

REVIEWS

Detection, Evaluation, and Treatment of Eating Disorders

The Role of the Primary Care Physician

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OBJECTIVE: To describe how primary care clinicians can detect an eating disorder and identify and manage the associated medical complications.

DESIGN: A review of literature from 1994 to 1999 identified by a MEDLINE search on epidemiology, diagnosis, and therapy of eating disorders, including anorexia nervosa and bulimia nervosa.

MEASUREMENTS AND MAIN RESULTS: Detection requires awareness of risk factors for, and symptoms and signs of, anorexia nervosa (e.g., participation in activities valuing thinness, family history of an eating disorder, amenorrhea, lanugo hair) and bulimia nervosa (e.g., unsuccessful attempts at weight loss, history of childhood sexual abuse, family history of depression, erosion of tooth enamel from vomiting, parotid gland swelling, and gastroesophageal reflux). Providers must also remain alert for disordered eating in female athletes (the female athlete triad) and disordered eating in diabetics. Treatment requires a multidisciplinary team including a primary care practitioner, nutritionist, and mental health professional. The role of the primary care practitioner is to help determine the need for hospitalization and to manage medical complications (e.g., arrhythmias, refeeding syndrome, osteoporosis, and electrolyte abnormalities such as hypokalemia).

CONCLUSION: Primary care providers have an important role in detecting and managing eating disorders.

KEY WORDS: eating disorders; primary care; medical complications.

J GEN INTERN MED 2000;15:577-590.

Eating disorders are common in young women. Although the evaluation and treatment of eating disorders has typically been thought to be the realm of the psychiatrist, the primary care physician plays an important role. In the era of managed care, the primary care physician may be the first to detect an eating disorder and is responsible for coordinating care, including management of complications and determining the need for hospitalization. In addition, a patient may need to see a primary care physician first in order to be referred to a mental health clinician. The primary care physician must work with a multidisciplinary team, including a nutritionist and a mental health specialist to provide well-integrated care for patients with eating disorders. Finally, particularly for those patients who have milder forms of disordered eating and may not be seeing a mental health specialist regularly, the primary care physician may have primary responsibility for ongoing care and for management of complications. The following questions will be addressed in this review: What signs and symptoms should lead the primary care physician to suspect an eating disorder? Are there high risk groups at particular risk for eating disorders? What laboratory tests should be part of the evaluation of a patient with a suspected eating disorder? What are common medical complications among patients with eating disorders? What are the data on current treatments for patients with eating disorders?

METHODS

Three authors did a MEDLINE search on epidemiology, diagnosis, and therapy of eating disorders, anorexia nervosa, bulimia nervosa, and disordered eating. Search terms included anorexia nervosa, bulimia nervosa, disordered eating, and female athlete triad. Other search terms included eating disorders (anorexia nervosa and bulimia nervosa) and epidemiology, eating disorders (anorexia nervosa and bulimia nervosa) and detection or screening, eating disorders (anorexia nervosa and bulimia nervosa) and medical complications, eating disorders (anorexia nervosa and bulimia nervosa) and treatment or therapy, eating disorders (anorexia nervosa and bulimia nervosa) and osteoporosis, and disordered eating and diabetes. When assessing treatment modalities, we specifically sought randomized clinical trials when available.

We confined our search to the English literature. We also reviewed the bibliographies of retrieved articles to

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find articles which had not been previously identified by the MEDLINE search. The MEDLINE search focused on 1994 to 1999; significant earlier articles identified through bibliographic searches were also included.

EPIDEMIOLOGY

The DSM-IV diagnostic criteria for anorexia nervosa and bulimia nervosa are listed in Table 1. New features of the DSM-IV criteria are that both anorexia nervosa and bulimia nervosa have restricting and binge eating/purging subtypes.

Anorexia Nervosa

The majority (95%) of patients with anorexia nervosa are female. The prevalence of anorexia nervosa has been estimated to be about 1% in adolescent girls, although it may be subclinical in up to 10% of young women aged 16 to 25. Although anorexia nervosa is typically considered a disease of Caucasians, eating disorders and body dissatisfaction seem to be common in African-American, Asian, and Hispanic populations as well.¹⁻³ Other risk factors for anorexia nervosa include being a middle- to upper-class female, participation in activities valuing thinness (e.g., ballet, gymnastics, modeling), and a family history of an eating disorder. An episode of anorexia nervosa is typically precipitated by a stressful situation.⁴ Anorexia nervosa may be associated with other psychiatric diagnoses, including an estimated 25% lifetime prevalence of obsessive compulsive disorder and a 50% to 75% prevalence of dysthymia.⁵ About 40% to 45% of anorexics recover completely, 30% improve, and 25% have a chronic course. The mortality rate is about 10% to 15%, the highest of any psychiatric disorder. Causes of death include starvation, suicide, and medical complications. Mortality is increased in those with a late age of onset, long duration of illness, and severe weight loss.⁴ Overall, a poorer prognosis is associated with lower initial weight, disturbed family relationships, being male, the presence of vomiting, longer duration of symptoms or failure to respond to earlier treatment.^{6,7}

Bulimia Nervosa

The estimated prevalence of bulimia nervosa is 3% to 10% of adolescent and college age women in the United States; however, because bulimics look healthier, the disease can be harder to detect. Bulimia typically begins after an unsuccessful attempt at weight loss or when the patient discovers that purging, fasting, and exercise can compensate for bingeing. Factors associated with developing bulimia include a history of childhood or sexual abuse, a history of psychoactive substance abuse or dependence, and a family history of alcoholism or depression.^{4,7-9} Depression and mood disorders are common in

Table 1. Eating Disorder Definitions

Anorexia Nervosa

Diagnostic Criteria (DSM-IV)

- Refusal to maintain body weight at or above 85% of normal weight for age and height.
- Intense fear of gaining weight or becoming fat, despite being underweight.
- Disturbances in the way in which body weight or shape is experienced, undue influence of body shape or weight on self-evaluation, or denial of the seriousness of current low body weight.
- Amenorrhea in postmenarcheal girls and women (missing at least 3 consecutive menstrual cycles or having periods only after administration of a hormone such as estrogen).

