MEDICAL FOOD FOR THOUGHT: THE MEDICAL ISSUES OF PATIENTS WITH ANOREXIA AND BULIMIA

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LEARNING OBJECTIVES:

• Identify medical problems related to bulimia nervosa, and how to manage them
• Identify medical problems related to anorexia nervosa, and how to manage them
• Recognize when a patient needs a higher level of care for ongoing management of medical problems
MEDICAL COMPLICATIONS

• In **anorexia** a direct result of starvation and weight loss
• In **bulimia** directly correlated with the mode and frequency of purging behaviors
• Litany of medical problems associated with these eating disorders
• Most are reversible and treatable – good news, if identified early in the illness
• A few are associated with permanent harm
MEDICAL COMPLICATIONS OF ANOREXIA NERVOSA

**Cardiovascular**
- Bradycardia and hypotension
- Mitral valve prolapse
- Sudden death - arrhythmia
- Refeeding syndrome
- Echo changes
- Pericardial effusions

**Endocrine and Metabolic**
- Amenorrhea
- Unintended pregnancy & miscarriages
- Osteoporosis
- Thyroid Abnormalities
- Hypercortisolemia
- Hypoglycemia
- Neurogenic diabetes insipidus
- Hypophosphatemia

**Dermatologic**
- Dry skin
- Alopecia
- Lanugo hair
- Starvation-associated pruritis
- Acrocyanosis

**Hematologic**
- Pancytopenia
- Decreased sedimentation rate

**Gastrointestinal**
- Constipation
- Refeeding pancreatitis
- Acute gastric dilatation
- Delayed gastric emptying
- Hepatitis
- Dysphagia
- SMA syndrome

**Hematologic**
- Pancytopenia
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**Neurologic**
- Cerebral atrophy

**Ophthalmic**
- Lagophthalmos

**Auditory**
- Patulous eustachian tube dysfunction

**Pulmonary**
- Aspiration pneumonia
- Respiratory failure
- Spontaneous pneumothorax
- Emphysema
MEDICAL COMPLICATIONS OF BULIMIA NERVOSA

Gastrointestinal
- Dental erosion and caries
- Parotid gland swelling
- Esophageal rupture
- Gastroesophageal reflux (GERD)
- Constipation due to laxative abuse
- Rectal prolapse
- Mallory-Weiss tear

Cardiac
- Arrhythmias
- Diet pill toxicity
- Palpitations
- Emitene cardiomyopathy

Pulmonary-Mediastinal
- Aspiration pneumonitis
- Pneumomediastinum

Endocrine
- Irregular menses
- Mineralocorticoid excess
- Diabulimia

Opthalmic
- Scleral hemorrhage

Metabolic
- Hypokalemia
- Dehydration
- Nephropathy
- Metabolic alkalosis
- Pseudo Bartter’s syndrome

ENT
- Epistaxis
- Pharyngitis

Dermatologic
- Russel’s sign
- Edema
WHEN TO HOSPITALIZE MEDICALLY (INPATIENT)

• For AN-R
  – Less than 70% of ideal body weight (APA)
  – Rapid weight loss with severely restricted caloric intake
    • Refeeding complications more likely
  – “Milliman criteria:” bradycardia, hypotension
  – **GOAL:** Initiate the weight restoration process, avoiding and treating refeeding complications
  – **But,** even 70-85% IBW, still need RES or PHP
SOBERING REALITY OF ANOREXIA NERVOSA

- Highest death rate of any psychiatric disorder
- 30-40% of deaths are due to medical complications
- Impelling need for medical expertise in continuum of care team
- Lower BMI, inadequate weight gain, chronicity and lack of achieving full weight restoration correlate with higher mortality risk
WHEN TO HOSPITALIZE MEDICALLY

• For Purging (AN or BN)
  – Potassium <2.8 mmol/L
  – Bicarbonate > 37 mmol/L
  – Excessive edema or **history** of edema with previous attempts at cessation of purging behaviors
  – **GOAL:** Replete electrolytes, detox from purging behaviors safely and without patient discomfort
  – Mortality rate in bulimia is twice that of controls
# A Clinician’s Guide to the Bulimic’s Medicine Cabinet

