

*Treatment in Psychiatry begins with a hypothetical case illustrating a problem in current clinical practice. The authors review current data on prevalence, diagnosis, pathophysiology, and treatment. The article concludes with the authors' treatment recommendations for cases like the one presented.*

# Anorexia Nervosa

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At the suggestion of her pediatrician, "Rachel," a 19-year-old college freshman at a competitive liberal arts college, was brought by her parents for psychiatric evaluation during spring break. According to her parents, Rachel had lost 16 lb since her precollege physical the previous August, falling to a weight of 104 lb at a height of 5 feet, 5 inches. Rachel's chief complaint was that "everyone thinks I have an eating disorder." She explained that she had been a successful student and field hockey player in high school. Having decided not to play field hockey in college, she began running several mornings each week during the summer and "cut out junk food" to protect herself from gaining "that freshman 10."

Rachel lost a few pounds that summer and received compliments from friends and family for looking so "fit." She reported feeling more confident and ready for college than she had expected as the summer drew to a close. Once she began school, Rachel increased her running to daily, often skipped breakfast in order to get to class on time, and selected from the salad bar for her lunch and dinner. She worked hard in school, made the dean's list the first semester, and announced to her family that she had decided to pursue a premed program.

When Rachel returned home for Christmas vacation, her family noticed that she looked thin and tired. Despite encouragement to catch up on rest, she awoke early each morning to maintain her running schedule. She displayed a newfound interest in cooking and spent much of the day planning, shopping, and preparing dinner for her family. Rachel returned to school in January and thought she might

be developing depression. Courses seemed less interesting, and she wondered whether the college she attended was right for her after all. She was sleeping less well and felt cold much of the day. Rachel's parents asked her to step on the bathroom scale the night she returned home for spring break. Rachel was surprised to learn that her weight had fallen to 104 lb, and she agreed to a visit to her pediatrician, who found no evidence of a general medical illness and recommended a psychiatric consultation.

Does Rachel have anorexia nervosa? If so, how should she be treated?

Anorexia nervosa is a serious mental illness characterized by the maintenance of an inappropriately low body weight, a relentless pursuit of thinness, and distorted cognitions about body shape and weight. Anorexia nervosa commonly begins during middle to late adolescence, although onsets in both prepubertal children and older adults have been described. Anorexia nervosa has a mortality rate as high as that seen in any psychiatric illness (1) and is associated with physiological alterations in virtually every organ system, although routine laboratory test results are often normal and physical examination may reveal only marked thinness.

## Diagnosis

### Current Definition

DSM-IV (2) lists four criteria for the diagnosis of anorexia nervosa:

1. Refusal to maintain body weight at or above a minimally normal weight for age and height
2. Intense fear of gaining weight or becoming fat, even though underweight
3. 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
4. In postmenarchal females, amenorrhea (i.e., the absence of at least three consecutive menstrual cycles)

DSM-IV describes two subtypes of anorexia nervosa—the restricting subtype, consisting of those individuals

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whose eating behavior is characterized by restriction of type and quantity of food without binge eating or purging behaviors, and the binge-purge subtype, consisting of those who also exhibit binge eating and/or purging behaviors, such as vomiting or misuse of laxatives.

### Diagnostic Challenges

The DSM-IV criteria are most easily applied when patients are both sufficiently ill to fulfill all four diagnostic criteria and able to describe their ideation and behavior accurately. However, because ambivalence and denial frequently lead those with anorexia nervosa to minimize their symptoms, the clinician must make inferences about mental state and behavior.

An additional problem in diagnosis is that many individuals meet some but not all of the formal diagnostic criteria. For example, some women who meet all other criteria for anorexia nervosa continue to report some spontaneous menstrual activity. In a community-based sample of 84 female patients with full- or partial-syndrome anorexia nervosa, those with amenorrhea were not statistically different from those without across a number of clinical variables (3), which raises questions about the utility of this diagnostic criterion (4, 5).

### Differential Diagnosis

Proper diagnosis of any condition that includes low weight and restrictive eating must include consideration of other psychiatric and medical conditions that include these problems. Psychotic disorders, including schizophrenia and schizoaffective and delusional disorders, as well as anxiety disorders, such as obsessive-compulsive disorder, can include symptoms of food avoidance and distorted beliefs about one's body. Medical conditions, including endocrine disturbances (such as thyroid disease and diabetes mellitus), gastrointestinal disturbances (such as inflammatory bowel and celiac disease), infections (such as hepatitis), and neoplastic processes may present with weight loss and should be considered when evaluating a patient for a possible eating disorder.

