Alcoholic Liver Disease: A Nutrition Focused Approach to Treatment

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OBJECTIVES

1. UNDERSTAND HOW MALNUTRITION IS RELATED TO CIRRHOSIS
2. LEARN AT LEAST ONE NUTRITION INTERVENTION THAT COULD BE USED TO TREAT CIRRHOSIS
PATIENT

- MALE
- ALCOHOL INTAKE
  - SUBJECTIVE DATA
  - 2-12 BEERS 1-2 TIMES/WEEK
  - LAST DRINK NOT DOCUMENTED
- NO PREVIOUS MEDICAL HISTORY PRIOR TO THIS YEAR
MEDICAL HISTORY

• **JANUARY**: FIRST ADMITTED FOR ABDOMINAL PAIN, BLOODY URINE
• DIAGNOSED WITH COLON CANCER
• COLON RESECTION
  • ASCITES: 2 LITERS OF FLUID REMOVED

“EXTREMELY CIRRHOTIC AND NODULAR LIVER”

CAUSE: ALCOHOL
LIVER’S ROLE IN ALCOHOL METABOLISM

ADH - liver

1. Ethanol + NAD ➔ Acetaldehyde + NADH (cytosol)

MEOS – other organs

1. Ethanol + NADPH ➔ Acetaldehyde + NADP

2. Acetaldehyde + NAD ➔ Acetate + NADH (mitochondria)
   *cell and liver damage

3. Acetate ➔ Skeletal muscle ➔ Kreb Cycle

4. Excess Acetate ➔ Excess Acetyl coA ➔ Fatty Acid Synthesis
   • altered NAD/NADH ratio
   • inhibited nutrient pathways
1. SYNTHESIZE BLOOD PROTEINS
   • CLOTTING FACTORS, CARRIER AND TRANSPORT PROTEINS
2. MAKES NON-ESSENTIAL AMINO ACIDS
3. BREAKDOWN PROTEINS FOR GLUCOSE
   • GLUCONEOGENESIS
4. UREA SYNTHESIS
   • EXCRETE TOXIC AMMONIA

AN IMPAIRED LIVER ALTERS PROTEIN METABOLISM ➔ MALNUTRITION
FACTORS FOR MALNUTRITION IN CIRRHOSIS

1. DECREASED INTAKE
   • EARLY SATIETY AND ASCITES

2. UNABLE TO STORE AND MAKE ADEQUATE AMOUNTS OF GLYCOGEN
   • GLUCOSE NOT READILY AVAILABLE
   • EARLY FASTING STATE = PROTEIN AND FAT BREAKDOWN

3. INCREASED ACTIVITY OF SYMPATHETIC NERVOUS SYSTEM
   • INCREASE IN HORMONES = HYPERMETABOLIC
• STATED HIS LAST FULL MEAL WAS IN DECEMBER 2016

• TYPICAL DAILY INTAKE AFTER DECEMBER:
  • 2 SMALL MEALS
  • 2 NUTRITION SUPPLEMENTS

• ESTIMATED NUTRIENT NEEDS:
  • 1600-2300 CALORIES
  • 65-80 GRAMS OF PROTEIN
SYMPTOMS

• ADMITTED FOR RECTAL BLEEDING AND ASCITES

• OTHER SYMPTOMS
  • MUSCLE WASTING
  • ABDOMINAL PAIN
  • WEIGHT LOSS
  • LOW APPETITE
  • LOW ENERGY
  • JAUNDICE
ANTHROPOMETRICS

ADMIT WEIGHT: 65.2 KG
USUAL WEIGHT: 70 KG
HEIGHT: 175.26 CM
ADMIT BMI: 20.37
## WEIGHT TRENDS

<table>
<thead>
<tr>
<th>Date</th>
<th>Weight (kg)</th>
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<tbody>
<tr>
<td>Usual body weight</td>
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<tr>
<td>January 3rd</td>
<td>72.3</td>
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<tr>
<td>January 22nd</td>
<td>75.9</td>
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<tr>
<td>January 27th</td>
<td>71.8</td>
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<tr>
<td>February 6th</td>
<td>65.2</td>
</tr>
<tr>
<td>February 8th</td>
<td>64.4</td>
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Percent weight loss in 1 month: 8.7%
PHYSICAL EXAM

