight starvation. Pr
hepatic encephalopathy
Excess carbohydrates (o
can cause fatty liver. Ex
nonalcoholic fatty liver
fat appears to be a risk
alcoholic liver disease.
ω-6 fats in combination
disease.
Nutritional supplements
been reported in some
liver-related complicatio

13

Virtual Grand Rounds

universe.gi.org

Prevalence and Implications of malnutrition

Malnutrition is best studied in severe AH/alcohol associated cirrhosis. However, once cirrhosis develops in viral or MASLD related liver disease, malnutrition also frequently occurs.

McClain CJ. Nutrition in Patients With Cirrhosis. In: Advances in Hepatology, Schiff ER, ed., Gastroenterology & Hepatology 12(8): 507-510, August 2016.Patel, et al. Nutr Clin Pract. 2017 Apr;32(1_suppl):101S-111S

14

Virtual Grand Rounds

universe.gi.org

Nutritional Status in AH

Every Patient is malnourished

Initial Laboratory	Severity of Liver Disease Mild	Moderate	Severe
Lymphocytes (1000-4000/mm3)	2,067 ± 148	1,598 ± 90	1,366 ± 83
Albumin (3.5-5.1 g/dl)	3.7 ± 0.1	2.7 ± 0.1	2.3 ± 0.1
Creatinine-Height Index (% of standard)	75.7 ± 2.84	62.9 ± 3.3	64.0 ± 4.65

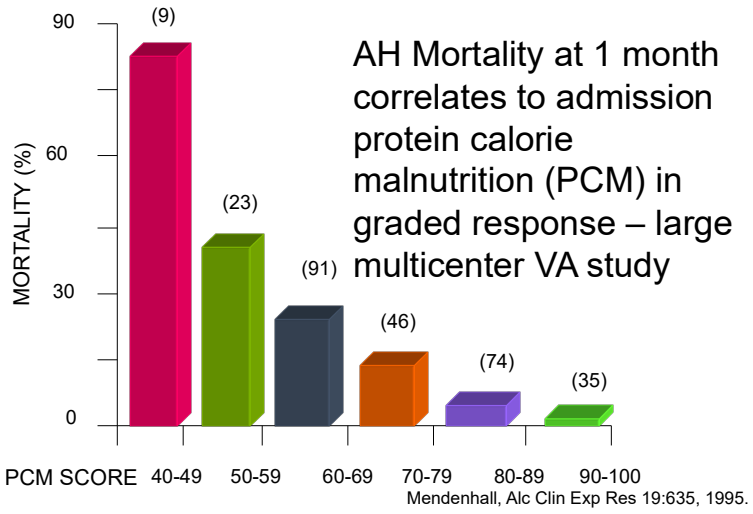
Mendenhall, et al. Am J Med 1984

15

Virtual Grand Rounds

universe.gi.org

Malnutrition Impacts Outcome



Mendenhall, Alc Clin Exp Res 19:635, 1995.

AH Mortality at 1 month correlates to admission protein calorie malnutrition (PCM) in graded response – large multicenter VA study

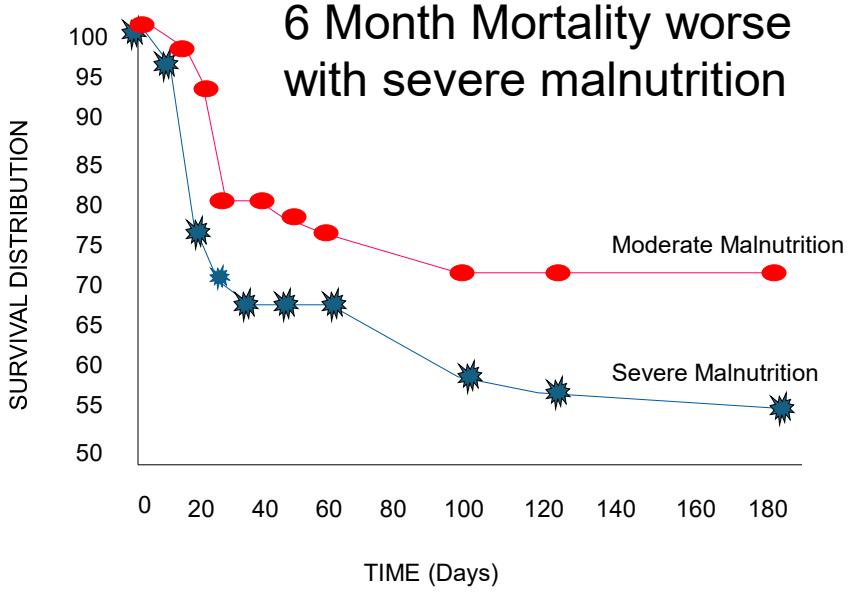
The Impact of Malnutrition on the Hospital and Infectious Outcomes of Patients Admitted With Alcoholic Hepatitis 2011 to 2017 Analysis of US Hospitals; Lee, et al. J Clin Gastroenterol 56:349, 2022

This study shows the presence of malnutrition is an independent risk factor of mortality and local/systemic infections in patients admitted with alcoholic hepatitis.

16

Virtual Grand Rounds

universe.gi.org



Mendenhall et al. Hepatology 1993;17:564

17

Virtual Grand Rounds

universe.gi.org

Altered Macronutrients

- Protein (sarcopenia, altered amino acids)
- Carbohydrate (fructose)
- Fat (unsaturated vs. saturated)

18

Virtual Grand Rounds

universe.gi.org

Protein

- Average daily protein intake 57 g
- Protein required for + nitrogen balance ≥ 85 g
- Frequent sarcopenia in cirrhosis of multiple etiologies

Mendenhall, et al. JPEN 19(4):258,1995

19

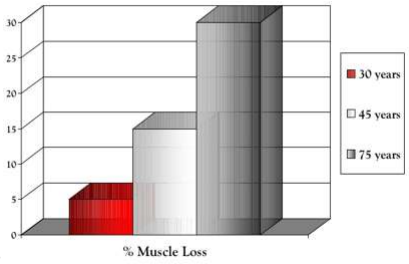
Virtual Grand Rounds

universe.gi.org

MAFLD Sarcopenic Obesity

Obese patients with MASH and cirrhosis can develop sarcopenia similar to AH. Sarcopenia also increases with age.