### Background

Anorexia nervosa has been recognized for centuries. Sir William Gull coined the term anorexia nervosa in 1873, but Richard Morton likely offered the first medical description of the condition in 1689 (6, 7). Despite its longstanding recognition, remarkably little is known about the etiology of, and effective treatment for, anorexia nervosa. A 2002 review in the *American Journal of Psychiatry* concluded that little progress was made during the second half of the 20th century in understanding the etiology, prognosis, or treatment of the disorder (8).

### Epidemiology

Prevalence rates for anorexia nervosa are generally described as ranging from 0.5% to 1.0% among females (9, 10), with males being affected about one-tenth as frequently (10, 11). A recent study describing a large population-based cohort of Swedish twins born between 1935 and 1958 found the overall prevalence of anorexia nervosa among the 31,406 study participants to be 1.20% and 0.29% for females and males, respectively; the prevalence of anorexia nervosa in both sexes was greater among those born after 1945 (12).

### Risk Factors

The identification of risk factors for anorexia nervosa is challenging because the low incidence of the disorder makes the conduct of prospective studies of sufficient size very difficult. A variety of possible risk factors have been

identified, including early feeding difficulties, symptoms of anxiety, perfectionistic traits, and parenting style, but none can be considered to have been conclusively demonstrated (13, 14). Similarly, cultural factors undoubtedly play some role in the development of anorexia nervosa, although the disorder's long history and its presence in regions around the globe (15–18) suggest that factors other than culture provide central contributions to the development of the disorder. In fact, one review that considers historical reports of eating disorders, data regarding changing incidence rates of eating disorders over time, and the prevalence of eating disorders in non-Western cultures concludes that anorexia nervosa is not a culture-bound syndrome (19). Genetic factors are increasingly accepted as important contributors to the risk of anorexia nervosa. Twin studies of eating disorders have consistently found that a significant fraction of the variability in the occurrence of anorexia nervosa can be attributed to genetic factors, with heritability estimates ranging from 33% to 84% (20).

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### Course of Illness

The course of anorexia nervosa is highly variable, with individual outcomes ranging from full recovery to a chronic and severe psychosocial disability accompanied by physical complications and death. Intervention early in the course of illness and full weight restoration appear to be associated with the best outcomes. Adolescent patients have a better prognosis than do adults. One-year relapse rates after initial weight restoration approach 50% (21). Intermediate and long-term follow-up studies examining clinical samples find that while a significant fraction of patients achieve full psychological and physical recovery, at least 20% continue to meet full criteria for anorexia ner-

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vosa on follow-up assessment, with many others reporting significant residual eating disorder symptoms, even if they do not meet full criteria for anorexia nervosa (22).

### **Physiological Disturbances**

A multitude of biological disturbances may occur in underweight patients, but most appear to be normal physiological responses to starvation. Clinically significant abnormalities may develop in the cardiovascular, gastrointestinal, reproductive, and fluid and electrolyte systems (23). These abnormalities usually do not require specific treatment beyond refeeding, and they return to normal on weight restoration. A worrisome possible exception is reduced bone density; since peak bone density is normally achieved during young adulthood, a prolonged episode of anorexia nervosa during this development stage may have a long-term impact on the risk of osteoporosis.

### **Neurobiological Hypotheses**

The striking physical and behavioral characteristics of anorexia nervosa have prompted the development of a variety of neurobiological hypotheses over the years. Recently, results of several investigations have suggested that abnormalities in CNS serotonin function may play a role in the development and persistence of the disorder (24, 25). Notably, studies of long-term weight-recovered patients have described indications of increased serotonin activity, such as elevated levels of the serotonin metabolite 5-hydroxyindoleacetic acid in the CSF (26) and reduced binding potential of 5-HT<sub>2A</sub> receptors, suggestive of higher levels of circulating CNS serotonin, in several brain regions (27).

Kaye and colleagues (28) hypothesize that individuals with anorexia nervosa may have a trait disturbance characterized by high levels of CNS serotonergic activity leading to symptoms of anxiety that are relieved by dieting, which leads to a reduction in serotonin production. However, this provocative hypothesis is based on assessments conducted after the onset of illness, which therefore cannot distinguish a predisposing trait from a long-lasting consequence of anorexia nervosa.