Subtypes

Restricting type: During the episode of anorexia nervosa, patient does not regularly engage in binge-eating or purging behavior (i.e., self-induced vomiting or misuse of laxatives, diuretics or enemas).

Binge-eating/purging type: During the episode of anorexia nervosa, patient regularly engages in binge-eating or purging behavior.

Bulimia Nervosa

Diagnostic Criteria (DSM-IV)

- Recurrent episodes of binge eating in a discrete period of time involving more food than most people would eat. There is a distinct feeling of lack of control during episodes.
- Recurrent inappropriate compensatory behavior to prevent weight gain, such as self-induced vomiting, misuse of laxatives, diuretics, enemas or other medications, fasting, or excessive exercise.
- Both binge eating and inappropriate compensatory behaviors occur on average at least twice a week for 3 months.
- Self-evaluation is unduly influenced by body shape and weight.
- The disturbance does not occur exclusively during episodes of anorexia nervosa.

Subtypes

Purging type: During the episode of bulimia nervosa, the patient regularly engages in self-induced vomiting or misuse of laxatives, diuretics, or enemas.

Nonpurging type: During the episode of bulimia nervosa, the patient uses other inappropriate compensatory behaviors, such as fasting or excessive exercise.

Female Athlete Triad⁹⁹

- Disordered eating: Spectrum of abnormal patterns of eating, including bingeing, purging, food restriction, prolonged fasting, use of diet pills, diuretics, and laxatives, and other abnormal eating behaviors.
- Amenorrhea: Absence of at least 3 to 6 consecutive menstrual cycles in women who have already begun menstruating. Primary and secondary amenorrhea are both more common in women athletes.
- Osteoporosis: Secondary to hypoestrogenism.

bulimics. The prognosis in bulimia is generally better than with anorexia: more than 50% recover, and few become anorectic. About 30% maintain a "nonspecified eating disorder." Of those who recover, 25% retain some abnormal eating habits. Factors associated with an increased

mortality rate in bulimia include both premorbid and paternal obesity.⁹

Many patients identified by the primary care physician may not meet full DSM criteria for a diagnosis of anorexia or bulimia nervosa, but will exhibit significantly disordered eating and exercise patterns, including either restrictive and/or binge eating with or without purging behaviors (eating disorder not otherwise specified). When identified in the younger patient, this may represent milder disease, which is more difficult to detect, but in which the outcome is likely to be better; conversely, in the older patient, it may represent the chronic sequelae of partial recovery from a full-blown eating disorder. In this latter group, psychiatric and nutritional treatment options may have been exhausted, and the primary care physician will be responsible for monitoring the course of a chronic illness.

Other high risk groups include female athletes (see Female Athlete Triad in Table 1) and diabetics. It has been estimated that the prevalence of disordered eating in athletes ranges from 15% to 62%.^{10,11} Up to one third of young women with insulin-dependent diabetes mellitus (IDDM) have eating disturbances.^{12,13} Patients with either of these syndromes also have medical complications that require treatment and monitoring by the primary care clinician.

DETECTION AND EVALUATION

Anorexia Nervosa

Since patients often do not present with a chief complaint of an eating disorder, the primary care physician must be alert to that possibility, particularly in young women. Low weight, progressive weight loss, or concern expressed by family members may also raise suspicion. Symptoms common in anorexia nervosa include amenorrhea, abdominal discomfort, bloating or constipation, and cold intolerance. When a clinician suspects anorexia nervosa, he/she should ask about previous weight and weight loss pattern, menstrual history, daytime hyperactivity and insomnia, and exercise habits. Two questions which may help in determining her eating habits include "What did you eat yesterday?" and "Do you ever binge eat (eat more than you want) or use laxatives, diuretics, or diet pills?" Attitude toward body weight or shape may be elicited by asking, "Do you think you are thin (too thin)?"

On physical examination, the patient may be hypotensive and bradycardic with significant orthostatic signs. The skin may be yellow, and lanugo hair may be present. Physical examination findings may include irregular cardiac rhythm and peripheral edema. Mitral valve prolapse is common in anorexia nervosa, as weight loss leads to a size disproportion between the left ventricle and the mitral valve. In one study, it was present in 37% of anorexics compared with 4% of controls.¹⁴ This prolapse does seem to be reversible with weight gain.¹⁵

Laboratory evaluation of the anorectic should include a complete blood count, electrolytes, magnesium, calcium,

phosphorus, urea nitrogen, creatinine, glucose, and albumin. Measuring FSH, LH, TSH and prolactin can be helpful in evaluating the cause of the amenorrhea. An electrocardiogram is especially important in patients who are bingeing and purging, and who may have metabolic abnormalities. Bone densitometry should be considered to assess severity of bone loss, especially if the results will affect the treatment.

Bulimia Nervosa

Bulimia nervosa may be more difficult to detect than anorexia. Two questions which have been shown to be very sensitive when used in the primary care setting for the detection of bulimia nervosa are "Do you ever eat in secret?" and "How satisfied are you with your eating habits?"¹⁶ These screening questions can easily be included on initial history forms and as part of a routine health maintenance assessment. Another screening tool, the SCOFF questionnaire, was recently evaluated and may ultimately be useful in screening for eating disorders. The questions include the following: (1) Do you make yourself **S**ick because you feel uncomfortably full? (2) Do you worry you have lost **C**ontrol over how much you eat? (3) Have you recently lost more than **O**ne stone (14 pounds) in a 3-month period? and (4) Do you believe yourself to be **F**at when others say you are too thin? Would you say **F**ood dominates your life? In a group of 116 patients with eating disorders and 96 controls, the positive answer to 2 of the SCOFF questions had 100% sensitivity for detecting anorexia nervosa or bulimia nervosa and 87.5% specificity.¹⁷ This test has yet to be validated prospectively in a broader population.