% muscle loss with aging



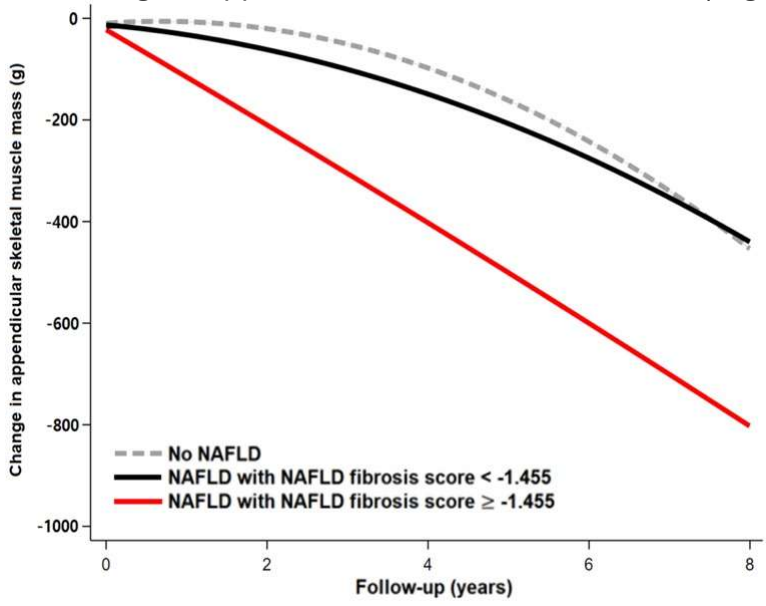
Patel, et al. Nutr Clin Pract. 2017 Apr;32(1_suppl):101S-111S
Dickerson, et al. Nutr Clin Pract. 2017 Apr;32(1_suppl):86S-93S

20

Virtual Grand Rounds

universe.gi.org

Change in appendicular skeletal muscle mass (in grams) by severity of NAFLD



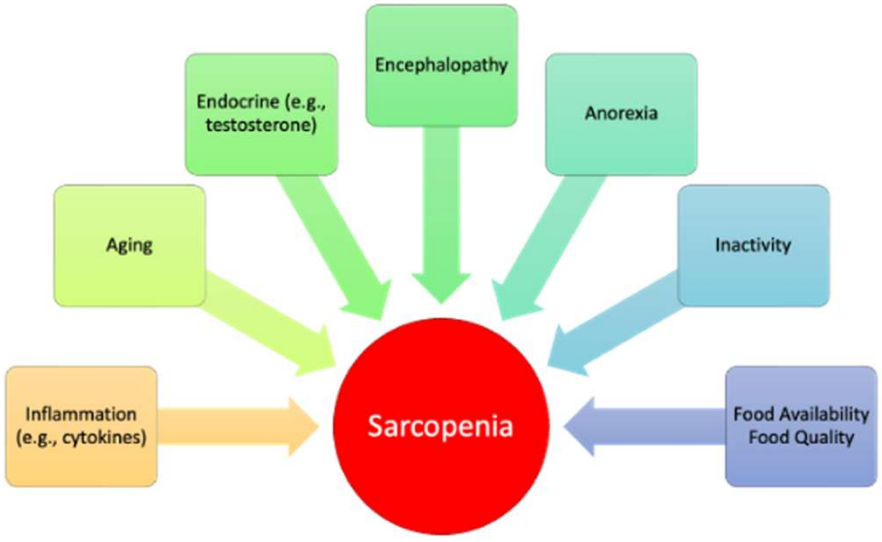
Hepatology, Volume: 76, Issue: 6, Pages: 1746-1754, First published: 19 May 2022, DOI: (10.1002/hep.32578)

21

Virtual Grand Rounds

universe.gi.org

Causes of Sarcopenia in Liver Disease



22

Virtual Grand Rounds

Carbohydrate

AVOID FRUCTOSE

- Fructose (+++++ in corn syrup)
- Soda, canned industrial food

Experimental Data

Mice fed with fructose develop more severe inflammatory injury compared to High Fat Mice (Kohli R, et al. Hepatology. 2010 Sep;52(3):934-44.)

Human Data

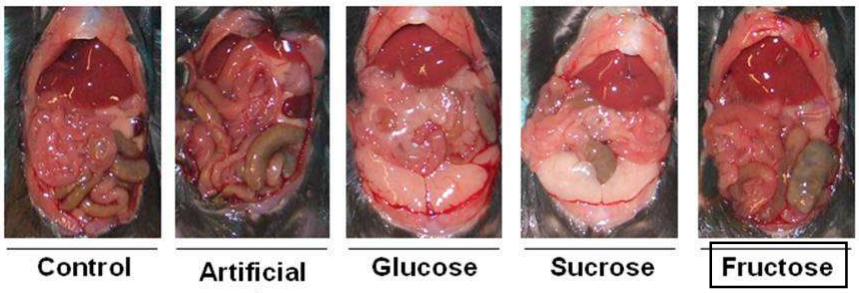
In patients with NASH, fructose consumption is associated with liver fibrosis (Abdelmalek MF, et al. Hepatology. 2010 Jun;51(6):1961-71.

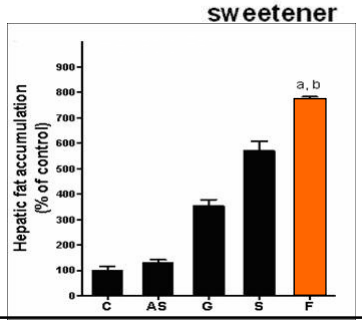
23

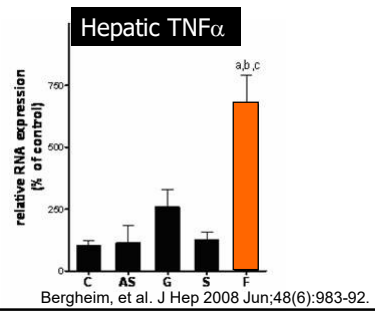
Virtual Grand Rounds

universe.gi.org

Carbohydrate/Fructose







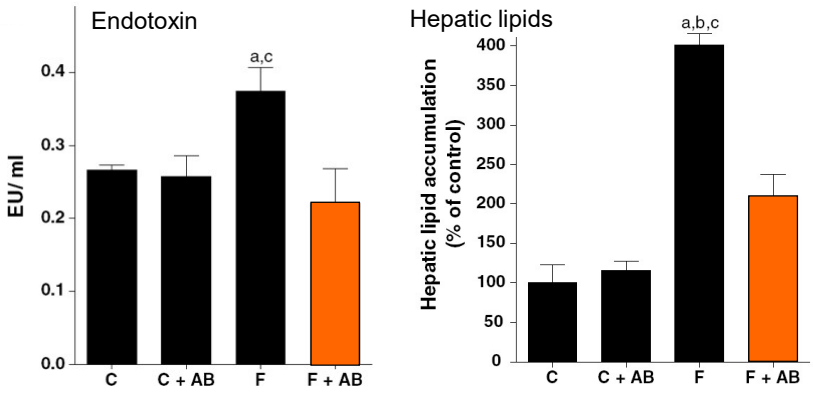
Bergheim, et al. J Hep 2008 Jun;48(6):983-92.

