Care of the Emaciated Patient

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What Causes Emaciation?

"The state of being abnormally thin or weak"

Causes in wildlife:

- Inability to hunt/eat
    - Chronic Illness
    - Chronic Injury
    - Congenital anomaly
    - Inexperience/naïve
    - Depleted resources
    - Trapped
- Parasitism
- Acute Stage (1st 2 weeks)
- Decrease
    - Metabolism
    - insulin level
    - T3 levels
- Increase
    - Catecholamines
    - growth hormone
    - Glucagon
    - cortisol
- Changes in hormones→ increased gluconeogenesis and skeletal muscle breakdown
- The brain survives on glucose produced from protein catabolism and hepatic gluconeogenesis

Consequences of Starvation

- Total body water loss is greatest during the first 10-14 days of starvation. Weight loss is the highest during the first few days because of this disproportionate water loss.

- During the delayed response to starvation (i.e. >10 days after onset) fat becomes the major source of energy instead of glucose.
    - The brain relies on ketone bodies as an energy substrate during this phase.
- Intracellular ions of potassium, phosphorus, and magnesium move to the extracellular space→total body levels of potassium, phosphorus, and magnesium are depleted.

- Lethargy
- Anemia
- Reduced immune function
- Reduced enzyme production
- Reduced bile production

Cardiac function is compromised

- Cardiac muscle mass decreases similar to that of lean body mass
- Cardiac output and ventricular compliance are reduced.
- Hypotension and bradycardia can occur in an effort to reduce oxygen consumption.

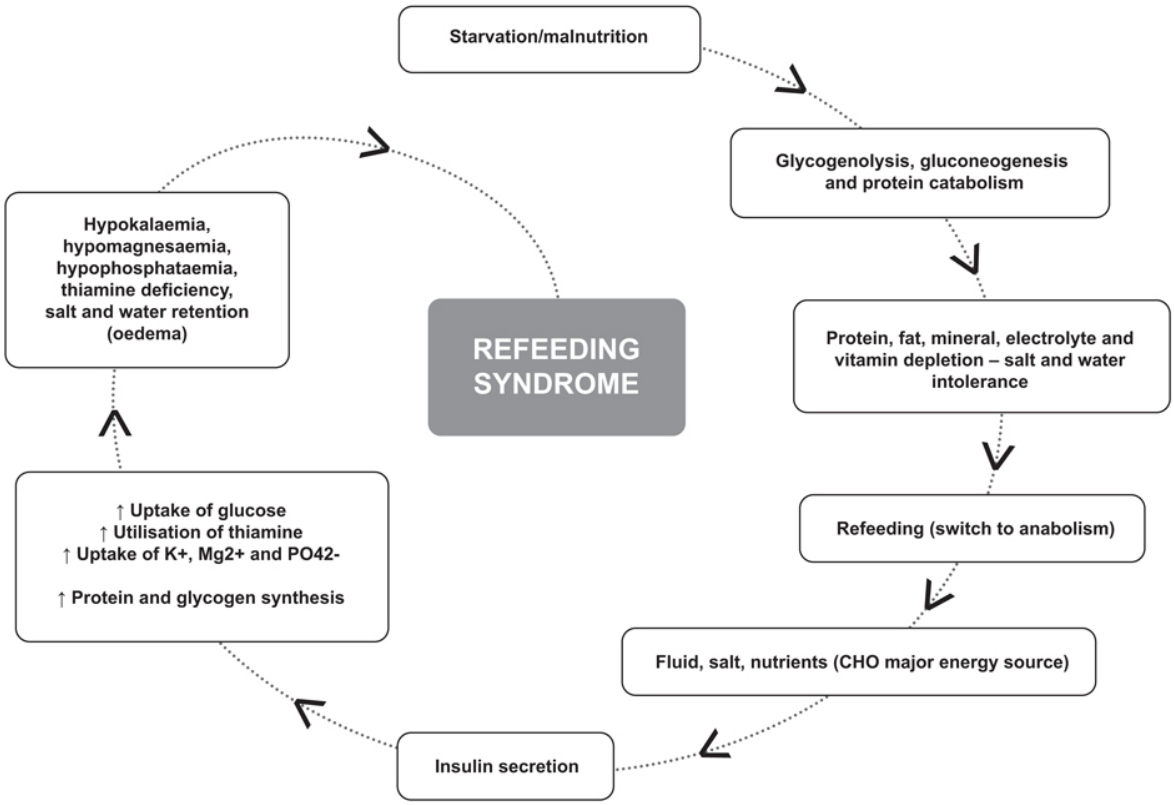
Changes to the gastrointestinal tract

- Reduced enterocyte formation; reduced villus height; decreased crypt cell proliferation; mucosal atrophy; decreased intestinal motility; and decreased nutrient absorption

First, do no harm

STABILIZE, STABILIZE, STABILIZE→These patients are critical!!