Clinicians should also ask about previous maximum and minimum weight, menstrual history, exercise habits, use of alcohol or other drugs, and whether the patient ever binges, or uses laxatives, diuretics, or diet pills. Other factors associated with bulimia nervosa include a personal history of rape, sexual assault, childhood abuse, or depression. A family history of depression or alcohol abuse is also common.

On physical examination, the bulimic generally looks healthy. She may have erosion of teeth enamel and/or many fillings, due to vomiting. Other physical examination signs include parotid gland hypertrophy, hoarse voice due to gastroesophageal reflux, Russell's sign (hypertrophy of the knuckles from inducing vomiting), peripheral edema, and rectal prolapse or bleeding due to chronic constipation. Laboratory evaluation is essentially the same as for the anorectic, with careful attention to the binge- and purge-induced electrolyte abnormalities (hypokalemia, hypochloremic metabolic alkalosis).

The role of the primary care clinician is to identify patterns of disordered eating. More important for the primary care clinician than making the exact diagnosis (which can ultimately be made by the treating mental health professional) is management and treatment of the complications caused by the disordered eating.

TREATMENT ISSUES

General Treatment Issues

Treatment of the patient with an eating disorder should involve a multidisciplinary team, including the primary care physician, nutritionist, and a mental health professional, all of whom should communicate and confer regularly. The role of the primary care physician is to coordinate treatment, to manage the medical complications, and to help determine the need for inpatient hospitalization. If the patient is unwilling or unable to see a mental health professional or nutritionist, the role of the primary care physician is to monitor weight, nutritional intake, and physical condition, while using contract setting regarding weight and food intake as a tool to help the patient see the need for treatment.

The immediate treatment interventions for both anorexia and bulimia are aimed at nutritional normalization and recovery of normal eating patterns. The best early results occur with weight restoration and individual and family psychotherapy as soon as the patient is medically able to participate. Effective psychotherapy cannot occur when the patient is in a starvation mode.⁴

A trial of outpatient management is often a requirement of insurance companies.¹⁸ Day programs and outpatient treatment are most effective in the motivated patient; the multidisciplinary team establishes criteria at which outpatient treatment is no longer appropriate. These include failure to follow-up, a "basement" weight, continued weight loss or inadequate weight gain, number of binge/purge episodes, or specified laboratory values or physical signs. The patient and all members of the team must agree on the limits, which are shared in writing and then firmly applied. For patients who refuse therapy, the goal of medical or nutritional follow-up should be to help the patient realize the seriousness of the situation and to work with her to accept treatment and minimize medical danger. Food diaries, monitored by a nutritionist, are an essential part of treatment. Food diaries are used for 2 purposes: to assess nutritional adequacy (i.e., protein, calcium, iron, and fat) and to record all food eaten (including mood and physical sensations before and after eating). When a nutritionist is not available, review of food diaries for nutritional adequacy also becomes the responsibility of the primary care physician. For the anorectic, an exact record of food consumption enables the treating professionals to suggest changes that result in a slow, steady weight gain and improvement of food tolerance. For bulimics, food diaries can be an important part of cognitive behavioral therapy.

Anorexia Nervosa

In addition to the general principles described above, some specific management strategies are important for patients with anorexia nervosa. It is important for the pri-

mary care physician, along with the patient and other members of the team, to set a target weight. An appropriate target weight is often a weight at which the patient previously menstruated. The patients become very frightened about weight gain, so generally the weight gain should be very gradual, and does not usually exceed 1/2 to 1 pound per week. Anorectics should be weighed by the primary care provider at every visit, generally weekly, ideally at the same time of day. Weighing techniques include ensuring that the patient has an empty bladder, no shoes, and one layer of clothing, preferably an exam gown. If necessary, urine specific gravity can be assessed to detect water loading. Weights should be reported to the practitioner rather than through patient report. Patients may misrepresent weights in order to meet a contract weight or to avoid hospitalization. All patients should receive multivitamins with iron and calcium. Zinc supplementation at 50 mg daily (14 mg elemental zinc) is well tolerated and may facilitate weight gain and improve affective symptoms.^{19,20} Metoclopramide may be helpful if the patient complains of abdominal bloating. Cisapride was assessed in another study; although the cisapride group improved subjectively, there was no association between subjective improvement and gastric emptying.²¹

Contract setting, done in collaboration with the entire team, is important for patients with eating disorders. Components of the contract include indications for hospitalization; agreement to appropriate follow-up and to keep a food diary, an exercise log, and a record of purges, if indicated; and agreement that weight loss or failure to gain agreed upon weight would mandate more intensive treatment.

Assessment of food diaries by the nutritionist should include a review of nutritional adequacy, especially protein, fat, and calories; a demonstration of portion sizes; a review of intervals between eating; goal setting for foods to be added; and a review of emotional and physical hunger when eating. If the primary care physician is providing nutritional counseling, food models are available to demonstrate serving sizes to patients.