Another recent line of inquiry into the biological underpinnings of anorexia nervosa focuses on the perfectionistic and rigid behavioral style, including repetitive and stereotyped behaviors, characteristic of the syndrome. Investigators have hypothesized that these behaviors may result from a propensity to extreme fear conditioning and resistance to fear extinction (29), suggesting that abnormalities may be present in limbic structures known to be involved in the acquisition of conditioned fear behavior. Other investigators have proposed that difficulties of individuals with anorexia nervosa in changing maladaptive behavior may relate to problems with set shifting, a function mediated by corticostriathalamocortical neural circuits (30, 31).

### **Evaluation**

Engaging a patient with anorexia nervosa to participate fully in the psychiatric evaluation may present a greater

challenge than would be the case for patients with other disorders, including other eating disorders such as bulimia nervosa or binge eating disorder. Patients with anorexia nervosa often present for evaluation not because of their own interest in symptom relief but because of the concerns of family, friends, or health care providers. It may be necessary to obtain additional information from family members or others who know the patient well.

In addition, during the evaluation, it may be helpful to identify symptoms of the illness that are most likely to be ego-dystonic for the particular patient. Patients commonly minimize their concerns about low weight, but they may be more concerned, and therefore more likely to participate in the evaluation, if they recognize poor concentration, increased irritability, low bone density, hair loss, or feeling cold as developments associated with their restrictive eating pattern.

Medical issues should be reviewed, including weight and menstrual history. A complete review of systems is indicated, as anorexia nervosa can manifest a multitude of disturbances, including cardiovascular symptoms (e.g., bradycardia and other arrhythmias, including QTc prolongation, and hypotension), gastrointestinal symptoms (e.g., slow motility, esophageal inflammation associated with purging), endocrinologic symptoms (low estrogen in females, low testosterone in males, osteopenia, and osteoporosis), and dermatologic changes, such as the development of a layer of fine hair (lanugo) on the face and extremities.

The evaluation should include specific questions about eating behaviors, including the number and content of all meals and snacks on a recent day. The clinician should inquire about 1) restricting behaviors, including limiting permissible foods, as well as decreasing caloric amounts; 2) binge eating; 3) purging behaviors, including vomiting and misuse of laxatives and diuretics; and 4) exercise and hyperactive behaviors, including preferential walking and standing.

Given patients' reluctance to endorse all of the diagnostic symptoms of anorexia nervosa on first meeting, the clinician may do well to identify the problem as "low weight" and explain that the treatment needs to include weight restoration, whether or not the patient meets full criteria for anorexia nervosa. Patients and their families are generally very interested in data from the World War II Minnesota study of semistarvation that documented the association between starvation and the development of psychological symptoms frequently identified with anorexia nervosa, such as depression, anxiety, obsessionality about food, and rigidity about eating behaviors (32). The clinician may have better results engaging the patient with the identification of symptoms that are commonly associated with the state of starvation and that the patient has likely found troubling (such as thinking constantly about food) and therefore worth resolving.

### **Treatment Guidelines**

All current treatment guidelines for anorexia nervosa emphasize weight restoration. There is no clearly defined

algorithm for how to accomplish this goal, although common practice includes the selection of the least restrictive treatment setting that is likely to be effective. The APA practice guideline on treatment of eating disorders suggests that highly structured treatments are often needed to achieve weight gain for patients at weights <85% ideal body weight (33). Hospital-based treatments may be used when weight is significantly low (e.g., <75% of ideal body weight) or when there has been rapid weight loss or medical signs of malnutrition, including significant bradycardia, hypotension, hypothermia, and so on.

Generally, outpatient treatments rely on a team of professionals. Medical monitoring, including weight and laboratory assessment, may be provided by an internist or pediatrician; psychological support is offered by a psychiatrist or other therapist; and nutritional counseling from a dietitian or nutritionist is often included. The team is generally led by the medical or psychiatric clinician—typically the one with the greatest expertise in the management of eating disorders.

Effective treatments generally assess outcome by weight and behavioral change. Nonspecific support needs to be paired with expectation of progress in measurable medical, behavioral, and psychological symptoms. Weight restoration is generally associated with improvement in a variety of psychological areas, including mood and anxiety symptoms (34, 35). In contrast, psychological improvement without accompanying changes in weight and eating behavior is of limited value. Patients and families should be informed about the physiology of weight gain, including the substantial number of calories required daily.

