



**ACUTE**  
CENTER FOR EATING DISORDERS  
& SEVERE MALNUTRITION  
BY DENVER HEALTH™

A CENTER OF EXCELLENCE

# Nutritional Rehabilitation & Early Refeeding of Severely Malnourished Patients

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# Objectives

- ⊕ Discuss and understand the role of the dietitian in the refeeding process
- ⊕ Understand how to nourish patients with eating disorders who have medical complications
- ⊕ Learn the pros and cons of using enteral and parenteral nutrition in the severely malnourished patient
- ⊕ Case review

# Anorexia Nervosa/ Severity Index

## ⊕ Types of Eating Disorders

- Anorexia Nervosa –Restricting
- Anorexia Nervosa – Binge/Purge
- Avoidant Restrictive Food Intake Disorder
- Atypical Anorexia Nervosa

## ⊕ Current severity specifier

- Mild: BMI  $\geq 17$  kg/m<sup>2</sup>
- Moderate: BMI 16-16.99 kg/m<sup>2</sup>
- Severe: BMI 15-15.99 kg/m<sup>2</sup>
- Extreme: BMI  $<15$  kg/m<sup>2</sup>

# Additional Causes of Severe Malnutrition

- ⊕ Cancer
- ⊕ Mycobacterium Avium Complex (MAC)/ Mycobacterium Avium-intracellular (MAI)
- ⊕ Drug use/ETOH use

\*Remember, malnutrition related to eating disorders or infection/disease can result in the same medical complications and similar refeeding practices



# Registered Dietitian Role in Refeeding

# Philosophy

- ⊕ Priorities of the nutrition portion of our program
  - 1<sup>st</sup> priority: Nourish the body/provide kcals
  - 2<sup>nd</sup> priority: Correct any macronutrient/micronutrient deficiencies
  - 3<sup>rd</sup> priority: Empower client to choose for self
  - 4<sup>th</sup> priority: Nutrition education
  - 5<sup>th</sup> priority: Reduce disordered eating behaviors

# RD Role in Refeeding

- ⊕ Daily rounding with MDs
  - Most days also f/u with psych, sometimes PT and LCSW
- ⊕ RD follows up with pt 5 days/wk
- ⊕ Assist with menu planning
- ⊕ Diet/Calorie advancement to promote wt gain
  - RD assists pt in making appropriate food choices, meeting calorie needs and incorporating challenging foods into their diet
  - Monitor Enteral and Parenteral Nutrition
- ⊕ Instill trust and promote therapeutic relationship between pt and RD

# Initial Intake

- Initial Interview
  - Build rapport with RD
  - Set RD expectations
    - Meal completion, wt gain, diet advancement
  - Understand patient goals/expectations
  - Review unit guidelines
    - Mealtime expectations, supplementation, supervision
  - Assess long term calorie goals for wt restoration



# Meal Planning

- ⊕ Balance of RD structure & patient choice
- ⊕ Pre-designed meal plans/menus for each common caloric level
  - based on both exchange system and total calories
- ⊕ RD can modify menu as desired to fit specific patient needs
- ⊕ Patient gets to choose between limited options

# Calories

- ⊕ Initial caloric level
  - Challenge: Underfeeding vs Overfeeding
- ⊕ Caloric increases
  - 1400-1800 kcals on admission
  - Advance by 300-500 kcals Q 2-4 days
- ⊕ Adjusting for the patient
- ⊕ 3-4 lb/wk wt gain goal

# Nutrition Education

- ⊕ Set expectations of body fluid restoration, weight restoration
- ⊕ Purpose of macronutrients in body
- ⊕ Impact of calories in a malnourished body on organs, etc.