Determining the need for hospitalization is an important role for the primary care physician. Criteria for inpatient hospitalization include rapid progressive weight loss, weight loss of more than 30% of ideal body weight, arrhythmia or bradycardia, signs of inadequate cerebral perfusion, and lack of response to outpatient treatment.⁴

The medical complications of anorexia nervosa are listed in Table 2. Cardiac complications include arrhythmias and sudden death, related to QT prolongation and electrolyte abnormalities.²² The refeeding syndrome is cardiovascular collapse due to repletion of circulatory volume while left ventricular mass is still reduced. It is potentiated by hypokalemia, hypocalcemia, and hypomagnesemia. To avoid this, refeeding is best done orally and slowly with electrolyte monitoring. Dermatologic complications include dry skin, yellowing of the skin (carotenodermia),²³ lanugo hair, and starvation-associated pruritis. Gastrointestinal complications include delayed gastric mo-

Table 2. Medical Complications of Anorexia Nervosa

Cardiovascular
Bradycardia and hypotension
Mitral valve prolapse
Sudden death (related to QT prolongation)
Peripheral edema
Refeeding syndrome
Dermatologic
Dry skin
Carotenodermia
Lanugo hair
Starvation-associated pruritis
Gastrointestinal
Constipation
Refeeding pancreatitis
Acute gastric dilatation due to refeeding
Endocrine and metabolic
Amenorrhea
Infertility
Osteoporosis
Thyroid abnormalities
Hypercortisolemia
Hypercholesterolemia due to impaired cholesterol metabolism
Hypoglycemia
Neurogenic diabetes insipidus
Impaired temperature regulation
Fluid and electrolyte abnormalities
Hematologic
Pancytopenia due to starvation
Decreased erythrocyte sedimentation rate

tility, constipation, and refeeding pancreatitis.^{24,25} There is an increased risk of infertility in patients with eating disorders, although whether a history of an eating disorder is a risk factor for infertility remains unclear.²⁶ Pelvic ultrasound demonstrates reduced size of both ovaries and the uterus which reverses with weight gain and normalization of eating patterns.²⁷⁻²⁹ Endocrine abnormalities include thyroid abnormalities similar to euthyroid sick syndrome,³⁰ hypercortisolemia,³¹ hypercholesterolemia due to impaired cholesterol metabolism,³² hypoglycemia, neurogenic diabetes insipidus,³³ and impaired temperature regulation. Pancytopenia can occur due to starvation.^{34,35}

The most significant long-term complication is the increased risk of osteoporosis associated with amenorrhea. Anorexics have hypothalamic hypogonadism which leads to a hypoestrogenemic state, reflected by lack of withdrawal bleeding after a progesterone challenge. This hypoestrogenemic state is associated with low bone density. Although bone mineral density is lower in anorexics when compared with normal weight women, it is highest among those who are physically active, suggesting a protective effect of physical activity,³⁶ although bone loss does occur even at those sites subjected to stress during exercise.³⁷ Bone mineral density 2 standard deviations below normal occurs in 50% of anorexics and is associated with clinical

fractures of multiple sites. In a 2-year prospective study, anorexics had an increased risk of fracture (relative risk, 7.0; 95% confidence level, 3.2 to 18.5) compared with normal weight women.³⁸ Bone mineral density may increase after resumption of normal menses, but whether it returns to baseline is not known.³⁹

In addition to weight gain and the resumption of normal menses, treatment options for low bone density include hormone therapy and the bisphosphonates. Although observational evidence suggests that women with anorexia nervosa or exercise-associated amenorrhea who take hormone replacement therapy or oral contraceptives have increased bone mineral density,^{40,41} evidence from clinical trials is scanty.

In 2 small clinical trials, anorectic women who took hormonal therapy had a greater increase in bone mineral density than those who did not; the effect was more marked in those with less than 70% ideal body weight. Although bone mineral density increased with hormone therapy, resumption of normal menses and recovery from anorexia nervosa had a more significant positive effect on bone density. Whether hormone replacement therapy or oral contraceptives are the superior treatment could not be determined from either study.^{42,43}

Bisphosphonates have been studied for the prevention and treatment of osteoporosis in postmenopausal women,⁴⁴⁻⁴⁶ but have not been studied in anorectic women. Although their positive effects on bone mineral density may be beneficial, no data on their long-term use are available. Because younger amenorrheic women could potentially be taking this medication for many years, more information on their long-term effects is critical before they are used routinely in this group.

Estrogen replacement alone may not prevent progressive osteoporosis in anorexics. Although resumption of normal menses has a more profound effect on bone density than supplemental estrogen, it is probably reasonable to prescribe supplemental estrogen until adequate weight gain for normal menstruation occurs. The primary care physician must be careful that estrogen replacement does not falsely reassure the patient regarding her future risk of osteoporosis, thus slowing weight gain. Currently there is inadequate evidence to recommend either oral contraceptives or replacement-dose estrogen as the superior treatment. Whether or not a patient desires contraception, other noncontraceptive benefits and risks of oral contraceptives should be considered in the choice for each patient. In addition, all anorectic women should receive calcium supplementation.

Psychological Treatments. Abnormal eating behaviors in anorexia are often viewed as an attempt to gain and maintain control. Unlike bulimia nervosa, no single psychotherapeutic model as emerged as the standard of treatment. Both family therapy and individual therapy have been shown to be of benefit, with family therapy being most indicated in younger patients.⁴⁷⁻⁵¹

Medications. In general, psychotropic medications have been less successful in anorexia nervosa than in bulimia. In one study, cryptoheptadine had some value.⁵² Few controlled studies on medications have been done, although many medications are used empirically. Several small studies of fluoxetine have not shown conclusive results.⁵³⁻⁵⁵ Anxiolytics can be helpful in treating the fear of loss of control, fear of weight gain and can be given before meals to reduce the anxiety associated with eating. Depression is often due to starvation and improves with the resumption of normal eating habits; if depression persists, antidepressants may be helpful.^{56,57}

Bulimia Nervosa

The medical complications of bulimia nervosa are listed in Table 3. Several treatment issues are unique to patients who binge and purge.