24

Virtual Grand Rounds

universe.gi.org

Antibiotics Protect against high fructose diet-induced MASH



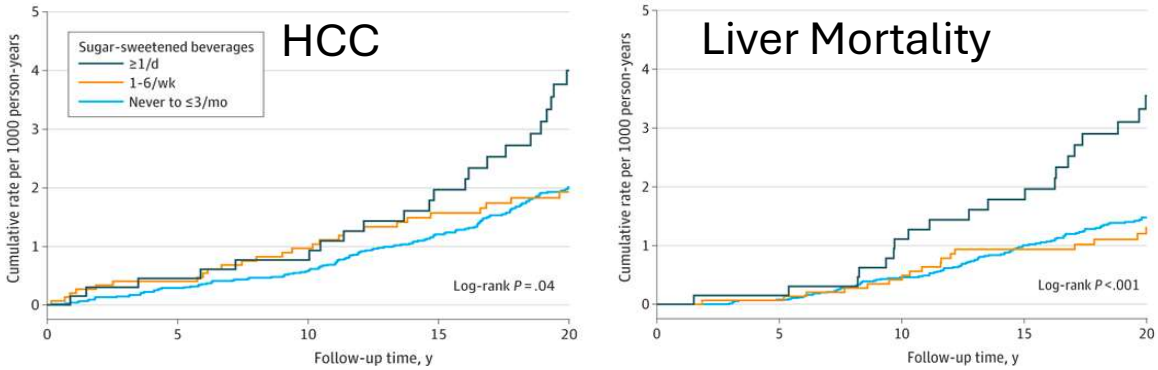
Bergheim, et al. J Hep 2008 Jun;48(6):983-92.

25

Virtual Grand Rounds

universe.gi.org

Sugar-sweetened beverage intake increases HCC and liver related mortality.
>98,000 post-menopausal women



Zhao L, et al. JAMA. 2023;330(6):537–546. doi:10.1001/jama.2023.12618

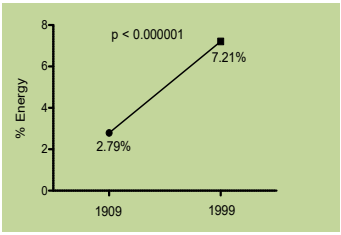
26

Virtual Grand Rounds

universe.gi.org

Fat

- **PUFA important for ALD**
  - **Animal Studies: The severity of experimental ALD correlated with dietary linoleic acid (n6 fat)**
  - **American Diet – unbalanced n3/n6 ratio – high in n6 PUFA**



Changes in the linoleic acid availability

- **Lipid peroxidation products (acrolein, 4HNE) and oxidized linoleic acid metabolites (OXLAMs) are highly toxic**
- **The strongest genetic factors in AH relate to fat (e.g., PNPLA3)**

Nanji AA, French SW. *Alcohol Clin Exp Res*. 1986; 10(3)271-3
Nanji AA, et al. *Life Sci*, 1989; 44(3):223-7.
Blasbalg T L et al. Am J Clin Nutr 2011;93:950-962
Kirpich IA, et al, Biomolecules. 2016 Jan 6;6(1). pii: E1.

27

Virtual Grand Rounds

universe.gi.org

Fat

- **Saturated/Trans fat important in MASH**

SUPER SIZE Me – Human Model



	Before	At 18 days	At 21 days
BP, mmHg	110/70	150/100	---
WT, lbs	185	203	---
TChol	165	225	230
TG	60	220	263
ALT	20	290	528
AST	21	130	187

28

Virtual Grand Rounds

universe.gi.org

Micronutrient Deficiencies in ALD

Nutrient Deficiency	Possible Manifestations
Vitamin A	Night blindness, Dry skin
Thiamine	Neurologic problems, Wernicke's encephalopathy
Folate	Anemia, Possible increased susceptibility to ALD, Altered methionine metabolism
Vitamin D	Bone Disease Altered Immune Function
Vitamin E	Possible increased susceptibility to liver injury, Oxidative Stress
Niacin	Pellegra dermatitis, Neurologic alterations, Hallucinations
Pyridoxine	Hypochromic anemia
Zinc	Skin lesions, Anorexia, Depressed wound healing, Hypogonadism, Altered immune function, Impaired night vision, Depressed mental function, Diarrhea, Increased susceptibility to liver injury
Magnesium	Muscle cramps, Glucose intolerance
Selenium	Myopathy, Cardiomyopathy, Oxidative stress

McClain, et al. Alcohol Clin Exp Res 35:815, 2011

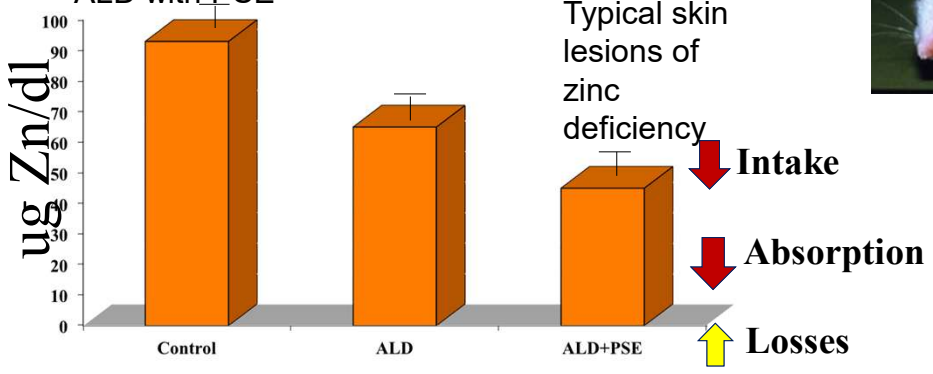
29

Virtual Grand Rounds

rg

Zinc Deficiency in ALD

Decreased serum zinc in ALD, and further decreased in decompensated ALD with PSE



Typical skin lesions of zinc deficiency

Mohammad, M. K., Z. Zhou, M. Cave, A. Barve and C. J. McClain. "Zinc and Liver Disease." *Nutr Clin Pract* 27, no. 1 (2012): 8-20