# Micronutrients

- ⊕ Common vitamin supplementation
- ⊕ Awareness of additional deficiencies
  - Example: zinc deficiency & lack of taste, hair loss, thiamine deficiency, vitamin D deficiency





# Medical Complications Impacting Nutritional Care

# Medical Issues

- ⊕ Refeeding Syndrome
- ⊕ Hypoglycemia
- ⊕ Hepatitis (refeeding and starvation)
- ⊕ Pseudo-Bartter's Syndrome
- ⊕ Gastroparesis
- ⊕ SMA Syndrome
- ⊕ Weight Disruption



# ASPEN Criteria for Identifying Refeeding Syndrome in Adults

	Moderate Risk (2 criteria needed)	Significant Risk
<b>BMI</b>	<b>16-18.5 kg/m<sup>2</sup></b>	<b>&lt;16 kg/m<sup>2</sup></b>
<b>Weight Loss</b>	5% in 1 month	7.5% in 3 months or >10% in 6 months
<b>Caloric Intake</b>	None or negligible oral intake for 5-6 days OR <75% of estimated energy requirement for >7 days during an acute illness or injury OR <75% of estimated energy requirement for >1 month	None or negligible oral intake for >7 days OR <50% of estimated energy requirement for >5 days during an acute illness or injury OR <50% of estimated energy requirement for >1 month
<b>Abnormal prefeeding K<sup>+</sup>, Phos, Mg serum concentrations</b>	Minimally low levels or normal current levels and recent low levels necessitating minimal or single dose supplementation	Moderately/significantly low levels or minimally low or normal levels and recent low levels necessitating significant or multiple dose supplementation
<b>Loss of subcutaneous fat</b>	Evidence of moderate loss	Evidence of severe loss
<b>Loss of muscle mass</b>	Evidence of mild or moderate loss	Evidence of severe loss
<b>Higher risk comorbidities (see list below)</b>	Moderate disease	Severe disease

# ASPEN Recommendations for Initiation of Calories

- ⊕ Initiate with 100–150 g of dextrose or 10–20 kcal/kg for the first 24 hours; advance by 33% of goal every 1 to 2 days. This includes enteral as well as parenteral glucose.
- ⊕ In patients with moderate to high risk of RS with low electrolyte levels, holding the initiation or increase of calories until electrolytes are supplemented and/or normalized should be considered.
- ⊕ Initiation of or increasing calories should be delayed in patients with severely low phosphorus, potassium, or magnesium levels until corrected.



# Refeeding Syndrome – Medical Nutrition Therapy

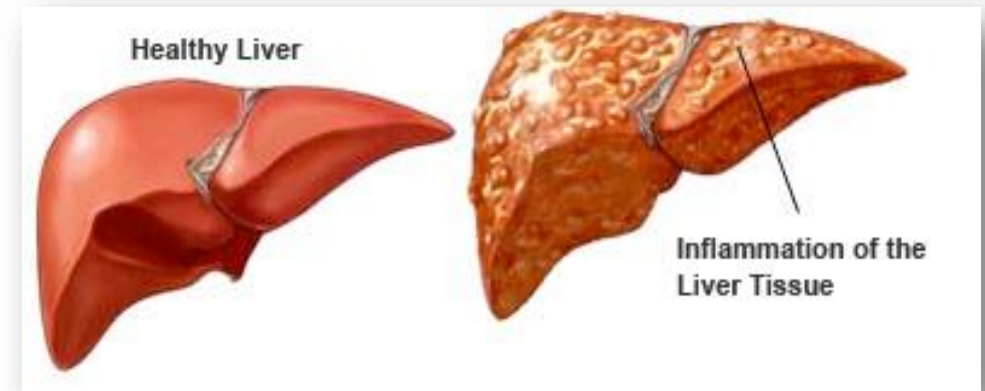
- ⊕ Use ASPEN criteria to identify risk
- ⊕ The lower the BMI – the higher the risk
- ⊕ Use ASPEN recommendation for initiation of calories if unable to monitor labs, heart rate, etc
- ⊕ When can you start patients on higher calories than ASPEN recommends?
  - Daily lab checks, telemetry monitoring, daily rounding, ICU type setting
  - Expertise of staff

# Hypoglycemia – Medical Nutrition Therapy

- ⊕ Will correct blood sugar if <60 mg/dl
  - Use 4 oz juice or oral nutrition supplement
  - Dextrose vs enteral nutrition
    - D5 blood sugar tends to spike and fall
    - Trickle feeds providing additional 200-300 kcals helps stabilize
- ⊕ Check blood glucose Q4 hours until normalized
- ⊕ Typically happens with continued nutrition intake/calorie increases when liver able to store glycogen
  - Typically, around 2200 kcals
- ⊕ Consider altering meals/snacks
  - Protein
  - HS snack