Gastrointestinal complications can occur at any part of the gastrointestinal tract from the mouth to the colon. Dental erosion from gastric acid may occur and may be irreversible.^{58,59} Brushing the teeth after a binge can worsen the problem, but rinsing with baking soda after vomiting seems to alleviate some of the acid-related complications. Parotid gland swelling can occur from repeated vomiting.⁶⁰⁻⁶² Other gastroesophageal complications include reflux due to chronic relaxation of the sphincter

Table 3. Medical Complications of Bulimia Nervosa

Gastrointestinal
Dental erosion
Parotid gland swelling
Esophageal rupture
Gastroesophageal reflux due to chronic relaxation of the sphincter
Acute gastric dilatation
Post-binge pancreatitis
Constipation due to laxative abuse
Cathartic colon
Pulmonary/mediastinal
Aspiration pneumonitis
Pneumomediastinum with weight loss or precipitated by vomiting
Pneumothorax or rib fractures
Cardiac
Arrhythmias
Diet pill toxicity: palpitations, hypertension
Emitene cardiomyopathy
Mitral valve prolapse
Endocrine
Irregular menses
Hypoglycemia
Mineralocorticoid excess
Metabolic
Electrolyte imbalances
Dehydration
Nephropathy

and esophageal rupture from vomiting.⁶³ Acute gastric dilatation and rupture is rare but is associated with a mortality rate of 80% when it occurs.⁶⁴⁻⁶⁶ Other gastrointestinal complications include postbinge pancreatitis and constipation due to laxative abuse.⁶⁷ Cathartic colon with toxic degeneration of Auerbach's plexus due to overuse of stimulant laxatives can render the colon unable to perform normal peristalsis without large doses of laxatives.^{68,69} Pulmonary and mediastinal complications include aspiration pneumonitis and pneumomediastinum.^{70,71} Cardiac complications include arrhythmias due to electrolyte imbalances, palpitations and hypertension due to diet pills, and mitral valve prolapse. Emitene (ipecac syrup), which is designed for one-time use, has been associated with cardiomyopathy and death when used repeatedly to induce vomiting.⁷²⁻⁷⁴ Endocrine and metabolic complications include hypoglycemia and electrolyte imbalances, particularly hypokalemia. Dehydration leads to aldosterone-induced renal potassium losses, and sodium loss in the stool causes activation of renin-angiotensin resulting in sodium retention and loss of potassium. Finally, in a chronic low potassium environment, a kaliopenic nephropathy occurs when tubular dysfunction leads to decreased urine-concentrating ability. Vomiting leads to loss of hydrochloric acid and a metabolic alkalosis, whereas laxative abuse leads to a loss of bicarbonate and a metabolic acidosis.⁷⁵⁻⁷⁷ Bulimics also may have hypothalamic hypogonadism, even at normal weights. If a progesterone challenge does not lead to withdrawal bleeding, hypoestrogenism is present and is associated with low bone mineral density. Use of estrogen replacement is probably indicated until the binge-purge pattern is eliminated.

Goal setting is important in bulimia and is focused on elimination of binge/purge behaviors, normalization of eating patterns, and resumption of normal menses. Contract setting between the patient and all members of the treatment team includes agreement on monitoring interval; agreement to keep food, exercise, and binge/purge diaries; and agreement on what parameters will be followed and how frequently they will be followed. Although most bulimics can be managed as outpatients, advance discussion about what would mandate more intensive treatment (e.g., severe electrolyte imbalances, need for withdrawal from laxatives or diuretics) is appropriate and should be clearly specified in a written contract shared by the patient and all members of the team. Chronicity of symptoms is not rare. Relapse is more frequent in those who are more symptomatic at onset.

Criteria for inpatient hospitalization in bulimia include severe depression and suicidality; marked fluid and electrolyte imbalances; the need for withdrawal from laxatives, diuretics, emetics, or diet pills; and significant substance abuse.⁴

Psychological Treatment. Cognitive behavioral therapy (Table 4) has emerged as the most effective therapy for bulimia nervosa when compared to other psychological

Table 4. Cognitive Behavioral Therapy*

Stage 1: (Sessions 1–8)
Overview, philosophy, and goals
Use of daily self-monitoring homework to identify binge/purge triggers
Emphasis on alternative, more constructive strategies for coping with desire to binge
Guidance in normalizing eating (3 meals plus 2 snacks)
Information on weight regulation and link between restriction/bingeing
Introduction of cognitive restructuring: patients identify, then challenge, the dysfunctional strategies linked to bulimia
Stage 2: (Sessions 9–16)
Problem-solving strategies to cope with situations leading to binge/purge behaviors
Cognitive restructuring of body weight/shape attitudes
Emphasis on flexible eating habits
Incorporation of previously avoided foods
Stage 3: (Sessions 17–20)
Continuation of Stage 2 strategies
Emphasis on maintenance of improvement and relapse prevention

*Adapted from Walsh et al.⁸⁴

treatments and to medications (antidepressants).^{9,78–84} Nondepressed bulimics are generally treated first with cognitive behavioral therapy; medication is added if they continue to binge or purge. Walsh et al. compared cognitive behavioral therapy with psychodynamically oriented supportive psychotherapy and also assessed whether adding medication to cognitive behavioral therapy produced additional benefits. They found that cognitive behavioral therapy was superior to supportive psychotherapy in reducing the number of binge/purge episodes and in increasing the percentage of individuals becoming binge/purge free. Adding medication (either fluoxetine or imipramine) to cognitive behavioral therapy was superior to cognitive behavioral therapy alone.⁸⁵ Several other studies have also suggested that combined treatment may have additional benefits.^{79,86,87} Two recent randomized trials suggest that self-care manuals can reduce the therapist contact hours required for cognitive behavioral therapy while achieving comparable efficacy.^{80,88}

Medications. Early studies suggested that imipramine was helpful in the treatment of bulimia nervosa.^{86,87} More recently, fluoxetine has emerged as an effective medication in bulimia nervosa. Two randomized trials support the superiority of fluoxetine over placebo, although the dose of fluoxetine which was effective (60 mg) was significantly higher than the dose typically used for depression (20 mg).^{89,90}