30

Virtual Grand Rounds

Diagnostic Dilema

18 y.o. WM sent for ↑LFTs
(AST 46, ALT 71)
Obese “all his life” (BMI 37)
Drinks at least 8 Mt. Dews/day
Trying to cut back
Sent for Wilson’s disease, hemachromatosis evaluation

31

Virtual Grand Rounds

universe.gi.org

PE

Obese

No signs of chronic liver disease

Neurologic—Grossly normal

Initial Labs

AST/ALT—28/51 IU
Bili, alk phos, albumin—Normal
Marsano Liver Panel—Normal, except for ceruloplasmin 15, copper 58, Ferritin 718, HFE test (-)

32

Virtual Grand Rounds

universe.gi.org

Next Test?

1. Liver biopsy with copper analysis
2. Liver biopsy with iron analysis
3. 24 hr urine copper
4. Slit lamp eye exam

Most Likely Diagnosis?

1. Wilson's disease
2. Hemochromatosis
3. MASH

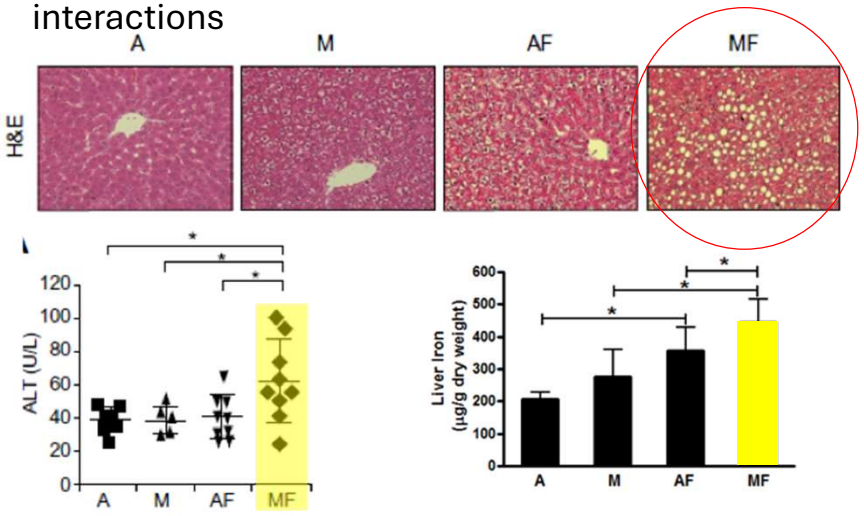
33

Virtual Grand Rounds

Diagnosis

universe.gi.org

- Obese young man with copper-fructose interactions



Song, et al., J Hepatol 56(2):433-440, 2012
Song, et al. Obesity 2013 Mar 20.
Song, et al. ACER 2016 Mar;40(3):518-528

34

Virtual Grand Rounds

universe.gi.org

Assessment of Nutritional Status

- Anthropometry (e.g., triceps skinfold) – edema impairs utility
- Biological parameters (e.g., visceral proteins) – liver disease and inflammation impair utility
- Assessment of muscle strength – simple; good for serial assessment
- Bioelectrical impedance – simple; good for serial assessment, multiple readouts
- Dual-energy X-ray absorptiometry, CT – more expensive
- Subjective global assessment – simple
- Energy balance – labor intensive, unlikely in clinical practice
- 24-hour urinary creatinine height index – requires 24-hour urine
- Metabolomics

McClain, et al. Alcohol Clin Exp Res 35:815, 2011
McClain, et al. Clin Liver Dis 25:557-570, 2021

35

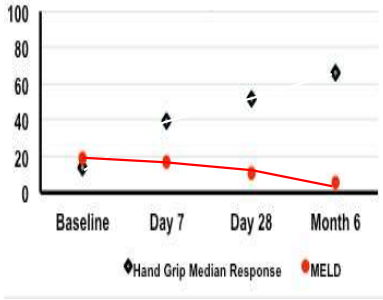
Virtual Grand Rounds

universe.gi.org

Nutritional Assessment

Measurement of handgrip strength using a handgrip dynamometer is quickly and easily performed, inexpensive, and noninvasive.

Moderate AH Patient



Gaikwad, N., et al. Ann Gastroenterol, 2016. 29(4): p. 509-514.

36

Virtual Grand Rounds

universe.gi.org

Nutritional Assessment

Bioelectrical Impedance

Bioelectrical impedance (BIA) involves introducing a small electric current to the body. As the current travels throughout the body water, it encounters different cell types (e.g., fat, muscle). Each of these has a specific ability to slightly oppose the current as it travels toward the exit point.

Pirlich and co-workers showed a strong correlation between BIA and the gold standard of total body potassium for assessing malnutrition in cirrhosis.

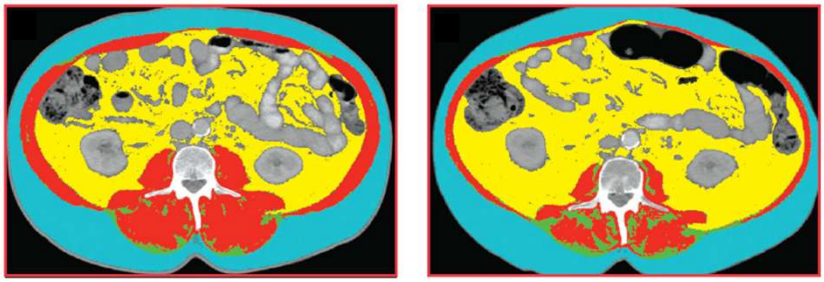
Pirlich, M., et al. Hepatology, 2000. 32(6): p. 1208-15.

37

Virtual Grand Rounds

universe.gi.org

Nutritional Assessment



Skeletal muscle loss in a patient over time. Left slice taken 390 days before death. Right slides 58 days before death. Skeletal muscle; visceral adipose tissue; subcutaneous adipose tissue; intramuscular adipose tissue.

A single cross-sectional CT slice (most often at the third lumbar vertebra - L3) has been validated as an accurate method of assessing whole-body skeletal muscle and fat mass.

Because cirrhotics frequently have CT scans for multiple reasons including HCC surveillance, CT scans are also often available for retrospective analysis.

