

ANOREXIA NERVOSA
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1. **General Considerations:**

- Anorexia nervosa is an eating disorder characterized by an intense fear of getting fat, incessant dieting, and substantial and often dangerous weight loss
- It is a disorder of adolescent girls and young women usually; 90-95% of patients with anorexia nervosa are female.
- Anorexia nervosa is common in industrialized nations such as the USA, Sweden and Canada where food is plentiful and thinness is valued.
- In the USA, prevalence is estimated to be 1% of young women and growing.
- Typical patients are white and middle to upper class.
- Bimodal peaks of age of onset occur at 13-14 and 17-18. The incidence may be higher in student populations.
- Certain groups are at increased risk and include:
 - Dancers
 - Long-distance runners
 - Skaters
 - Models
 - Actors
 - Wrestlers
 - Gymnasts
 - Flight attendants
 - College sorority members
- Possibly the greatest difficulty in treating this disorder is the profound denial and resistance to treatment on the part of the patient.

2) DSM IV Criteria for Diagnosis of Anorexia Nervosa

- A. Refusal to maintain body weight at or above a minimally normal weight for age and height (e.g. weight loss leading to maintenance of body weight < 85% of that expected)
- B. Intense fear of gaining weight or becoming fat, even though underweight
- C. Disturbance in the way in which one's body weight or shape is experienced, undue influence of body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight
- D. In postmenarchal females, amenorrhea i.e. absence of at least three consecutive menstrual cycles. (A woman is considered to have amenorrhea if her periods occur only following hormone; e.g. estrogen administration).

Specify Type:

Restricting type: during the current episode of anorexia nervosa, the person has not regularly engaged in binge eating or purging behavior (i.e. self-induced vomiting or the misuse of laxatives, diuretics, or enemas)

Binge-eating/purging type: during the current episode of anorexia nervosa, the person has regularly engaged in binge-eating or purging behavior (i.e. self-induced vomiting or the misuse of laxatives, diuretics, or enemas).

3. Clinical Presentation

- Most patients do not present voluntarily for medical care. Most are referred by a friend, family member, teacher or coach.
- The patient usually denies symptoms, appears irritated or indifferent and while superficially compliant, is deeply distrustful and reticent.
- The patient may be bundled in oversized clothes to disguise her emaciation.
- If she acknowledges symptoms, the most common complaints are:
 - Constipation
 - Abdominal bloating
 - Dizziness
 - Discomfort sitting
 - Cold intolerance

4) Psychological Presentation in Anorexia Nervosa

- Behavioral and emotional presentation may vary greatly from cheerful and hyperactive to subdued and depressed.
- Usually, she relies heavily on denial and intellectualization.
- Socially isolated
- Extreme obsessional thinking about food, weight, metabolism, body image may be revealed and be so extreme that the patient appears delusional or psychotic.
- Patients are usually deeply distrustful and see the primary care provider as the enemy who is trying to make the patient “get fat”. It may take enormous persistence to establish a relationship where the patient will reveal inner thoughts.

- Personality features include:
 - Perfectionism
 - Excessive conformity
 - Profound low self-esteem
 - Guilt and intolerance of anger
 - Competitiveness
 - Envy
 - An extreme sense of responsibility
 - Immaturity
 - Exquisitely sensitive to rejection
 - Conflicted about close relationships
 - Poorly formed sense of identity
 - Severe conflicts about sexuality
 - Fears of being unjustly controlled

- Family dynamics
 - Mothers may tend to impose their own needs on the child making the child feel controlled and exploited.
 - Mothers may appear as caring, devoted, self-sacrificing women but their almost saintly nurturance of others is a defense against low self-esteem and fear of rejection.

- Daughters may feel rage against their controlling mothers but are conflicted by guilt and fear of loss and therefore often respond by nurturing their mothers!
- Fathers may be superficially highly successful, independent men who are autocratic and demand unconditional loyalty from their wives and children.
- Fathers underneath may also suffer from low self-esteem and mistrust their wives; they often turn to their daughters for emotional needs. Likewise the daughters often turn to the fathers for emotional needs.
- The anorexic daughter often views the parent's relationship as a model of female-male relationships that is to be avoided at all cost and anorexia is a flight back to childhood, to avoid development into an adult woman.

5. **Physical Examination**

- May appear younger than stated age
- Decreased subcutaneous fat; atrophic breasts; emaciation
- Dry skin with lanugo hair and a yellow hue from carotenemia
- Alopecia
- Sunken eyes with periorbital edema
- Peripheral edema
- Bradycardia, hypotension, hypothermia
- Parotidomegaly (if actively bingeing/purging)
- Dental enamel erosion (if bingeing/purging now or in past)
- Callouses on the dorsal surface of the hands (if bingeing/purging)

6. **Medical Complications of Anorexia Nervosa**

a. Cardiovascular Complications

- Most common cause of sudden death
- Extreme protein-calorie malnutrition and weight loss causes profound bradycardia, hypotension and decreased LV mass and systolic function
 - Systolic BP can go as low as 70
 - Sinus bradycardia as low as 30-40
 - These changes may be secondary to a lowered basal metabolic rate.
 - There may be decreased sympathetic activity on the heart and elevated vagal activity.
 - These changes are not usually treated unless there is clinical evidence of negative sequelae from them.