# Hepatitis

- Almost 50% of patients with AN have hepatitis
  - Increased transaminase – ALT/AST
- Increased risk with low body weight
- Starvation vs Refeeding
- Indicative of additional medical complications



# Starvation Hepatitis

- ⊕ More common in people with lower BMIs and greater risk for refeeding syndrome
- ⊕ Indicated by blood test that show elevated LFTs (ALT > AST)
- ⊕ Not uncommon to have elevated LFTs upon admission to ACUTE
- ⊕ Generally resolved with nutrition

# Refeeding Hepatitis

- ⊕ Appears after refeeding process has begun
- ⊕ Happens when dextrose calories are excessive and causing steatosis, usually within 1 week of refeeding
- ⊕  $AST > ALT$
- ⊕ Typically resolves with
  - Decrease in carbohydrates
  - OR decrease in overall calories

# Pseudo-Bartter's Syndrome

- ⊕ Caused by frequent self-induced vomiting, laxative or diuretic abuse and abrupt cessation
- ⊕ Characterized by hypokalemia and metabolic alkalosis
- ⊕ Typically, pt is volume depleted and needs fluid restored via IV

# Pseudo-Bartter's Syndrome – Medical Nutrition Therapy

- ⊕ Edema formation causes extreme discomfort
  - Both physical and mental
- ⊕ Slow infusion of IV fluids when rehydrating
- ⊕ Limit dietary salt
  - Typically, open to this to avoid further swelling
  - Can cause some upset 2/2 lack of taste in food
- ⊕ Rapid weight gain can be deceptive
  - Assess for edema
  - Feed/advance meal plan through this

# Gastroparesis – Medical Nutrition Therapy

- Almost universal with a BMI <15
- Small, frequent meals
  - Start with 5-6 meals/day
- Low fiber
  - Minimal fruits and vegetables
- Soft/liquid diet
  - Offer supplements/juices/milk
- Low fat
  - Barriers to this with refeeding
- Post-pyloric enteral nutrition



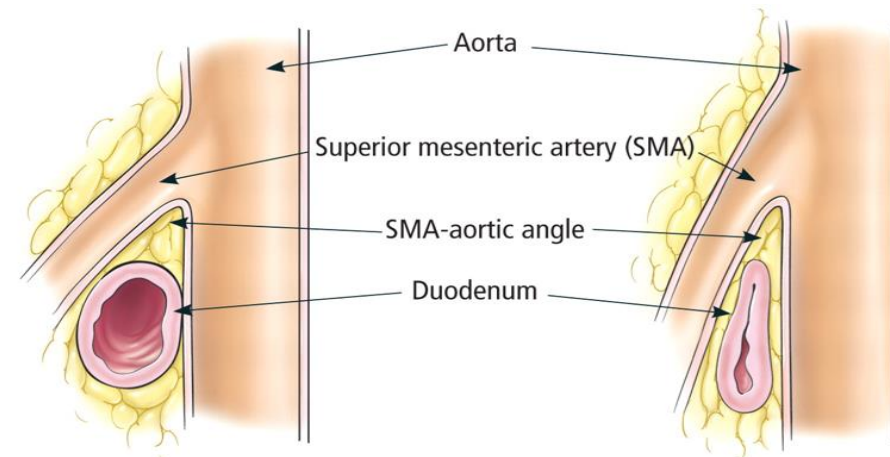
# Superior Mesenteric Artery (SMA) Syndrome

## ⊕ Caused by weight loss

- Loss of fat pad causing the SMA to compress the third portion of the duodenum
- Causes obstruction of proximal small intestine

## ⊕ Symptoms include:

- Extreme post prandial fullness, nausea, abdominal pain, bloating
- Symptoms resolved with vomiting



# SMA Syndrome – Medical Nutrition Therapy

- ⊕ Type of diet depends on severity of SMA Syndrome
  - Partial vs complete SMA
  - Advancement of diet
    - Liquids, pureed food, soft solids, solids
- ⊕ Nutrition Support for some cases
  - J-Tube Placement or Parenteral Nutrition



# Weight Disruption

- What is weight disruption?
- What should we be aware of?
  - Risk for Refeeding Syndrome
    - Refer to ASPEN guidelines
      - Consider rate of weight loss, nutrient intake, muscle/fat wasting, lab values
  - Risk for SMA Syndrome
    - Large amt of wt loss in short period of time can lead to SMA syndrome
      - Listen to patient's physical complaints correlated with eating, adjust diet as needed
  - Risk for Pseudo-Bartter's
    - What behaviors was pt using PTA to lose so much wt in a short period of time?