- Get a baseline if you can
    - PCV/TP, chemistry (esp electrolytes: Na, K, Mg, P), fecal, crop swab, full rads once stable
- WARM the patient
    - Thermoregulation costs a lot of energy!
- REHYDRATE the patient
    - Warm, isotonic crystalloids (LRS, NormR) + added electrolytes PRN, careful with Dextrose…
    - Assume severe dehydration
    - Consider (at least partially) rehydrating via the PO route
- Start a GRADUAL nutritional plan



<u>Consequences of Refeeding Syndrome</u>

- Hypophosphatemia
- Whole body phosphate depletion
- Mg and K deficiencies
- Hemolytic anemia
- Hyperglycemia
- Cardiac arrhythmias
- Hypoventilation
- Seizures, altered mentation
- Poor immune function
- Muscle weakness
- Death

<u>*Not thought to occur in birds, reptiles??</u>

Start Slowly with Food Reintroduction

- Start with liquid/slurry diets
    - Start dilute, work up in concentration
    - Birds, reptiles - gavage
- Low carb, high fat, easily digestible
- Balanced in K+, P, Mg
- Frequent, small volume meals
- After 3-4 days can add more carbs and protein
- Gradually increase amount fed each day and decrease frequency until normal diet resumed (7-10 days)

How Much do I Feed?

- Start at 25% of their resting energy requirement for the first 24 hours.
- Resting energy requirement is measured in kcal/day. This amount should be fed in several small meals.
- After the first 24 hours, the amount of food should be slowly increased over the next 3-5 days until full RER is achieved.

Energy Needs

➨ Calculate MEC:

MEC (Metabolic Energy Coefficient) = the amount of calories needed at rest in a thermal neutral environment per day

Also called RER (Resting Energy Requirement)

Placental mammals:

MEC = 70 x $W^{.75}$ (body weight in kg) = Kcals needed/24 hr

Marsupials:

MEC = 49 x $W^{.75}$ (body weight in kg) = Kcals needed/24 hr

Birds (less than 100 gm; passerines):

MEC = 129 x $W^{.75}$ (body weight in kg) = Kcals needed/24 hr

Birds (greater than 100 gm; nonpasserines):

MEC = 78.3 x $W^{.75}$ (body weight in kg) = Kcals needed/24 hr

Snakes:

MEC = 10 x $W^{.75}$ (body weight in kg) = Kcals needed/24 hr

Calculate caloric requirement for the animal's state:

- Healthy Adult: MEC x 1.5 to 2
- Debilitated Adult: MEC x 2.5 to 3
- Lactating: MEC x 3 to 4
- Healthy Young: MEC x 4
- Debilitated Young: MEC x 4.5 to 5

Emaciation in Pediatrics

- Causes:
    - Absence of parent(s)
    - Improper human rearing
    - Depleted resources
    - Injury/Illness/Parasitism
- Once most are at an emaciated state, prognosis is very poor
- Typically have concurrent issues
    - Severe dehydration
    - Severe parasite infestations
    - Hypothermia
- Energy requirements are so much higher, so need to be re-nourished at a quicker rate
    - Still small frequent meals and start dilute (which you may be doing anyway) and PO fluids to rehydrate!

Euthanasia Guidelines

- Severe emaciation + patient obtunded
- Emaciation due to:
    - Chronic injury
        - Fractures
    - Congenital anomaly
        - Malocclusion
    - Any other condition that you would normally EOA for…
    - On the flipside, be sure you're not releasing an animal that would be predisposed to emaciation…

Take Home Points

- “Go slow, go low”
- Frequent monitoring of PCV/TP and electrolytes
- Diarrhea is not uncommon
- Normal diet should be resumed by 10-14 days
- Frequent weight and BCS checks
- Most will do very well if you can get them past the initial 72 hrs!