

Case report

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## Resting tachycardia, a warning sign in anorexia nervosa: case report

Mori J Krantz<sup>1,2</sup> and Philip S Mehler\*<sup>1,2</sup>

Address: <sup>1</sup>Department of Medicine at Denver Health Medical Center, 660 Bannock Street, Denver, CO 80204, USA and <sup>2</sup>Department of Medicine at the University of Colorado Health Sciences Center, 4200 E 9th Ave, Denver, CO 80262, USA

Email: Mori J Krantz - mkrantz@dhha.org; Philip S Mehler\* - pmehler@dhha.org

\* Corresponding author

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### Abstract

**Background:** Among psychiatric disorders, anorexia nervosa has the highest mortality rate. During an exacerbation of this illness, patients frequently present with nonspecific symptoms. Upon hospitalization, anorexia nervosa patients are often markedly bradycardic, which may be an adaptive response to progressive weight loss and negative energy balance. When anorexia nervosa patients manifest tachycardia, even heart rates in the 80–90 bpm range, a supervening acute illness should be suspected.

**Case presentation:** A 52-year old woman with longstanding anorexia nervosa was hospitalized due to progressive leg pain, weakness, and fatigue accompanied by marked weight loss. On physical examination she was cachectic but in no apparent distress. She had fine lanugo-type hair over her face and arms with an erythematous rash noted on her palms and left lower extremity. Her blood pressure was 96/50 mm Hg and resting heart rate was 106 bpm though she appeared euolemic. Laboratory tests revealed anemia, mild leukocytosis, and hypoalbuminemia. She was initially treated with enteral feedings for an exacerbation of anorexia nervosa, but increasing leukocytosis without fever and worsening left leg pain prompted the diagnosis of an indolent left lower extremity cellulitis. With antibiotic therapy her heart rate decreased to 45 bpm despite minimal restoration of body weight.

**Conclusions:** Bradycardia is a characteristic feature of anorexia nervosa particularly with significant weight loss. When anorexia nervosa patients present with nonspecific symptoms, resting tachycardia should prompt a search for potentially life-threatening conditions.

### Background

Anorexia nervosa is an increasingly common psychiatric disorder with a multitude of medical complications. Most of these complications are reversible if there is timely restoration of body weight, which is the cornerstone of treatment. A multidisciplinary team approach including psychiatric and dietary expertise can often effect a successful outcome. [1] Familiarity with signs, symptoms and

medical sequelae of this disorder are essential. Common physiologic alterations in anorexia nervosa include hypotension and bradycardia, which may be pronounced. We describe the case of a 52-year old woman with severe anorexia nervosa and resting tachycardia caused by cellulitis. This diagnosis was initially overlooked due to the chronicity and nonspecific nature of her complaints.

## Case Presentation

We cared for a 52 year-old white woman with a 20-year history of anorexia nervosa who was admitted to the hospital with three weeks of increasing bilateral leg pain and weakness. She reported two-months of progressive malaise, decreased appetite, and subjective chills without fever. The patient reported severe bereavement following her mother's recent death, which increased her aversion to food.

On presentation she was afebrile and weighed 49 kg with a body mass index (BMI) of 16 kg/m<sup>2</sup>. Her blood pressure was 96/50 mm Hg with a heart rate of 106 beats/min and no orthostatic changes in pulse or blood pressure were detected. The respiratory rate was 16 /min and room-air oxygen saturation was normal. In general, she appeared cachectic but was in no acute distress. Lungs were clear to auscultation. Cardiovascular examination revealed normal jugular venous pressure and was otherwise unremarkable except for the presence of resting tachycardia. Abdominal exam revealed mild tenderness to palpation in the left lower quadrant, but no hepatosplenomegaly or ascites was detected. Neurologic examination revealed normal strength, reflexes and sensation in all extremities. Skin exam was notable for an erythematous rash on the left thigh and mild desquamative erythema involving her hands and feet bilaterally. She also had fine lanugo-type hair and brittle nails.

Laboratory investigations revealed an elevated white blood cell count of  $15 \times 10^9$  cells/L (5–10 cells/L). The hematocrit was 30% (40–50%), which was unchanged from previous outpatient measurements. Her serum glucose concentration was low at 43 mg/dL (60–100 mg/dl). Renal and thyroid function tests were also normal. A 12-lead electrocardiogram demonstrated sinus tachycardia with a corrected QT interval (QTc) of 488 msec (normal range in women, 400–470 msec) despite normal serum potassium, magnesium and calcium concentrations. A markedly reduced serum albumin of 1 g/dL (3.5–5.0 g/dl) was noted, but hepatic transaminase levels were normal.