Several investigators have noted a seasonal pattern among some bulimics, with distinct winter worsening of symptoms in 10% to 42% of individuals.^{91–93} Three small randomized, controlled trials have examined the effect of

bright light therapy on bulimic symptoms. All the studies included small numbers of women and patients were generally not selected for the presence of seasonal symptoms. In one study, bright light of 10,000 lux for 30 minutes in the morning was superior to 500 lux of red light (placebo) on all measures of mood and eating outcomes.⁹⁴ In another study, bright light-treated women bulimics noted improvement in depression scores but no significant change in bulimic symptoms,⁹⁵ while a third study did note a significant decrease in bingeing.⁹⁶

HIGH RISK GROUPS

Not all patients with patterns of disordered eating meet the criteria for a full-blown eating disorder. Patients with disordered eating patterns who do not meet eating disorder criteria are still at risk for complications. Two groups at particularly high risk are diabetics and female athletes.

Disordered Eating in Diabetics

Up to one third of women with IDDM have eating disturbances,^{12,13,97} and up to 40% of young patients with IDDM will have microvascular complications.⁹⁸

In a recent prospective study, 91 women with IDDM were followed for 4 to 5 years and assessed for the presence of disordered eating, including binge eating, omission or underdosing of insulin to promote weight loss, self-induced vomiting, or use of laxatives. After 4 years of follow-up, 86% of women with highly disordered eating had retinopathy, compared with 43% and 24% of women with moderately or nondisordered eating, respectively. Despite the limitations of this study (no baseline measures of retinopathy, no interim assessments of glycemic control, and no measures of severity of retinopathy), the impaired metabolic control associated with disordered eating behavior in patients with IDDM does seem to be associated with an increased risk of diabetic retinopathy.⁹⁹ Physicians should remain alert for patterns of disordered eating in patients with IDDM.

Female Athlete Triad

Many female athletes exhibit disordered eating patterns. Although these athletes may not meet criteria for anorexia nervosa or bulimia nervosa and typically do not have disturbances in body image, behaviors and complications similar to those seen in full-blown eating disorders are seen.

The female athlete triad (disordered eating, amenorrhea, and osteoporosis) was described initially in 1992.¹⁰⁰ Disordered eating is described as a spectrum of abnormal patterns of eating, including bingeing, purging, food restriction, prolonged fasting, use of diet pills, diuretics, and laxatives, and other abnormal eating behaviors. Amenorrhea, both primary and secondary, is more common in

Table 5. Summary of Studies on Treatment of Anorexia Nervosa and Bulimia Nervosa*

Study	Study Objective	Study Design	N	Key findings	Limitations
Psychological Treatment of Anorexia					
Robin, 1994	To compare individual and behavioral family therapy in the treatment of anorexia	RCT	24	Significantly greater increase in BMI and return of menses in family therapy group Comparable improvement in other variables, including eating attitudes and body shape dissatisfaction	Small study Included hospitalization for refeeding in an unspecified number of patients
Eisler, 1997	To compare individual and family therapy in anorexia in 4 prognostic groups: EOSH, EOLH, LO, BN	RCT	80	Family therapy was superior to individual therapy for EOSH Both treatments were comparable in all other groups	Incomplete follow-up Incomplete information on other treatments not included in analysis All participants previously treated as inpatients
Crisp, 1991	To compare the following interventions: inpatient treatment, outpatient individual and family psychotherapy and dietary counseling, outpatient group psychotherapy and dietary counseling, and referral back to primary physician after initial assessment	RCT	90	Significant weight gain in all 3 treatment groups (9.0 to 10.1 kg) vs 3.2 kg in the no treatment group No significant differences between the 3 treatment groups	Patients are a highly selected group of referred anorexics Compliance was not optimal Patients only received 12 outpatient therapy sessions
Gowers, 1994	To compare 2-year outcome of 2 combined outpatient therapy arms with assessment/referral only in the treatment of anorexia	Subset follow-up of Crisp, 1991	40	Continued weight gain in year 2 in both outpatient treatment arms	Subset follow-up with combination of 2 treatment arms No follow-up for inpatient group No adjustment for confounding by additional therapy after original 12-visit intervention
Treasure, 1995	To compare cognitive analytic and educational behavioral outpatient therapy in the treatment of anorexia nervosa	RCT	30	Subjective improvement greater in cognitive analytic group Comparable change in weight and all objective measures in both groups	Small study in select referral group Large drop-out rate (1/3) Relatively inexperienced therapists
Pharmacologic Treatment of Anorexia					
Halmi, 1986	To assess the role of cryptoheptadine and amitriptyline in the treatment of anorexia	RCT	72	Cryptoheptadine had a small effect on decreasing the number of days necessary to reach target weight In subgroup analyses, treatment efficacy was improved in nonbulimic anorexics but was decreased in bulimic anorexics Amitriptyline had no significant effect	Study only assessed short-term effects of treatment
Gwirtsman, 1990	To assess the role of fluoxetine in treatment of anorexia	Open-label trial	6	Doses of fluoxetine were often higher than used in depression Depressive symptoms improved and all women gained weight	Only 6 patients No control group
Kaye, 1991	To assess the role of fluoxetine in maintenance of weight gain in anorexia nervosa	Open-label trial	31	After an average of 11 months of follow-up, 94% of patients maintained a body weight above the anorexic range	No control group Relatively short follow-up
Attia, 1998	To assess the efficacy of fluoxetine in the treatment of anorexia	RCT	31	No significant differences on any outcome between fluoxetine and placebo groups, including subgroup analyses	Small sample size limited study power Intensive inpatient treatment group

(Continued)

Table 5. (Continued)