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Medication Type</th>
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<tbody>
<tr>
<td>60%</td>
<td>Self-induced vomiting</td>
</tr>
<tr>
<td>30%</td>
<td>Laxatives (stimulant type)</td>
</tr>
<tr>
<td>4%</td>
<td>Diet Pills-Stimulants</td>
</tr>
<tr>
<td>4%</td>
<td>Diuretics</td>
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<tr>
<td>2%</td>
<td>Thyroid hormone</td>
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Pre-emptive Treatments with Purging Cessation
(Avoiding Failure!)

“Doc, this is the first time I didn’t develop edema when I stopped purging.”
PSEUDO-BARTER’S SYNDROME

– Consequence of severe volume depletion from chronic loss of fluids via purging of any type

– Up-regulation of **Aldosterone** production → an adrenal gland hormone, responsible for retention of salt and water to maintain homeostasis and prevent fainting from low blood pressure

  • Upon abrupt stopping of any chronic excessive purging behavior can lead to **severe-rapid** edema formation due to salt-avid state from elevated aldosterone levels
TURNING OFF ALDOSTERONE

• Restoring normal levels of Aldosterone actually takes WEEKS after stop purging

• Rapid infusion of IV fluids will result in significant edema formation and weight gain when Aldo levels high

• Don’t bolus IV saline in these patients!! **Tell the ER!** Big Patient fear.

• Transient early use of **Spironolactone** (25-200 mg/day) will antagonize Aldosterone, promote potassium retention and prevent-treat edema formation (7-14 days). **Very helpful**

• Caution with Spironolactone and renal insufficiency
HYPOKALEMIA

• Seen in all types of purging disorders

• Finding of significant hypokalemia, in an otherwise healthy appearing young woman, is highly specific for bulimia nervosa – inquire at all medical interactions! (ER, Student health, PCP visits)

• Predisposes bulimics to palpitations and cardiac arrhythmias; low potassium in young females associated with increased mortality rate

• The efficacy of potassium repletion is abrogated, unless volume is also restored and aldosterone turned off, by giving fluids
ACUTE SIALADENOSIS - BULIMIA

- Bilateral swelling of parotid glands
- Usually appearing three days after cessation of purging by vomiting
- Painful and disfiguring
ACUTE SIALADENOSIS
LEMON DROP PROTOCOL

- Sugar free lemon drops every few hours or other sialagogues
- Ibuprofen (weight-adjusted dosing) 3-4 times a day
- Warm compresses hourly while awake
- **Start early**
- Rarely pilocarpine tablets
EDEMA IN EATING DISORDERS

• Troublesome for eating disorder patients who focus on their body image
• Frequent complaint
• Three types:
  ✓ 1. Bulimia with abrupt cessation of purging behaviors (Pseudo-Bartter’s)
  2. Anorexia during early refeeding (mild)
  3. Anorexia during weight restoration (refeeding syndrome)
Edema (fluid retention) in lower legs

- In AN-R during early refeeding get exuberant insulin secretion in response to carbohydrates
- Insulin’s normal effect on the kidney is to cause salt and water retention → edema
- Goes away naturally within a week or two – **mild**
- Set expectations! Leg elevation – patience
- Not “refeeding syndrome” which is more ominous and involves lungs and heart
- No diuretics should be prescribed
- Reassurance
REFEEDING SYNDROME

- Classic study by Keys in 1940 (“Minnesota Experiment”)
- Seen with unintentional refeeding experiments involving POWs from WWII. Once released from concentration camps, they were given sweet foods by well-intentioned soldiers and precipitously died.
- These severe complications of refeeding rediscovered with introduction of Total Parenteral Nutrition (TPN) in 1969.
- Anorexia nervosa serves as a sobering model for the possible calamity inherent with injudicious refeeding of severely malnourished patients. Manifests with peripheral edema, heart failure, hemolysis, seizures, hypophosphatemia and possibly death.
REFEEDING HYPOPHOSPHATEMIA