From The: The 110th Abbott Nutrition Research Conference June 23-25, 2009, Columbus, Ohio, Measurement Of Lean Body Mass Using Ct Scans Vickie Baracos, Phd, University Of Alberta, Canada

Paris, M. Et Al. Curr Opin Clin Nutr Metab Care, 2016. **19**(2): P. 125-30.

38

Virtual Grand Rounds

universe.gi.org

Nutritional Assessment

Subjective Global Assessment

Hospitalization
Severely malnourished

2 years later
Well nourished

Subjective global assessment (SGA) is a bedside evaluation of nutritional status that includes patient history regarding weight loss, usual dietary intake, functional capacity, gastrointestinal symptoms, and evidence of malnutrition on physical exam. Using this information, patients are classified as: 1) well nourished; 2) moderately malnourished; or 3) severely malnourished.

Detsky, A.S., et al. JPEN, 1987. 11(1): p. 8-13.
Lim, S.L., et al. JPEN, 2016. 40(7): p. 966-72.

39

Virtual Grand Rounds

universe.gi.org

Major Causes of Malnutrition

- Anorexia/Altered Taste/Smell
- Nausea/Vomiting/Delayed Gastric Emptying
- Diarrhea/Malabsorption/Dysbiosis
- Poor Food Availability/Quality/Unpalatable Diets
- Hormones/Cytokine Effects
- Complications of Liver Disease (PSE, Ascites)
- Fasting for Procedures/Interruption of Feeding
- Social, racial and economic issues

McClain, et al. Clin Liver Dis 25:557-570, 2021

40

Virtual Grand Rounds

universe.gi.org

Understanding Drinking Patterns/Amounts

Standard Drink = 14 grams alcohol

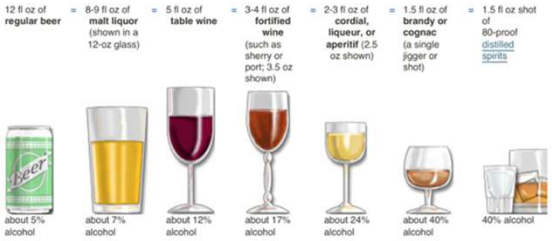
	♀	♂
Moderate Drinking	≤ 1/Day	≤ 2/Day
Binge Drinking	4+/Occasion	5+/Occasion
AUD- normal ALT	17/day	17/day
AUD- ↑ ALT Early stage ALD	11/day	15/day

~2000 empty calories/day

Alcohol – Empty Calories

What's a "standard" drink?

Answer = 14 gm alcohol



http://www.rethinkingdrinking.niaaa.nih.gov

Barve S, et al. Current Reviews 2017 38(2):289-302.

41

Virtual Grand Rounds

universe.gi.org

Sugared Pop/Fructose - Empty Calories

290 calories

Fructose: It's "Alcohol Without the Buzz"

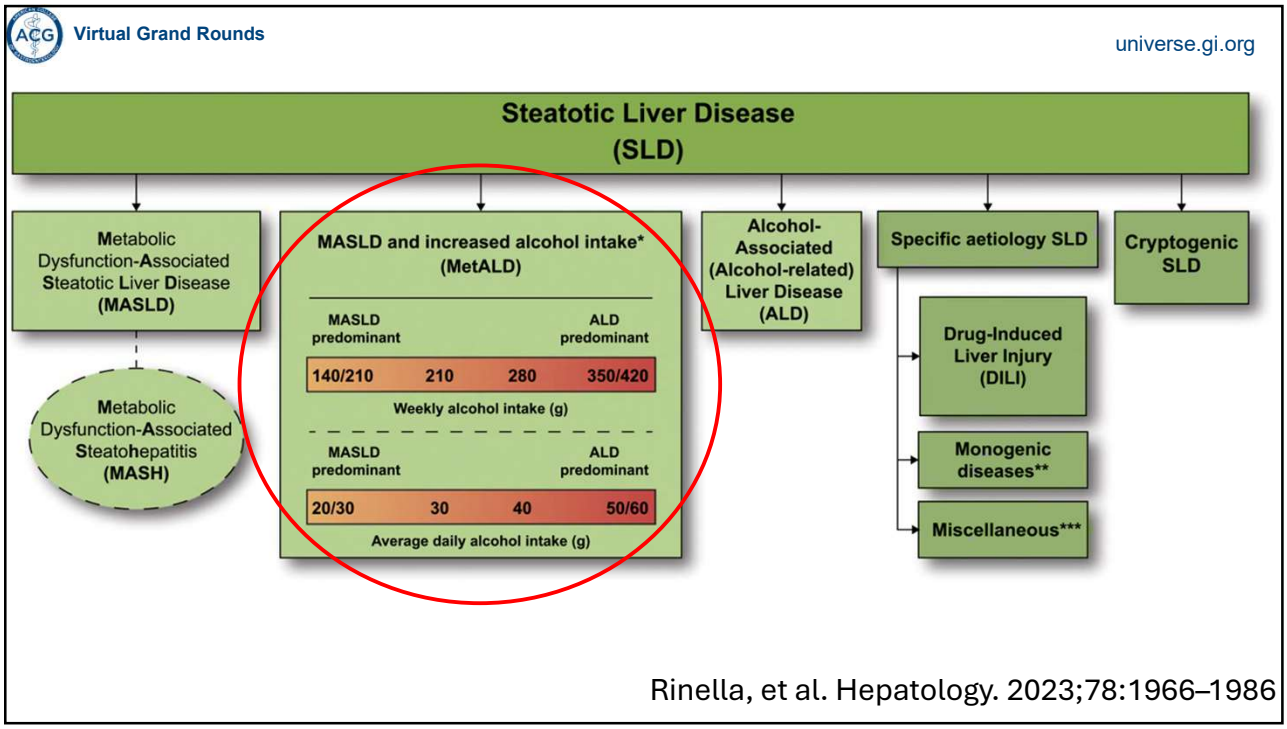
Robert H. Lustig*

Department of Pediatrics and the Philip R. Lee Institute for Health Policy Studies, University of California, San Francisco, CA