- EKG shows
 - sinus bradycardia
 - ST segment depression
 - T wave flattening
 - Low voltage
 - Rightward QRS axis.
 - If QT prolongation present, observe more carefully especially with regard to medications and concomitant exercise as QT prolongation may be a marker for cardiac arrhythmias and sudden death.

- High incidence of mitral valve prolapse, usually mild without significant MR presumably because of myocardial atrophy and intravascular volume depletion

- **The period of greatest danger for cardiac decompensation is not at peak weight loss but rather within the first 2 weeks of refeeding!**
 - Myocardium is unable to withstand the stress of increased metabolic demands during refeeding. Cardiovascular collapse and death occurs upon refeeding with oral or parenteral intake of highly caloric nutrients, especially glucose.
 - This syndrome was first demonstrated in WW II when concentration camp survivors died upon refeeding with high carbohydrate foods.
 - Hypophosphatemia occurs upon refeeding. As glucose is infused or ingested, it produces a shift of phosphate from the extracellular space intracellularly. Phosphate depletion produces ATP depletion which results in decreased cardiac stroke volume.
 - Refeeding must be accomplished slowly with only modest caloric increases during the first few weeks to allow recovery of LV mass.
 - A sudden sustained increase in HR (even if not tachycardia) can warn of cardiac decompensation. Also watch for severe bradycardia (<40), rhythms other than NSR, systolic BP < 60 or evidence of CHF.

Strategies to Avoid the Refeeding Syndrome

- 1. Identify patients at risk (the chronically malnourished or those who have not eaten for 7-10 days).**
- 2. Measure serum electrolytes and correct abnormalities before refeeding.**

3. **Follow serum chemistries including phosphate every 3 d for the first 7 days and then weekly during the rest of refeeding.**
4. **Attempt to increase daily caloric intake slowly by 200-300 kcal every 3-5 days until sustained weight gain of 1-2 lb per week is attained.**
5. **Monitor patient carefully for development of tachycardia or edema.**

b. **Endocrine Complications**

- **Amenorrhea** is the foremost change in patients with anorexia and is required for the diagnosis.
- LH and FSH are low as well as estrogen levels.
- LH secretion does not vary and in fact the LH response to gonadotropin releasing hormone (GnRH) is blunted.
- Global hypothalamic dysfunction is probably at least partially responsible for the pathogenesis of amenorrhea in patients with anorexia.
- Because androgens are aromatized to estrogens in adipose tissue and because patients with anorexia severely lack adipose tissue, estrogen levels remain low.

- Absence of menses may precede significant weight loss in pts with anorexia and may persist beyond nutritional rehabilitation and weight gain. Excessive exercise and malnutrition may also contribute to amenorrhea.
- Longer duration of the eating disorder and younger age at onset predict persistent amenorrhea.
- Many of the endocrine changes in anorexia reflect adaptive responses to malnutrition. Decreased fertility is expected in the severe stages of this disease.
- If patients with anorexia conceive, the outlook for the fetus is grim:
 - Low birth-weight
 - Increased incidence of spontaneous abortions
 - Congenital malformations
 - Increased perinatal mortality
 - Ineffective parenting

- **Profound osteopenia** develops in patients with anorexia. This becomes a difficult management issue as the peak age of onset of anorexia corresponds to the time period wherein maximum skeletal growth and mineralization occur. The bone loss may not be reversible even with weight gain, exercise and calcium/estrogen supplements. (Skates)

- Others have shown that patients with anorexia may be more vulnerable to **irreversible trabecular bone loss** which contrasts with postmenopausal

women who suffer both cortical and trabecular bone loss. Estrogen administration in postmenopausal women protects bone mass, however.

- Other possible contributors to the bone loss in patients with anorexia include the **hypercortisolemia** or possibly **progesterone deficiency** seen in these patients. Progesterone promotes bone formation and accelerates remodeling. **Low insulin-like growth factor 1 (IGF-1)** may also contribute to bone loss.
- Treatment to prevent bone loss particularly in the adolescent patient should be aggressive.
 - Moderate weight bearing exercise
 - Calcium supplements of 1000-1500 mg/d
 - 400 iU vitamin D
 - Weight gain and proper nutrition to assure resumption of menses
 - Oral contraceptives may promote premature closure of bone epiphyses in the adolescent patient but are a reasonable alternative in the older patient. Unfortunately, the benefits of estrogen in these patients has not yet been proven in controlled trials.
- **Hypercortisolemia** despite normal levels of ACTH also occur. This may be a protective change assuring glucose production at alternative sites.
- **Sick euthyroid syndrome** occurs with decreased T3 levels, low to normal T4 levels and elevated rT3.
- **Growth hormone levels are elevated** in patients with anorexia. However, arrested growth in adolescence occurs suggesting that there must be a state of decreased growth hormone action. Insulin-like growth factor 1 (IGF-1) is decreased suggesting a growth hormone resistance.
- **Decreased vasopressin** occurs in 40% of patients with anorexia and is consistent with partial diabetes insipidus.