Study	Study Objective	Study Design	N	Key findings	Limitations
Szmuckler, 1995	To assess the role of cisapride in the treatment of anorexia	RCT	34	Equal change in gastric emptying and weight gain in both groups Subjective improvement in cisapride group not correlated with gastric emptying	Inpatient group treated with vigorous refeeding Substantial variation of gastric emptying in normals
Katz, 1987	To assess the role of zinc supplementation in treatment of anorexia	RCT	15	Zinc supplementation decreased depression and state-trait anxiety Trends toward improved physical outcomes in zinc group were not significant	Adolescent population 14–19 years Small sample size limited power
Birmingham, 1994	To assess the efficacy of zinc supplementation in treatment of anorexia	RCT	54	Rate of increase in BMI significantly faster in zinc supplementation group	Inpatient group Short-term study 35% drop-out rate Most patients had normal zinc levels
Psychological Treatment of Bulimia					
Treasure, 1996	To compare stepped-care treatment with a self-care manual plus abbreviated CBT with CBT	RCT	110	Comparable outcome at end of treatment and 18 months in both groups Self-care group used 0–6 CBT sessions (median = 3)	Substantial drop-out rates both at 16 weeks and 18 months CBT group combined immediate and delayed treatment Clinician-assessors may not have been blinded
Thackwray 1993	To compare CBT and BT to a self-monitoring control group in bulimia nervosa	RCT	47	Posttreatment abstinence of binge-purge behavior was equally and significantly greater in CBT and BT than CG At 6 months, CBT > BT > CG in maintaining abstinence	8-week intervention only Study population was older and heavier than many bulimic groups
Garner 1993	To compare CBT and SET in bulimia nervosa	RCT	60	CBT was marginally more effective in decreasing vomiting ($P < .06$) CBT and SET were equally effective in reducing binge behavior CBT produced more favorable changes on a variety of eating attitudes and psychological variables	Multiple comparisons limit interpretation of significant results
Fairburn 1993	To compare CBT with BT and IP in bulimia nervosa at 12 months (18-week intervention)	RCT	75	Binge-purge abstinence was higher in both CBT and IT than BT at 12 months Both IP and CBT produced significant improvement in eating attitudes and psychosocial function	33% drop-out rate by 12 month follow-up
Lewandowski, 1997	To assess the efficacy of cognitive behavioral therapy in bulimia nervosa	Meta-analysis	26 studies	A large effect size was found posttreatment for improvement in eating behaviors and cognitive/attitudinal measures Small follow-up effect size for a variety of outcomes	No ratings of study quality Combined controlled and uncontrolled studies (intra- and intergroup results) in calculating effect size Heterogeneous follow-up measures No adjustment for length or intensity of treatment No discussion of publication bias
Thiels, 1998	To compare self-care plus abbreviated CBT with CBT	RCT	62	Significant improvement in overeating, vomiting, and other parameters in both groups	Some enrollees no longer met DSM-III-R criteria for bulimia Outcomes assessed by study therapists in nonblinded manner Substantial drop-out rate

(Continued)

Table 5. (Continued)

Study	Study Objective	Study Design	N	Key findings	Limitations
Fairburn, 1995	To compare the effects of BT, CBT, and focused IP on long-term outcomes in bulimia nervosa	Prospective follow-up of patients enrolled in 2 short-term psychotherapy trials	89	Average length of follow-up was 5.8 years 46% had an eating disorder at follow-up The proportion of patients with a diagnosis of bulimia nervosa at follow-up did not differ between the three treatment groups The proportion of patients with a diagnosis of any eating disorder at follow-up was significantly lower in those who had received cognitive behavioral therapy or focal interpersonal therapy than in those who had received behavioral therapy	Data combined from 2 trials, so treatments not truly randomized Average length of follow-up was 5.8 years, but varied from 3–11 years
Pharmacologic Treatment of Bulimia					
Fluoxetine Bulimia Nervosa Collaborative Study Group, 1992	To compare fluoxetine (20 mg), fluoxetine (60 mg) and placebo in the treatment of bulimia nervosa	Multicenter RCT	387	Patients were followed for 8 weeks Fluoxetine at 60 mg/day was significantly better than placebo at reducing vomiting episodes and binge-eating episodes Fluoxetine at 20 mg/day was inferior to 60 mg/day on both measures	Vomiting was the only purging method analyzed Outcomes were self-reports
Goldstein, 1995	To compare fluoxetine (60 mg) with placebo in the treatment of bulimia nervosa	Multicenter RCT	398	Patients were treated for 16 weeks Fluoxetine-treated patients had a significant reduction in weekly vomiting (–50% vs –21%) and weekly binge-eating (–50% vs –15%) episodes	Although follow-up was longer than in previous studies, it was still only 16 weeks Main outcomes were self-reports Vomiting was the only purging outcome measured
Psychological vs Pharmacologic Treatment of Bulimia					
Walsh, 1997	To assess whether a 2-stage antidepressant medication intervention (desipramine followed by fluoxetine) added to the benefit of psychological treatment and to assess whether medication plus psychological treatment was superior to medication alone	RCT	120	Medication plus psychological treatment resulted in a modestly greater reduction in binge episodes than did psychological treatment alone CBT plus medication was superior to medication alone but supportive psychotherapy plus medication was not	16-week follow-up There was no group that received psychotherapy alone (all who did not receive medicine received psychotherapy plus placebo) The only patients who received fluoxetine were those who failed desipramine
Goldboom, 1997	To compare fluoxetine and CBT for bulimia nervosa	RCT	76	Reduction in binge/vomit episodes across all 3 treatment groups approached significance ($p < 0.07$) CBT and combined groups more effective than fluoxetine in reducing binge/vomit behavior at post-treatment follow-up	Absence of placebo group Primary analysis based on those who completed rather than intention to treat High drop-out rate (43%) across all arms Enrollees represented only 13% of referrals during study period
Mitchell, 1990	To compare the following short-term interventions in treatment of bulimia: imipramine, placebo, imipramine plus structured group therapy, and placebo plus structured group therapy	RCT	171	Significant decrease in binge/vomit behavior in all 3 treatment groups Decrease in bingeing and vomiting significantly greater with group therapy than imipramine Combined therapy superior for affective symptoms, but not eating behaviors	Very intensive nature of structured group therapy limits its reproducibility Short-term follow-up Substantial noncompletion rate in active drug groups Did not include SSRIs which have been shown to be effective in bulimia nervosa