REFEEDING SYNDROME

- Tissue Hypoxia
- Myocardial Myopathy
- Hypophosphatemia
- Increased Demand for Phosphorous to provide phosphorylated intermediates of Glycolysis and high energy compounds like ATP
- Renal Excretion of Phosphorous & Muscle Catabolism
- Normal Serum Phosphorous
- Insulin Secretion
- Glycolysis Intracellular Influx of Phosphorous

CARBOHYDRATES

- 2,3-DPG
- ATP
- Glycolysis
RECOMMENDATIONS TO AVOID THE REFEEDING SYNDROME:
PREVENTION IS ACHIEVABLE

1. Recognize the “patient at risk”, it involve RD’s
2. Carefully test for and correct electrolyte abnormalities before initiating any nutrition support whether PO, NG or TPN
3. Judiciously restore circulatory volume, closely monitor vitals and physical examination
4. Closely monitor the electrolytes over the first 1-2 weeks, especially Phosphorous and Potassium
5. New study (IJED) on hypophosphatemia risks. (lower BMI)
6. Increase caloric delivery thoughtfully
7. Here: “A little nutrition support is good, too much is lethal”, but recent studies support more aggressive refeeding protocols
8. Start 1400-1800 kcal/day and increase by 300-400 kcal every 3-4 days till sustain weight gain. Becoming more aggressive and more NG’s to avoid “underfeeding.” Goal is 3-4 pounds per week as Inpatient.
OSTEOPOROSIS IN ANOREXIA NERVOSA

• **Potentially irreversible** complication
  
  – By the end of the second decade, more than 90% of peak bone mass has been achieved in healthy woman: in adolescent-onset AN, this may not occur
  
  – Onset of bone loss in anorexia is rapid (2.5%/year) and severe
  
  – Often amenorrheic < 90% IBW
  
  – Increased life-long fracture risk!!
  
  – Not seen in bulimia, except if past history of AN
  
  – Exercise and bone health; Consider both ends of the curve (not always good)
  
  – Highly prevalent
OSTEOPOROSIS IN ANOREXIA NERVOSA
HUGE PROBLEM

Dexa Z score > -1.0  Z score -1.0 to -2.5  Z score < -2.5

Adolescents  50%  25%
Adult Women  90%  38%
OSTEOPOROSIS: TREATMENT

• Order DEXA in all patients with anorexia nervosa after 9-12 months of diagnosis, or 6-9 months of amenorrhea
• Check DEXA every 2 years in anorexia nervosa patients
• ? Bone quality vs bone density
• Bisphosphonates are indicated in males with A.N. & osteoporosis, if testosterone is normal
• Document informed consent with women of childbearing age and osteoporosis if using bisphosphonates
• A “bridge” until full weight restoration is achieved
• Teriapartide (PTH) – beneficial but, cost and daily shot?
• Prolia – only anecdotal evidence in AN, promising but cost?
• Vitamin D and Calcium (1200mg/day) important but can’t fly solo! Less aggressive with Vitamin D (level > 20)
OSTEOPOROSIS

• Estrogen
  – Virtually all trials conclude...just say no to estrogen
  – Use obscures the benefits of natural menstrual cycle resumption and confuses
  – Highly prevalent and entrenched myth
  – Transdermal estrogen may be of benefit
ANOREXIA NERVOSA - METABOLIC

- Patients with A.N. die with near-normal albumin levels. Does not change much during weight restoration.
- Low cytokine levels, but not 100% clear. Microbiome??
- Prealbumin better marker of disease severity
- Hypoglycemia is concerning – don’t dismiss; need close monitoring and maybe admission.
CONSTIPATION – ANOREXIA NERVOSA

• Constipation universal in severely underweight, even if never abused laxatives
  – Slowed GI transit time
• High fiber worsens bloating at low weights
• Miralax (PEG), BID-TID
• Abdominal x-rays to reality check burden of stool present when ongoing complaints, before treat with stimulant laxatives
CONSTIPATION – BULIMIA – STIMULANT LAXATIVE ABUSE