c. **Gastrointestinal Complications**

- **Gastrointestinal transit is prolonged** in up to 80% of patients. Gastric atrophy and decreased antral motility contribute.
- Patients may complain of early satiety and bloating.
- Metochlopramide may relieve symptoms.
- **Reflex hypofunctioning of the colon** results from lack of oral intake. Constipation and fecal impaction can occur. Nutritional rehabilitation, adequate fluid intake, and minimal fiber supplements will relieve symptoms.

d. **CNS Complications**

- Cerebral atrophy occurs in patients with anorexia.
- Weight gain shows significant reversibility toward normal brain volumes

e. **Dermatologic Complications**

- Dry scaly skin
- Brittle hair and nails
- Increased lanugo-like body hair on the back, arms, legs, and side of the face (adaptive mechanism to conserve body heat!)

f. **Hematologic Complications**

- Fat atrophy of the bone marrow
- Pancytopenia
- Isolated leukopenia
- Anemias of the normocytic or macrocytic varieties

7) **Treatment**

- Notoriously difficult because of resistance from patient and family
- Patient and family attempt to “split” the healthcare team (cause disagreements or disputes).
- Multidisciplinary team is essential for treatment
 - primary care provider
 - psychiatrist
 - psychologist or other mental health professional
 - nutritionist
- Attempt to engage the patient in her treatment. Concentrate on an acknowledged symptom (cold intolerance, abdominal bloating, constipation, poor concentration)
- **Triad of sensitivity, empathy, and respect for the patient coupled with firm requirements for physical safety are the core requirements for effective treatment.**
- Major role of the primary care provider is to monitor medical status:
 - Frequent visits
 - Measure vital signs, including orthostatics
 - Laboratory monitoring including electrolytes, urinalysis, BUN, EKG

- Set limits for medical danger (**and there should be no negotiation about these limits!**) to include:
 - Lower limit of acceptable weight (< 75% of ideal body weight) or precipitous weight loss in a short period of time
 - Vital sign parameters (orthostatic changes, HR < 50)
 - Hypokalemia, hypophosphatemia
 - EKG abnormalities (prolonged corrected QT; arrhythmias)
 - Acute food refusal
 - Suicidal ideation
- By setting limits, the primary care provider appears to the patient as an ally. Although she appears to struggle to retain control, silently she may be relieved that someone else is in command.
- Many patients will find ways to alter their weight for clinic visits such as by water loading or refraining from urination.
- Some authors recommend that primary care providers not demand a set amount of weight gain per visit. Although increased weight gain is the ultimate goal, it should be left to occur as a natural outcome of psychotherapy.
- Other components of the treatment plan include individual psychotherapy and family therapy. A wide-range of psychotherapeutic modalities has been advocated including supportive, psychoeducational, cognitive-behavioral and insight-oriented therapies.
- Psychiatric hospitalizations, residential treatment programs and half-way houses have also been helpful and/or necessary.
- Serotonin re-uptake inhibitors, although useful in treating bulimia nervosa, have had less success in anorexia.
- Any comorbid disorder such as depression, anxiety or obsessive-compulsive disorder should be appropriately treated.
- Low dose anxiolytics before meals can sometimes help with meal-time anxiety.

8. Prognosis

- 50% recover to a normal weight
- 25% remain thin but not dangerously so
- 20% remain emaciated
- 5-10% either become overweight or die

9) References

Beresin EV. Anorexia nervosa. *Comp Ther*, 1997;23:664-671.

Kaye WH, Klump KL, Frank GK, and Strober M. Anorexia and bulimia nervosa
Annu Rev Med 2000, 51:299-313.

Kreipe RE, Birndorf SA Eating disorders in adolescents and young adults. *Med Clinics of NA*, 2000; 84:1027-1049.

Mehler PS, Gray M, Schulte M Medical complications of anorexia nervosa *J of Women's Health*, 1997;6, 533-541.

Skates SJ, Herzog DB, Nussbaum SR. The clinical course of osteoporosis in anorexia nervosa. *JAMA* 1991;265:1133.

Walsh JME, Wheat ME, Freund K. Detection, evaluation, and treatment of eating disorders: the role of the primary care physician. *J Gen Intern Med* 2000;15:577-590.