(Continued)

Table 5. (Continued)

Study	Study Objective	Study Design	N	Key findings	Limitations
Agras, 1992	To compare pharmacologic treatment, CBT, or both in the treatment of bulimia	RCT	71	Patients in the medication groups were treated for either 16 or 24 weeks At 16 week follow-up, those receiving CBT or combined therapy had reduced their purging and bingeing significantly more than the medication group At 32 week follow-up, only the combined treatment was superior CBT may help prevent relapse after withdrawal of medication	Treatments were not blinded Only 32 week follow-up Medications which have been clearly shown to be effective in bulimia nervosa (eg, SSRIs) were not studied
Light Therapy of Bulimia Nervosa					
Lam, 1994	To assess the efficacy of winter bright light therapy in the treatment of bulimia nervosa	Random cross-over design	20	Significant improvement in most outcomes with bright light compared with baseline or placebo light No change from baseline on any measure in placebo light group	Small short-term study Rapid relapse after withdrawal of bright light therapy
Blouin, 1996	To compare winter bright light therapy with placebo light therapy in bulimia	RCT	18	Significant decrease in depression scores in bright light group No effect of bright light on eating behaviors	One week intervention only with low-intensity (2500 lux) bright light 13 of 18 met criteria for major depression at baseline
Braun, 1999	To determine the effect of winter bright light therapy in the treatment of bulimia	Matched controls	34	Binge frequency decreased significantly more in the bright light group Decreases in purge behavior and depressive symptoms were comparable in both groups	Nonrandom assignment Compliance assessed by self-report 3-week intervention only

*RCT indicates randomized clinical trials; BMI, body mass index; EOSH, early onset, short history; EOLH, early onset, long history; LO, late onset; BN, bulimia nervosa subtype; CBT, cognitive behavioral therapy; BT, behavioral therapy; SET, supportive expressive therapy; IP, interpersonal therapy; SSRI, selective serotonin reuptake inhibitor.

women athletes than in their more sedentary peers. Osteoporosis occurs and is secondary to hypoestrogenism. Half of all amenorrheic athletes have bone densities at least 1 standard deviation below the mean. These athletes have an increased risk of stress fractures, and bone density may be decreased even in those sites subjected to impact loading during exercise. Some of this bone loss may be irreversible. The female athlete triad is more common in appearance- and endurance-based sports such as gymnastics, ballet, and long-distance running. It also seems to be more common in athletes who are training seriously and who have an overcontrolling parent or coach. Estimates of the prevalence of disordered eating in athletes range from 15% to 62%, and amenorrhea may occur in 3% to 66% of athletes. The prevalence of premature osteoporosis is not known.^{10,11}

At present, there is little evidence regarding treatment of the female athlete triad. It is likely that strategies used for other eating disorders, such as counseling, cognitive behavioral therapy, and possibly exercise restriction, would be helpful. Open communication with coaches and trainers will enable common goal setting (e.g., weight at which exercise must be restricted). The desire to participate in sports and the lure of performance-enhancing diet may motivate some patients. Clinicians should main-

tain a high index of suspicion in all female athletes and should remain alert for the syndrome in young women who come in for a preperformance physical examination.

Eating Disorders in Males

Although eating disorders occur predominantly in females, they do occur in males. They tend to be more common in those who are gay or bisexual, and premorbid obesity is more common. There is an increased frequency in those in jobs where there is high pressure to be thin, such as acting or modeling. Men with eating disorders have a higher incidence of substance abuse than men who eat normally, and a family history of alcohol use or an affective disorder is more common. Of 135 males seen in an eating disorders clinic, 46% were bulimic, 22% were anorectic, and the rest had unspecified eating disorders.¹⁰¹

SUMMARY AND CONCLUSIONS

Eating disorders are common in young women of all ethnic groups, and clinicians must maintain a high index of suspicion. Primary care physicians must be able to detect eating disorders, determine the need for hospital-

ization, and manage the medical complications of eating disorders. The primary care physician is part of a multidisciplinary team including a nutritionist and a mental health professional. Common goal setting, open communication, and firm adherence to agreed-upon contracts are essential aspects of the team approach. Treatments for anorexia nervosa and bulimia nervosa are summarized in Table 5.

Nutritional management based on food diaries includes indicated supplementation (iron, calcium, multivitamins) and assessment of both eating patterns and nutritional adequacy, especially protein, fat, and calories. Amenorrheic patients with eating disorders should receive estrogen therapy.

Psychotherapy is imperative for patients with eating disorders, although effective psychotherapy cannot occur while the patient is in a starvation mode. All patients with bulimia nervosa should receive some form of psychotherapy, preferably cognitive behavioral therapy. Individuals who continue to have difficulty with bulimic behaviors despite therapy or who are clinically depressed should be treated with selective serotonin reuptake inhibitors; fluoxetine has the most evidence. Light therapy may be considered, particularly in seasonal bulimics.

Diabetics are at risk for disordered eating, and disordered eating increases the risk of microvascular complications. Clinicians should maintain a high index of suspicion for disordered eating in female athletes. Finally, although eating disorders are more common in females, clinicians must remain alert for eating disorders in males.

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