Adv. Nutrition 4:226-235, 2013

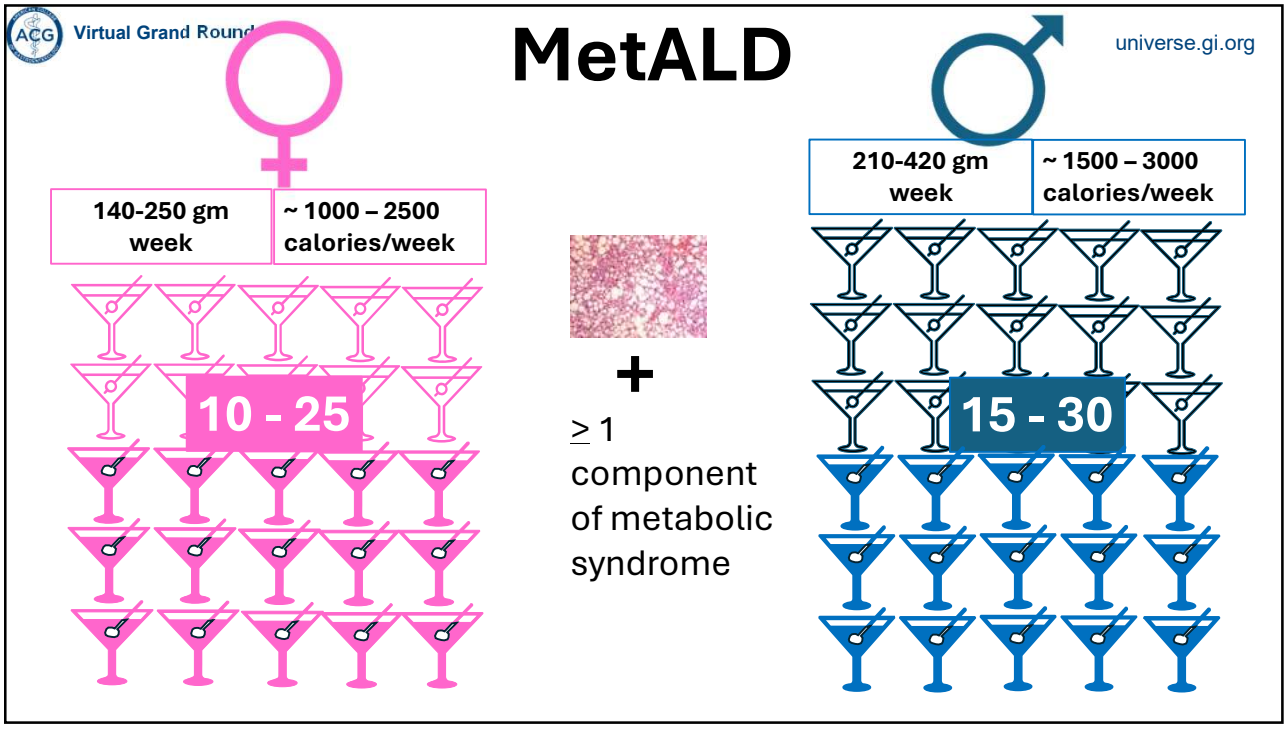
Yoneda, et al. BMC Gastroenterol 2012;12:16

42



Rinella, et al. Hepatology. 2023;78:1966–1986

43



44

Virtual Grand Rounds

"Classic Phenotypes"

universe.gi.org

ASH

MetALD

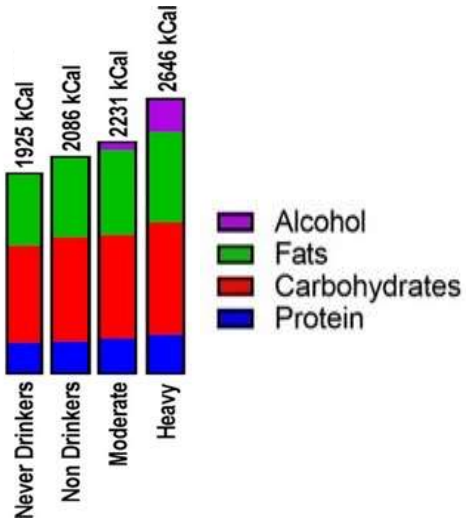
MASH

45

Virtual Grand Rounds

Nutrition and Alcohol - NHANES

universe.gi.org



Warner JB, et al. Alcohol Clin Exp Res. 2022 Nov;46(11):2025-2040. PMID: 36124871; PMCID: PMC9722540.

Research Article
MASLD and Alcohol-Related Liver Diseases

JOURNAL OF HEPATOLOGY

Healthy eating and physical activity significantly lower sex-specific alcohol-attributable liver mortality in the United States

Authors

Eduardo Vilar-Gomez, Lauren Nephew, Samer Gawrieh, ..., Niharika Samala, Suthat Liangpunsakul, Naga Chalasani

Highlights

- Any daily alcohol intake or binge drinking increases liver mortality risk.
- Healthy diet and physical activity significantly lower alcohol-related liver mortality across all drinking patterns.
- The liver survival benefits from physical activity and diet quality were more significant in women than men.
- Economically disadvantaged populations are exposed to high-risk alcohol use, unhealthy diet, and physical inactivity, and therefore increased liver mortality.