Given the patient's long history of anorexia nervosa and the recent death of her mother, her presentation was principally attributed to progressive malnutrition. She was started on enteral feeding and an eating disorder specialist was promptly consulted, who commented that resting tachycardia is uncommon in patients with exacerbation of anorexia nervosa.

On the second hospital day she remained afebrile but sinus tachycardia persisted. The white blood cell count had increased to  $25 \times 10^9$  cells/L (5–10 cells/L) and an erythrocyte sedimentation rate was elevated at 60 mm/hr (0–30 mm/hr). The elevated markers of inflammation

despite her profound cachexia, coupled with leukocytosis suggested an infectious etiology. Though blood cultures were negative, the erythema of her thigh was subsequently diagnosed as erysipelas. Treatment with antibiotics was initiated and her energy level rapidly returned to baseline. She was discharged from the hospital after receiving a full course of antibiotic therapy. Prior to hospital discharge, leukocytosis had resolved, her albumin level was returning towards normal and her resting heart rate had decreased to 45 beats per minute. A follow-up serum albumin performed two months later at an eating disorder center was normal (4.1 g/dL).

## Discussion

The present case illustrates the importance of seeking an underlying infectious or inflammatory etiology in anorexia nervosa patients presenting with resting tachycardia. The Diagnostic and Statistical Manual of Mental Disorders (DSM-10) defines anorexia nervosa as an intense fear of gaining weight, undue emphasis on body shape, a body weight less than 85% of predicted, and amenorrhea. [2] As in the case presented, hospitalization is often indicated when rapid and severe weight loss occurs or when severe depression is present. [3] Presenting complaints prior to hospitalization are often vague and patients demonstrate a lack of concern for their weight loss. Nonetheless, clinicians must maintain a high index of suspicion for underlying medical illness in such patients.

Many of the physical and laboratory findings in our patient were consistent with worsening anorexia nervosa (Table 1) including lanugo-like hair, QTc prolongation, and anemia. [3] In contrast to our patient however, anorexia nervosa patients usually have a markedly decreased erythrocyte sedimentation rate. Moreover, the hypoalbuminemia observed in our patient is uncharacteristic of anorexia nervosa; despite severe caloric restriction most anorexia nervosa patients maintain a normal serum albumin level. [4] The presence of tachycardia was also inconsistent and coupled with hypoalbuminemia and elevated markers of inflammation suggested a supervening acute medical illness.

Sinus bradycardia is the most common cardiovascular feature of anorexia and heart rates as low as 25 beats per minute have been reported. [5] This may in part be an adaptive response to weight loss and negative energy balance and cardiac monitoring is rarely necessary unless the heart rate drops below 35 beats/minute. We did not obtain Holter monitoring in our patient, but the restoration of sinus bradycardia with treatment of the underlying infection was striking.

Bradycardia in anorexia nervosa reflects a state of increased cardiac vagal activity, [6] which theoretically

**Table 1: Common physical signs and diagnostic findings in anorexia nervosa**

System	Findings
Dermatologic	brittle nails, lanugo-like facial hair, carotenoderma, thinning scalp hair
Immunologic	reduced number of CD4 and CD8 cells, reduced serum complement levels
Hematologic	anemia, leukopenia, reduced erythrocyte sedimentation rate
Cardiovascular	bradycardia, hypotension, QT prolongation
Metabolic/Endocrine	hypoglycemia, hypercholesterolemia, hypokalemia, euthyroid sick syndrome, diabetes insipidus, preserved serum albumin

may be considered a protective factor for arrhythmia risk. This excess parasympathetic activity manifests acutely as increased heart rate variability on 24-hour Holter monitoring, but normalizes after refeeding. [7] On the contrary, resting tachycardia in anorexia nervosa may be predictive of arrhythmia and sudden death risk, when associated with relative excess of sympathetic nervous system activity. [8] Future studies addressing cardiac autonomic function in ambulatory patients with anorexia nervosa are needed to address the high rates of sudden death observed in this disorder. Regardless, resting tachycardia in severely malnourished patients with anorexia nervosa is uniformly pathologic and often suggests an underlying acute medical illness.

**List of abbreviations**

None declared.

**Authors' contributions**

MJK and PSM drafted the manuscript and PSM managed the patient. Both authors read and approved the final manuscript.

PSM is an internist and eating disorder specialist and MJK is a cardiologist.

**Competing interests**

None declared.

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Written consent was obtained from the patient prior to publication of this report.

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