# Weight Disruption - Continued

- ⊕ How do we refeed patients with weight disruption?
  - Varies per pt based off of goals of care and reason for weight disruption
    - Typically start on a higher meal plan than the severely underweight patients
    - Are we trying to weight restore them or maintain their current body weight?
    - Consider appropriateness of a feeding tube
      - Is it medically indicated?
      - Is the desire to use a feeding tube more behavioral?  
i.e. wanting to “look” or “be” sick enough

# Weight Disruption - Continued

- ⊕ What caused their weight disruption?
  - Examples: gastric bypass/various surgery vs ED behaviors vs illness
  - What was their “normal” weight prior to weight disruption? What weight did the patient “feel good” at prior to weight loss?
    - Often this weight is higher than a typical IBW but that does not mean the patient should not gain weight back

# Weight Disruption - Continued

- Behavioral Issues
  - Pt could have been using extreme behaviors such as severe restricting, purging or laxative abuse PTA to lose such a large amount of wt in a short period of time
  - Monitor for purging, restriction in-house
  - If using behaviors in-house could possibly drop phos later in stay, continue to monitor
  - May need to adjust goals for wt
  - Important to remember just b/c they are at a possibly higher or normal wt doesn't mean they don't need residential level of care to work on behaviors



# Nutrition Support

# Nutrition Support – Types

- ⊕ **Oral refeeding is always our #1 choice**

- ⊕ **Enteral Nutrition**

  - Indications

  - Types of tubes used on ACUTE

- ⊕ **Parenteral Nutrition**

  - Indications

  - Peripheral Parenteral Nutrition (PPN) vs Central Parenteral Nutrition (CPN)



# Nutrition Support – Indications

- ⊕ History of multiple unsuccessful attempts at diet tx
- ⊕ Life-threatening wt loss of more than 60% IBW or less
- ⊕ Worsening & severe psychological or physical state
- ⊕ Complete noncompliance despite standard treatment
- ⊕ Pt unwilling or unable to cooperate with PO intake

# Enteral Nutrition – When to Use

- ⊕ Particularly useful in patients with ARFID
- ⊕ Starting to be used w/ patients on extremely high calorie level (usually 4000+) to help alleviate discomfort
- ⊕ Preferred method to combat persistent hypoglycemia (typically <60 mg/dl)
- ⊕ Can be used in patients with SMA or severe gastroparesis
- ⊕ OK to be supplemental

# Enteral Nutrition – Types of Tubes



- ⊕ Nasogastric Tube (NGT)
- ⊕ Dobhoff Tube (DHT)
- ⊕ Percutaneous Endoscopic Gastrostomy Tube (PEG)/PEG-J tube (PEG-J)
- ⊕ DHT is preferred tube
  - Ideally placed post-pyloric
  - Helps combat feelings of persistent fullness
- ⊕ PEG tube or PEG-J tube placed when indicated that EN may be long term
  - Issues with PEG-J

# Enteral Nutrition – Continued



- ⊕ What type of formula to use
  - Consider use of low fiber formula to help with gastroparesis
  - As kcals increase, may need more concentrated formula 2kcal/ml to decrease volume
- ⊕ Depending on type of tube, need to consider rate of infusion/thickness of formula to prevent clogging/need for replacement
  - Consider use of hourly flushes to help with clog prevention as well as hydration status

# Enteral Nutrition – Continued

- ⊕ Nocturnal vs continuous vs bolus TF
  - Encourage nocturnal tube feeds esp if pt is consuming PO during daytime
- ⊕ Adjusting TF rate based off of pt schedule or completion
- ⊕ Weaning off of EN and adding PO
  - Assisting pt in making calorie dense choices
  - Cleared by SLP
  - Where is patient's discharge plan?