SEVERE MUSCLE LOSS IN THE CLAVICLES, PATELLAR REGION, CALVES AND THIGHS

SEVERE FAT LOSS IN TRICEPS
NUTRITION DIAGNOSIS

SEVERE PROTEIN CALORIE MALNUTRITION (CHRONIC) RELATED TO POOR APPETITE SECONDARY TO ALCOHOLIC LIVER CIRRHOSIS AS EVIDENCED BY SEVERE MUSCLE AND FAT LOSS PER PHYSICAL EXAM AND SEVERE WEIGHT LOSS GREATER THAN 5% IN ONE MONTH
1. **MEDICAL FOOD SUPPLEMENTS**
   - 2 PROTEIN SUPPLEMENTS PER DAY

**NUTRITION GOAL:** DIET TO ADVANCE BY NEXT RD VISIT
1. **MEDICAL FOOD SUPPLEMENTS**
   - DIFFERENT PROTEIN SHAKE

2. **MEALS AND SNACKS**
   - SMALL, FREQUENT MEALS
     - EARLY SATIETY
     - GLUCOSE READILY AVAILABLE

3. **NUTRITION EDUCATION**
   - REVIEWED CIRRHOSIS DIET GUIDELINES WITH PATIENT AND FAMILY

**NEW GOAL:** EAT AT LEAST 50% OF AT LEAST 2 MEALS PER DAY
MONITOR AND EVALUATE

- FOOD AND NUTRIENT INTAKE: AMOUNT, FREQUENCY, TYPE, ADEQUACY
- NUTRITION FOCUSED PHYSICAL FINDINGS: APPETITE, PAIN
- BODY COMPOSITION: WEIGHT TRENDS
Question: Treat malnutrition or HE?

2013 Review

Ammonia can be present regardless of intake
Vegetables – low in AAA
Dairy protein – high in BCAA

Grams of protein/kg
0.5 = muscle breakdown
<1 = increased risk of muscle wasting and negative nitrogen balance
1.2 = muscle mass was maintained

Hepatic Encephalopathy (HE)
Too much ammonia can worsen HE.
PROS TO VEGETABLE PROTEIN

1. FIBER
   • SLOW CARB ABSORPTION = SHORT TIME IN FASTING STATE
   • INCREASES RATE OF NITROGEN EXCRETION → POSITIVE NITROGEN BALANCE

2. LOW IN AROMATIC AMINO ACIDS (AAA)
   • EX: TRYPTOPHAN → OXYPHENOL

3. LOW IN SULPHATED AMINO ACIDS
   • EX: METHIONINE → MERCAPTANS

4. HIGH IN AMINO ACIDS: ORNITHIONE AND ARGinine
   • INCREASE RATE OF UREA SYNTHESIS
CONS TO VEGETABLE PROTEIN

1. BULK
   • EARLY SATIETY

2. PALATABILITY
   • NO SALT

3. BIOAVAILABILITY OF PROTEIN AND MINERALS
   • IRON, CALCIUM
• **PROTOCOL**
  • 1.2 GRAMS OF PROTEIN/KG/DAY FOR 2 WEEKS
  • 4 MEALS/DAY + EVENING SNACK OF COMPLEX CARBS

• **MEASURED**
  • BLOOD AMMONIA AND NUMBER CONNECTION TEST (NCT)

• **RESULTS**
  • PATIENTS IMPROVED: 79.7% - SS
  • MOST IMPROVEMENT SEEN IN PATIENTS WITH SEVERE HE
  • NOT IMPROVED: 20.3%
  • 0.5 GRAMS OF PROTEIN/KG/DAY + NITROGEN SUPPLEMENTS
• **PROTOCOL**

• 3 DIETS: ALL SUBJECTS TRIED EACH FOR 2 WEEKS

• **RESULTS**

• BOTH VEGETABLE GROUPS IMPROVED NCT TIME - SS

• 80 GRAM GROUP: EEG TEST IMPROVEMENT – SS
  • MEASURES BRAIN ACTIVITY
Summary

• Malnutrition is a common complication of cirrhosis
• Symptoms and treatments to consider:
  • Decreased intake → small frequent meals for regular glucose
  • Hypermetabolic state → protein and energy needs

• Protein Intake
  • 1.0-1.2 grams/kg
  • Consider hepatic encephalopathy
  • Treatment with vegetable and dairy protein may be beneficial

Our role is important! ☺
Resources

Rest In Peace 2017