• Treatment: creates angst for patients when stopping
  – Manage **expectantly**, offer osmotic laxatives like polyethylene glycol
  – Abdominal x-ray can evaluate objectively how much stool is present – may need frequent x-rays
  – If excessive stool, intensify medical management. If minimal stool, reassure
  – Replete potassium to >4.5 mEq/L
  – No logic to gradual taper of stimulate laxatives!! (cathartic colon!!)
  – Dispel erroneous beliefs – Rome Criteria
CATHARTIC COLON SYNDROME???

A.K.A “Why we don’t taper stimulant laxatives…we STOP them”
GASTROINTESTINAL FACTORS WHICH CAN IMPEDE REFEEDING IN A.N.

1. Gastroparesis and Gastric Dilatation
2. SMA Syndrome
3. Dysphagia
4. Diarrhea
GASTROPARESIS - ANOREXIA

• Loss of normal stomach peristalsis (movement)
  – Causes early satiety, nausea, bloating, gassiness
  – Nearly **universal** in severe underweight anorexia nervosa
    (This isn’t “ED talking”!)
  – Nuclear med emptying study rarely needed, but can add
    confirmation. Painless and safe. Maybe obtain if symptoms
    persistent despite treatment
  – Low dose short-term metoclopramide (2.5 mg 30 min before)
  – Occasionally add BID Erythro. Watch QT! or Azithro, which
    is much cheaper than liquid EES and maybe safer
  – Patience – GI transit normalizes in a few weeks with
    adequate fluid and nutritional intake. Avoid “too much fiber”.
    Use smaller meals, small particle feeding, more liquid and
    soft feedings
ACUTE GASTRIC DILATATION
(ANOREXIA NERVOSA)

Huge stomach!
Cause unknown
SUPERIOR MESENTERIC ARTERY (SMA) SYNDROME – ANOREXIA NERVOSA

• Third portion of duodenum becomes compressed between the aorta and the vertebral column due to weight loss and loss of the fat pad that normally surrounds the blood vessels
• Present with weight loss, abdominal pain, distention, nausea and vomiting. “Not always in their head”
• Functionally: a small bowel mechanical obstruction that can be fixed by weight restoration. No surgery
• DX: UGI series or CT scan of abdomen
SUPERIOR MESENTERIC ARTERY (SMA)

Normal

- Superior Mesenteric Artery (SMA)
- Duodenum
- Abdominal Aorta
- Mesenteric Fat

Weight Loss

- Superior Mesenteric Artery (SMA)
- Compressed Duodenum
- Absence of Mesenteric Fat

SIDE VIEW
DYSPHAGIA (DIFFICULTY SWALLOWING) – ANOREXIA NERVOSA

• Occurs in moderate-severe anorexia nervosa due to weak swallowing muscles from atrophy
• Interferes with refeeding progress due to difficult swallowing - coughing
• May lead to aspiration pneumonia
• Likely more common than previously appreciated
• Speech therapy evaluation, modified barium swallow to diagnose
• Exercises and aspiration precautions
• No straws

DIARRHEA IN ANOREXIA NERVOSA

• Early in refeeding
• Frustrates weight gain
• Due to small bowel villous atrophy – malabsorption
• Diamine Oxidase levels are low
• Resolves with weight restoration, but may need to simplify dietary components early on
CARDIAC (ANOREXIA NERVOSA)

- Heart muscle atrophy with loss of ventricular mass
- Attenuated BP response to exercise and reduced exercise capacity
- Low blood pressure (70/40)
- Bradycardia (resting pulse 40-60) – takes weeks to resolve – not athletic heart
- Tachycardia with minimal exertion (120-150 BPM)
- Mitral valve prolapse (palpitations)
- Pericardial effusions

Don’t Rx!
CARDIAC (ANOREXIA NERVOSA)