Journal of Hepatology 2026. vol. 84 | 18–34

46

Virtual Grand Rounds

universe.gi.org

Nutrition Support

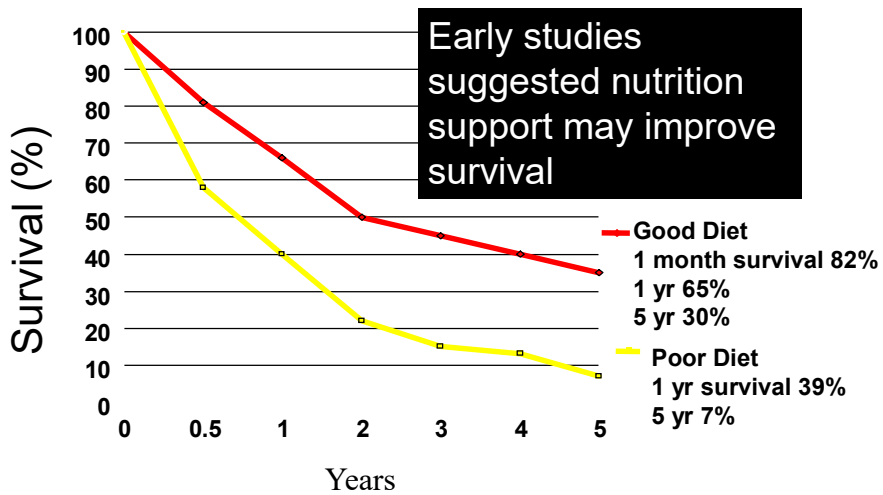
47

Virtual Grand Rounds

universe.gi.org

Nutrition Support

124 alcoholic cirrhotics in Columbia University Research Service



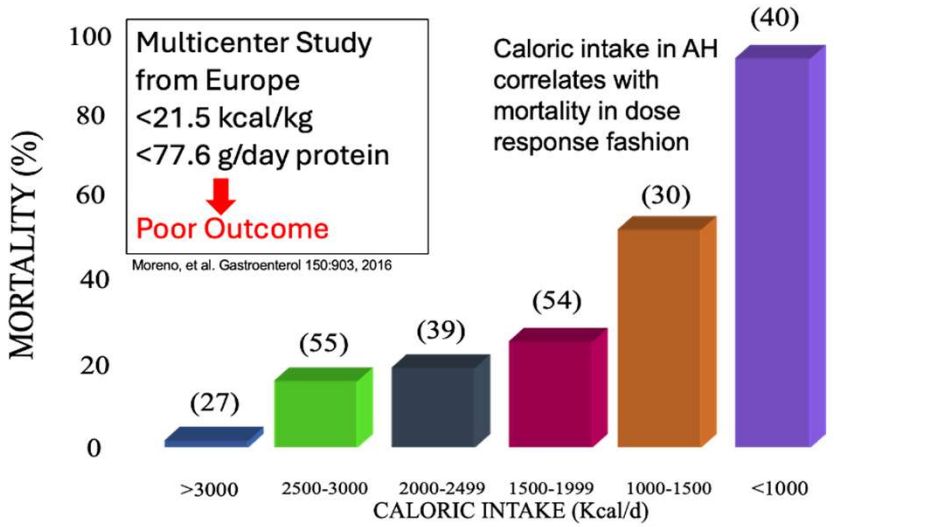
Patek, et al. JAMA 1948;139:543

48

Virtual Grand Rounds

Inadequate Food Intake Increases Mortality

universe.gi.org



Mendenhall, et al. Alc Clin Exp Res 19:635, 1995.

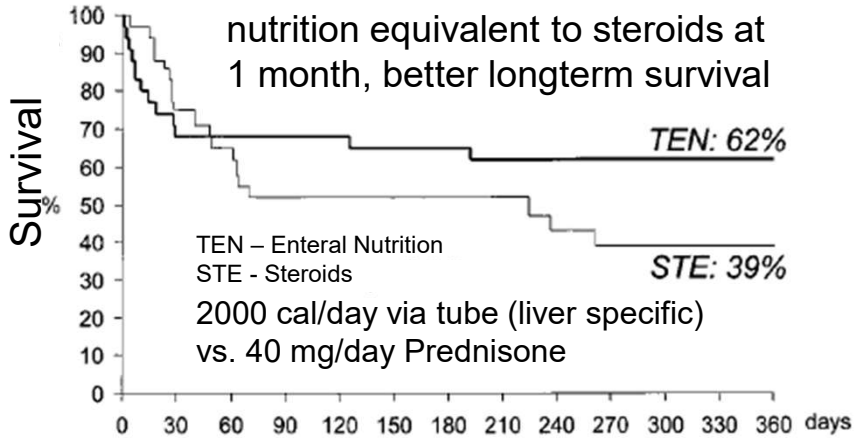
49

Virtual Grand Rounds

Enteral Nutrition

universe.gi.org

Multicenter trial showed enteral nutrition equivalent to steroids at 1 month, better longterm survival



TEN – Enteral Nutrition
STE - Steroids

2000 cal/day via tube (liver specific)
vs. 40 mg/day Prednisone

50

Special Nutrition Considerations

- No evidence that tube feeding will precipitate bleeding, even in presence of varices
- Do NOT protein restrict for PSE
- More not necessarily better, be aware of potential nutrient toxicity (e.g., Vit A induced hepatotoxicity)

51

Nutritional Recommendations for Inpatients with Cirrhosis

- Early evaluation of electrolyte disturbances
- Early nutrition assessment and regular follow-ups
- Total energy: 1.2-1.4 x resting energy expenditure or 35-40 kcal/kg BW/d
- Protein: 1.2-1.5 g/kg/d (upper level in hospital)
- Fat: 30-40% of non-protein energy
- Formulate water and electrolyte intake to individual needs, renal function, diuretic sensitivity
- Replace vitamins and minerals (avoid excessive iron, copper, and vitamin A supplementation)
- Complement daily requirements with enteral feedings (parental if enteral route otherwise contraindicated)
- Hypocaloric, high protein diet for obese subjects
- Nutrition education with dietician including nighttime snacks

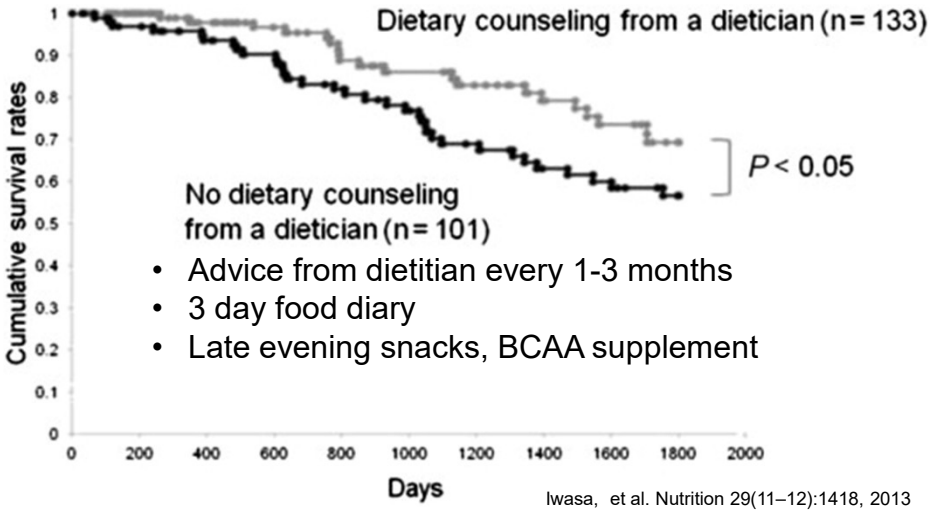
McClain, et al. Clin Liver Dis 25:557-570, 2021

52

Virtual Grand Rounds

universe.gi.org

Outpatient Therapy



- Advice from dietitian every 1-3 months
- 3 day food diary
- Late evening snacks, BCAA supplement