# Parenteral Nutrition

- ⊕ High risk of complications, PO intake preferable method of refeeding
  - For severe and refractory cases only
  - When unable to tolerate PO and/or EN
  - RD to help with appropriate calculations and monitoring of PPN or CPN

# Parenteral Nutrition – Continued

- ⊕ CPN used for pts with obstruction or other reason that may indicate bowel rest
  - Ideal to PPN as it can provide significant calories and be used long term if needed.
  - Be aware of GIR and LIR. Still determining using IBW vs CBW
  - Monitor labs – electrolytes, liver function tests, blood glucose
- ⊕ PPN can be used short term but not ideal as it provides minimal calories
  - Can be used if pt has trauma related to EN and only needs it for an acute situation
  - Can not be discharged to outside treatment center on PN



# Case Study “Tammy”



# Patient Overview

Tammy

- 37 yr old female

➔ Admitted to ACUTE via air ambulance

- Was at OSH for approximately 6 wks PTA after being found down w/ BG of 23 mg/dL
- Lost additional 6 lbs in OSH
- DNR – Hospice vs ACUTE

➔ Admitted for medical stabilization 2/2 severe AN-R

➔ PMH: ED x 23 yrs, anxiety, depression, OCD

➔ Past Medical Complications: edema, syncope, falls, electrolyte abnormalities

➔ LMP: Oct 1996

# Anthropometric Data

- ⊕ Ht: 5'4"
  - Measured at 5'1.5" however pt w/ compression fractures that reduced ht so historical ht was used (verified by pt and MOP)
- ⊕ Wt: 22.4 kg
- ⊕ IBW: 54.5 kg
- ⊕ % IBW: 41.2% (over estimated 2/2 edema)
- ⊕ BMI = 8.5

# Medical Complications

## ⊕ **Gastroparesis**

- Low fiber, low volume, frequent meals. Eventually used EN

## ⊕ **Refeeding Hypophosphatemia**

- Phos x24 hrs : 3.1, 1.3, 1.0. Normalized w/in 24 hours
- Repleted via oral medication

## ⊕ **Risk for Refeeding Syndrome**

- BMI <16, Low levels of phos, little to no nutrition intake for >10 days
- Resolved with nutrition

## ⊕ **Refeeding edema**

- Continued to resolve with increased nutrition and protein, medication to help with diuresis

# Medical Complications (continued)

## ⊕ Refeeding hepatitis

- AST/ALT: 278/225 (high)
- Resolved with nutrition in approximately 2 weeks

## ⊕ Slow transit constipation

- Combination of nutrition and medication (miralax)

## ⊕ Hypoglycemia

- Resolved with consistent nutrition. Approximately 10 days from admission.

## ⊕ Osteoporosis

- Combination of medication (progesterone and estrogen) and nutrition

## ⊕ Severe Malnutrition

- Continued to resolve with on going nutrition

# Nutrient Needs

- ⊕ Pt started on 1400 kcal diet
- ⊕ Started on 100% of kcals via oral intake
- ⊕ Est calorie needs: 2483+
  - BMR: 998 kcals x 2.5 AF
- ⊕ Est Protein needs: 45+
  - 2g/kg

# Advancement of Diet

- ⊕ Pt's diet advanced Q3 days until wt restoring appropriately
- ⊕ Would typically stay on a meal plan for 7-14 days depending on wt restoration
- ⊕ Introduced use of enteral nutrition on 3400 kcal meal plan
- ⊕ Max kcals during stay: 4200 kcals

# Discharge

- ⊕ Upon final discharge pt was on 4200 calories (100% via EN)
- ⊕ Total length of stay: 65 days
- ⊕ Discharge wt: 37.6kg (15.1 kg wt increase)
- ⊕ % IBW: 69.0%
- ⊕ BMI :14.3
- ⊕ D/c'd to res LOC

# Challenges

- ⊕ Edema upon admission
- ⊕ Wt loss PTA
- ⊕ Expectations at OSH
  - Refused EN, hospice care
- ⊕ Food behaviors
  - Food hiding, EN vs PO
- ⊕ Ethical considerations
  - Advanced directive from OSH (use of tube feed, desire to go home and die)



# In Summary...

- ⊕ Nutrition Philosophy = nourish the body in a safe and appropriate way
  - Not as concerned about correcting ED behaviors
- ⊕ Nutrition is medicine
  - Will help with medical complications that arise from malnutrition
  - Sometimes using enteral parenteral nutrition can be beneficial
- ⊕ Teamwork is key

# Questions?



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