- Increased risk of sudden death
- Clean coronaries on post-mortem – not MI’s
- ??QT prolongation → Torsade De Pointes, → sudden death (the old). Not inherent to A.N. If present, think lytes-meds
- Increased QT interval dispersion on EKG, is associated with propensity to ventricular arrhythmias (the new)
ENDOCRINE – ANOREXIA NERVOSA

- Hypoestrogenic and low T
- Amenorrhea – hypothalamic (GnRH): **Not fail-safe**
- Fertility likely intact if weight restores. But preterm infants, miscarriage risk and unintended pregnancies are a problem during A.N.
- Euthyroid sick syndrome (nml TSH). Don’t treat!
- Hypoglycemia
- High cortisol levels
- “Diabulimia”
- Diabetes mellitus: Permissive hyperglycemia
HEMATOLOGIC – ANOREXIA NERVOSA

- Trilinear hypoplasia (leukopenia > anemia > thrombocytopenia) All 3 cell lines affected in bone marrow
- Gelatinous marrow transformation
- Neutropenic precautions not necessary
- Don’t Rx with growth factors
- Falsely elevated B-12 and folate levels
ANOREXIA NERVOSA FOLLOW-UP AFTER SUCCESSFUL MEDICAL TREATMENT

Cardiovascular
- ✔ Bradycardia and hypotension
- ✔ Mitral valve prolapse
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- ✔ Refeeding syndrome
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Endocrine and Metabolic
- ✔ Amenorrhea
- ✔ Infertility
- ✗ Osteoporosis
- ✔ Thyroid abnormalities
- ✔ Hypercortisolemia
- ✔ Hypoglycemia
- ✔ Neurogenic diabetes insipidus
- ✔ Arrested growth
- ✔ Low testosterone

Dermatologic
- ✔ Dry skin
- ✔ Alopecia
- ✔ Lanugo hair
- ✔ Starvation-associated pruritis

Hematologic
- ✔ Pancytopenia due to starvation
- ✔ Decreased sedimentation rate

Gastrointestinal
- ✔ Constipation
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- ✔ Hepatitis
- ✔ Dysphagia

Neurologic
- ✗ Cerebral atrophy - Cognitive

Ophthalmic
- ✔ Lagophthalmos

Pulmonary
- ✔ Aspiration pneumonia
- ✔ Respiratory failure
- ✔ Spontaneous pneumothorax
- ✔ Emphysema
BULIMIA NERVOSA FOLLOW-UP AFTER SUCCESSFUL MEDICAL TREATMENT

**Gastrointestinal**
- Dental erosion
- Parotid gland swelling
- Esophageal rupture
- Gastroesophageal reflux (GERD)
- Cathartic colon
- Mallory-Weiss tear

**Cardiac**
- Arrhythmias
- Diet pill toxicity: palpitations, hypertension
- Emitene cardiomyopathy

**Pulmonary-Mediastinal**
- Aspiration pneumonitis
- Pneumomediastinum

**Endocrine**
- Irregular menses
- Mineralocorticoid excess (temporary)

**Metabolic**
- Hypokalemia
- Dehydration
- Nephropathy
- Metabolic alkalosis
- Pseudo barter's syndrome
- Hyperphosphatemia
SUMMARY

• In Anorexia Nervosa, medical complications from malnutrition and weight loss
• In Bulimia, medical complications from mode and frequency of purging
• Most reversible!!
• Therefore need to diagnose and treat in timely and evidence-based manner to help effectuate successful treatment outcomes for eating disordered patients
But medical questions remain:
1. Who gets gastroparesis and how long does it persist?
2. Who gets SMA and when does it resolve?
3. What is the optimal mode and rate of refeeding?
4. What is the role of supplements in the refeeding process?
5. When do orthostatic changes in pulse and blood pressure revert to normal in A.N.?
6. What is optimal treatment for osteoporosis?
7. Who gets pseudo-bartters edema?
8. How long do aldosterone levels remain high?
9. What is optimal oral hygiene practice in B.N.?
10. What is the medical issue that most frustrates your patients?