Iwasa, et al. Nutrition 29(11–12):1418, 2013

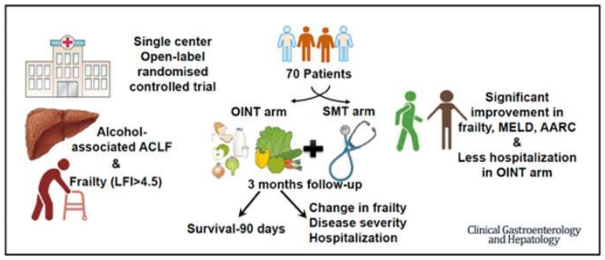
53

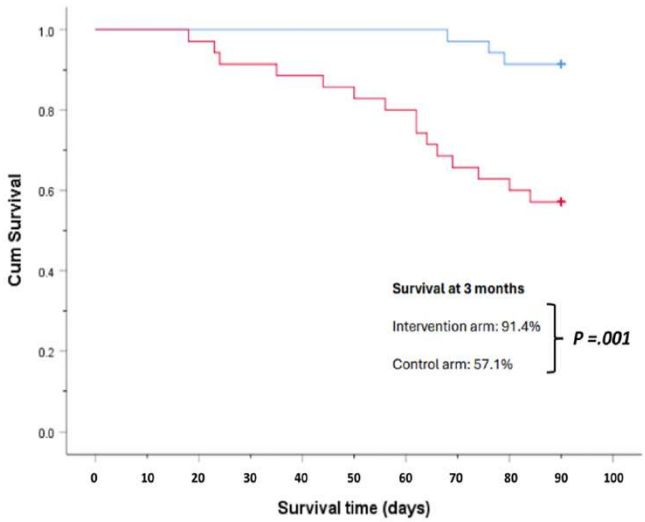
Outpatient Intensive Nutrition Therapy Improves Survival and Frailty in Males With Alcohol-related ACLF - Randomized Controlled Trial

universe.gi.org

Patal Giri,[1] Sunil Taneja,[2] Nancy Sahni,[3] Harish Bhujade,[4] B. K. Padhi,[5] Tanka Karki,[4] Pratibha Garg,[2] Sahaj Rathi,[2] Arka De,[2] Nipun Verma,[2] Madhumita Premkumar,[2] and Ajay Duseja[2]

Clinical Gastroenterology and Hepatology 2025;23:1164–1173





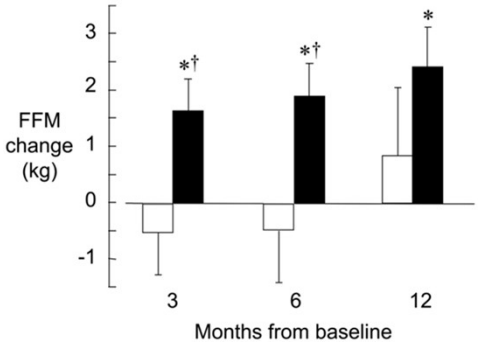
Intervention arm (OINT)	35	35	35	35	35	35	35	34	32	32
Control arm (SMT)	35	35	34	32	31	30	28	23	22	20

54

Virtual Grand Rounds

universe.gi.org

Late Evening Snack Improves Muscle (FFM) mass



- Snack – after 9pm ~700 cal, ~26 g protein
- Late evening snacks/meals prevent nocturnal amino acid breakdown for gluconeogenesis; decrease amino acid loss and improve nitrogen balance
- Improves quality of life

Swart, et al. BMJ 299:1202, 1989
Yamauchi, et al. Hep Research 21:199, 2001
Hirsch, et al. JPEN 17:119, 1993
Plank, et al. Hepatology 48:557-566, 2008

55

Virtual Grand Rounds

universe.gi.org

MASH Lecture!

- Portion size
- No sugared pop
- No fast food
- No alcohol
- Exercise
  - 150-300 min moderate intensity or 75-150 min vigorous/weekly
- Coffee
- Vitamin E 800 IU/day

56

Virtual Grand Rounds

universe.gi.org

Take-Home Points

ACG Guidelines

Causes

Food Related	• Poor availability/quality • Unpalatable (low Na, protein, etc.)
Medical Causes	• Fasting for procedures • Interruption of feeding
GI-Related	• Nausea/vomiting/diarrhea • Dysbiosis/bacterial overgrowth
Complication of Liver Disease	• HE, ascites

57

Virtual Grand Rounds

universe.gi.org

Take-Home Points

Treatment	**Team Approach**	Structured programs are needed to assess and treat sarcopenia before, during, and after transplant in patients with cirrhosis.
	Nutritional Assessment	Body mass index is more easily assessed than waist circumference. However, waist circumference better correlates with metabolic disease risks. Subjective Global Assessment, hand grip strength, bioelectric impedance, and imaging are increasingly used assessment methods.
	Lifestyle Modifications	Encouraged for all, decreases adverse clinical outcomes in patients with MASH.

Dietary Recommendations

- **Low-fructose diet** is recommended for all patients with chronic liver disease across the spectrum of disease.
- **Late evening snacks** to improve lean muscle tissue and decrease risk for ascites/HE
- **Nutritional supplementation** for patients with alcohol-associated hepatitis and cirrhosis
- In patients with non-cirrhosis MASH, consider **daily supplementation of vitamin E 800 IU.**
- In patients with chronic liver disease, **drinking two or more cups of coffee per day** can decrease risk for fibrosis progression or development of HCC.
- In patients with chronic liver disease, **protein should not be restricted.**
- For patients with **cirrhosis and HE who need nutritional supplementation**, ACG suggests a diet enriched with **plant-based sources of protein.**
- ACG **refrained from making a recommendation for or against rigorous restriction of dietary sodium** among **patients with cirrhosis and ascites** who are **managed with diuretic** therapies.

58

69 y.o. WF

- Cirrhosis
- 4 standard drinks/day (~500cal)
- 2 sugared colas/day (~500 cal)
- Fast food
- No exercise, has difficulty getting out of chair and climbing stairs
- Lives alone in 10,000 ft^2 house

59

Approach

- No sugared pop/fast food/alcohol
- Night-time snack
- One floor condo with gym
- No rugs
- Meals delivered
- New friends/activities
- Daily exercise, including resistance exercises

60

Virtual Grand Rounds

universe.gi.org

Questions

Craig J. McClain, MD, FACG

Manal F. Abdelmalek, MD, MPH, FACG

61

62