A family-based outpatient treatment for anorexia nervosa, also called the “Maudsley method,” may be helpful for younger patients (36). This approach empowers the parents of a patient with anorexia nervosa to refeed their child, renegotiate the relationship between child and parents to involve issues other than food, and help their child resume normal adolescent development without an eating disorder. Several preliminary studies have shown promising results for family therapy with adolescent patients (37, 38).

For patients with anorexia nervosa who do not respond to outpatient treatments or those who do not have specialized outpatient treatments available in their vicinity, more structured treatments such as inpatient or partial hospital (day treatment) programs may be necessary. Structured treatments generally include observation during and after meals together with a consistently applied behavioral program that reinforces weight gain and normal eating behaviors. In recent years, the length of hospital stay for anorexia nervosa has decreased substantially because of economic limitations imposed by third-party payers; nonetheless, hospital programs can achieve a rate of weight gain of 2–4 pounds per week during active treatment (39).

## Controlled Treatment Trials

While structured settings have been used successfully for weight restoration treatments, there is little empirical support for a specific level of care or a particular psychosocial treatment for anorexia nervosa. As mentioned, a family-based approach appears promising for children and adolescents with anorexia nervosa; family therapy has been reported to be superior to individual therapy in two randomized controlled trials for adolescents with anorexia nervosa (40, 41). For adults with anorexia nervosa, a small study by Pike and colleagues (42) found cognitive behavior therapy superior to nutritional counseling in preventing relapse after hospital-based weight restoration. A recent study by McIntosh et al. (43) provocatively suggested that a patient-centered nonspecific supportive therapy may have been more helpful than cognitive behavior therapy or interpersonal therapy, as measured by a global rating of anorexia nervosa symptoms, in a sample of 56 underweight women with anorexia nervosa receiving treatment over a minimum of 20 weeks; unfortunately, the amount of weight gain was modest and not significantly different among the three study treatments.

Randomized controlled trials of medications for patients with anorexia nervosa have consistently reported disappointing results. Several psychopharmacologic agents have been studied, without identification of clear benefit, although studies have been limited by small sample sizes and the fact that most of the trials have been conducted in hospital settings where other treatment interventions are offered in addition to study medication (44). While it has been suggested that psychotropic medications are rendered ineffective in underweight patients by the biological impact of starvation, a recent study comparing fluoxetine and placebo in weight-restored patients notably found no significant benefit to medication during the year following nutritional rehabilitation (45).

## Summary and Recommendations

Although recognized for centuries, anorexia nervosa remains enigmatic, often difficult to treat, and potentially lethal. The current approach to treatment includes careful medical assessment, ongoing medical and weight monitoring, and behaviorally oriented treatment aimed at normalizing weight and eating behaviors. Family-based treatment appears promising for younger patients.

With Rachel, the patient in the vignette, her typical presentation, her low weight (corresponding to a body mass index of 17.3), and her reluctance to restore her weight to its previously healthy level led the evaluating psychiatrist to conclude that Rachel indeed had anorexia nervosa. The psychiatrist recommended that Rachel attempt outpatient treatment but explained to her and her family that many patients require more structured settings for successful weight restoration. The psychiatrist recommended that Rachel see an eating disorder specialist knowledgeable about the characteristics of anorexia nervosa and experienced in dealing with the challenges of its treatment. The

outpatient treatment plan included weekly psychotherapy sessions, along with regular visits with her pediatrician and a nutritionist. Although Rachel had complained of “depression,” the psychiatrist elected not to prescribe antidepressant medication, as there is no evidence of its utility in anorexia nervosa, and weight gain in this disorder is known to lead to improvement in mood. In the meetings with Rachel, the psychiatrist used cognitive behavior therapy techniques to help her in reevaluating her assumptions that low weight was somehow essential to her sense of self-worth. Treatment outcome was assessed by changes in weight and eating behavior. Rachel’s family participated by helping to supervise meals at the start of treatment and offering her more autonomy around eating as she made progress. Rachel was asked to gain weight at a rate of >1 lb per week and knew that failure to meet this goal would lead to transfer of treatment to a more structured setting. Rachel reached and maintained her premorbid weight and was able to return to school 6 months after initial presentation.

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