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Body composition and anorexia nervosa: does physiology explain psychology?[1–3]

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Anorexia nervosa is a serious psychiatric illness primarily affecting adolescent girls and young women. It is characterized by distortions of body image, an intense fear of becoming fat, and relentless dieting, and culminates in severe undernutrition and amenorrhea. Although estimates vary, the mortality rate from this disorder is reported to be as high as 21% (1).

One-third of patients who develop this disorder recover with few sequelae and one-third recover sufficiently to return to a productive level of functioning but continue to struggle with issues of weight and shape. For the remaining one-third of patients, however, the illness is chronic and marked by a relapsing course that requires repeated hospitalization (1). An average of 30–50% of hospitalized patients require rehospitalization within 1 y of discharge (2, 3). There is no compelling explanation for this high rate of relapse.

The distortions of body image and fear of becoming fat that dominate the thoughts of low-weight patients with anorexia nervosa persist during recovery. It is not unusual to hear patients complain during weight gain that "It's all going to my stomach" or to ask "Don't I look pregnant?" In the heyday of psychoanalysis, these complaints were viewed as the expression of oral impregnation fantasies and were treated, without significant success, by attempts to uncover unconscious conflicts. More recently, these concerns are usually minimized and treated as evidence of continued psychological disturbance.

Although many studies describe body composition cross-sectionally in women with anorexia nervosa, surprisingly little research has systematically investigated the changes in body composition and body fat distribution that occur with normalization of body weight. The published findings suggest, to varying degrees, a predilection for the accumulation of truncal fat relative to extremity fat (4–6).

In this issue of the Journal, Grinspoon et al (7) describe results that more strongly support an abnormal distribution of body fat with weight gain. In their longitudinal study (9 mo) designed to serially assess body composition in ambulatory women with anorexia nervosa relative to that of control subjects, they noted abnormalities in the patient group both during times of low weight and after a period of weight gain. At a low weight, when trunk fat as a percentage of total fat was similar to that of control subjects, the patients had a lower amount of extremity fat than did the control subjects. After a modest weight gain, the percentage of extremity fat changed little but the percentage of trunk fat increased significantly.

As intriguing as the discovery of this finding is the attempt to understand its mechanism. Potential factors, as the authors acknowledge, include rate of weight gain and neuroendocrine effects of estrogen, cortisol, or both. With respect to rate of weight gain, previous studies relied on cohorts predominantly recruited from inpatient populations. Typically, the rate of weight gain in inpatients is greater than that achieved in outpatients. Despite these differences in patient populations, it is significant that in the outpatients in Grinspoon et al's study, who had a slower rate of weight gain, central accumulation of body fat persisted. However, at the 9-mo follow-up visit, the patient group was still markedly underweight, with a mean body mass index (in kg/m^2) of 17.5 compared with 21 in the control subjects. Whether this lipodystrophy persists when weight normalizes completely, or even worsens, is an important unresolved question. Because healthy individuals tend to gain weight and abdominal fat with increasing age, future studies might control for the effect of time on body composition by serially assessing healthy subjects as well as patients.

Grinspoon et al found that exogenous estrogen was not protective against central fat accumulation. At first glance this seems surprising; however, there is growing evidence that many medications used by patients with anorexia nervosa do not have their expected effect. Klibanski et al (8) documented the lack of positive effect of exogenous estrogen on bone density. In a study by Szmukler (9), the gastric motility agent cisapride did not significantly improve gastric emptying time compared with a placebo. Trials of multiple classes of psychotropic medications—including neuroleptics, antidepressants, and mood stabilizers—used to augment weight gain and treat anorexia nervosa also showed no significant effects. In a study that documented the lack of efficacy of fluoxetine for the inpatient treatment of anorexia nervosa, Attia et al (10) postulated that it is the anorectic's state of starvation and low weight that interfere with the functioning of otherwise useful medications. A comparison with the efficacy of medications in other underweight populations is warranted.

The finding of a significant correlation between urinary free cortisol concentrations and central fat accumulation in women

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with anorexia nervosa is new and exciting, as Grinspoon et al note. Although a primary disturbance in body fat distribution in women who develop anorexia nervosa cannot be ruled out, it is more likely that lipodystrophy occurs as a function of weight gain. If future research bears out the correlation between cortisol and body fat distribution, cortisol concentrations could ultimately serve as a biological marker for those who will gain the most abdominal fat and thus help guide the psychological therapy.

Another area for future research is the potential link between this distorted physiology during weight gain and the distorted psychology so central to anorexia nervosa. Do patients who experience the most distress about their body during weight gain also have the highest ratio of truncal fat to extremity fat or display the greatest change in truncal fat? Is there a biological basis for their psychological concerns? Perhaps some patients' body image perception that "It's all going to my stomach" is not so distorted. If there is truth to this observation, how long does it persist? Does body composition continue to change with maintenance of a normal weight? If so, for how long? Answers to these questions have important implications for the treatment of patients with anorexia nervosa and for helping patients tolerate their bodies during recovery.

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