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Case Report

An Association Between Anorexia Nervosa and Schizophrenia: A Case Report

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ABSTRACT

Anorexia nervosa (AN) is a serious psychiatric illness marked by an inability to maintain a normal healthy body weight. The prevalence of AN comorbid with other psychiatric disorders has been reported to be quite high. Whereas depression and anxiety disorders are the most common comorbid diagnoses in anorexic patients, the dual-diagnosis of anorexia and schizophrenia is a relatively rare condition and is currently understudied.

Based on the observations from single case reports or case series, several explanations have been made about the co-occurrence of anorexia and schizophrenia. Here, we present the case of a female patient who developed schizophrenia during an anorexic period, which then progressed to a pattern of disordered eating and body image. This case is rare because the patient had a comorbid diagnosis of AN and schizophrenia. To the best of our knowledge, there are only a few previous case reports in the literature describing an anorexic patient with comorbid schizophrenia. In this case report, the diagnosis of AN is addressed, the definition and significance of similar cases are discussed, and the comorbidity of AN and schizophrenia are reviewed.

Keywords: Anorexia nervosa; Schizophrenia; Comorbidity

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INTRODUCTION

Anorexia nervosa (AN) is a serious psychiatric illness marked by an inability to maintain a normal healthy body weight, often dropping below 85% of the ideal body weight. Individuals with AN continue to obsess about weight, remain dissatisfied with the perceived size of their bodies, and engage in an array of unhealthy behaviors to perpetuate weight loss (i.e., purging, dieting, excessive exercise, fasting). Individuals with AN place central importance on their body shape and weight as a marker of self-worth and self-esteem. Although amenorrhea is a diagnostic criterion, it is of questionable relevance(1).

The prevalence of AN is approximately 0.5% to 1% and is highest among adolescent girls and young women(2).Epidemiological studies show that the gender ratio for AN is approximately 9:1, (women to men)(3).

Typical personality features of individuals with AN include perfectionism, obsessionality, anxiety, harm avoidance, and low self-esteem. The most common comorbid psychiatric conditions include major depression and anxiety disorders. Anxiety disorders often predate the onset of the eating disorder and depression often persists post-recovery(4). The comorbidity of AN with depression and anxiety disorders is quite high,(5) yet the comorbidity of AN and schizophrenia is relatively rare. Studies show that the prevalence of comorbid schizophrenia in anorexic patients is between 0% and 12%.5

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A recent study indicated that, overall, the prevalence of diagnosable schizophrenia in clinical samples of patients with eating disorders is generally calculated as below 10%, with males having a higher risk than females(6).

In this paper the authors intend to present a middle-aged Persian female patient with comorbid AN and schizophrenia. This report also highlights the importance of improving and expanding the workforce in the eating disorders research field.

CASE PRESENTATION

ZK, a 52-year-old educated woman, was employed in her older brother's private office. She has six brothers and two sisters, and is the fourth child. Her school and university performance was consistently in the top level, although she did not study very much. She graduated with a master's degree in English literature. Both parents were university graduates with respectable careers, which provided them with a good income. The patient had no family history of schizophrenia or eating disorders.

Nearly eight years ago ZK developed intermittent diarrhea and constipation, severe bloating, and periumbilical pain. After several work ups, she was diagnosed with irritable bowel syndrome (IBS). At that time she was very active, hiking and mountain climbing professionally. A few months later, after a lecture on diet and heart disease on television, she subsequently began to reduce the fat in her diet. She prepared a very detailed diet list by using calorie values of vegetarian foods obtained from the internet. Her diet was mainly cooked rice, beans, potatoes and bread. When she was asked about this alteration, the patient said she believed that herbal proteins and minerals were healthier and would help her lose weight and get into better shape.

A year later, the patient developed a depressive mood, and was anhedonic, disappointed, and sleepless. She lost her appetite and only ate a small amount of vegetables at meal hours. At that time her weight was 58 kg, and she nearly lost 10 kg in 6 months. Her family observed some bizarre behavior, such as keeping the curtains closed during the day in order to prevent anyone from seeing inside the house, and from time to time ZK told her mother that she was suspicious of a hidden camera in the house. She also had some obsessive-compulsive disorders, thinking that objects were never in their appropriate places. The patient was hostile and impatient towards people, especially office clients, and once attempted to commit suicide by cutting her vein with a blade, but was unsuccessful. She rejected the notion of having mental problems and was brought to a psychiatrist by her parents, which led to a hospital admission. ZK was diagnosed with schizophrenia and began taking amytriptiline (150 mg/day), imipramin (150 mg/qhs), and risperidone (4 mg/day). Approximately one month later, her psychotic symptoms were controlled, and she was discharged under medication. Afterwards she maintained her vegetarian diet. After 7 years, she started to change her diet from vegetables to beans and rice only. When she ate even a very small amount she felt very guilty. She carried on her diet and exercise regime for one year until her admission to our clinic, with complaints of morbid fatigue and exhaustion. During the previous three months, she could only walk with a walker, and lost 11 kilos in two months. She drank two cans of diet cola and mineral water per day. Her last menstrual period was six months ago.

The patient was emaciated, with sunken cheeks and eyes, and her body mass index (BMI) was under the normal range at the time of hospitalization. Her vital signs were stable. Her skin was dry and she had brittle hair. ZK noted that she had dental caries and many tooth problems during the year prior to her admission. Both breasts were atrophic. There were no cardiac clicks or murmurs, nor any arrhythmias. Her abdomen was scaphoid in appearance, but there was no apparent tender point. Lower extremities had 3+ pitting edema, which lasted for four months according to the patient. Her neuromuscular exam revealed extremely distal and proximal limb weakness and diminished deep tendon reflexes. Trousseau's sign was positive, but she denied experiencing any seizure attacks.

She had flat mood and affect. Her speech was poor in content although the amount has increased. She frequently gave irrelevant answers to questions, however her thought content was normal. The patient denied having delusions, ever being sexually active or abused, and drug or alcohol consumption. Moreover, her family also did not have any suspicions about them.

Her laboratory data is presented in Table 1. Urine analysis and culture, stool exams, collagen vascular disease and viral markers, serum IgG, IgM, IgA, C-ANCA, P-ANCA, anti-endomysial antibody, anti-tissue transglutaminase (IgA and IgG), ASCA, and tuberculin skin test were all normal.

Early after admission, the patient was visited by a dietitian and, considering megaloblastic anemia, a

Table 1: Laboratory data of the patient with comorbid anorexia and schizophrenia.

Test	Result	Reference value	Test	Result	Reference value
WBC	5.2	6-10 × 10^3 cell/micl	**Sodium**	135	135-148 mEq/l
Hemoglobin	7.5	12-16 gr/dl	**Potassium**	3	3.5-5.3 mEq/l
MCV	113.5	77-97 femtoliter	**Bilirubin (total)**	2.1	Up to 1.0 mg/dl
MCH	37.5	26-32 picogr	**Bilirubin (direct)**	0.5	Up to 0.4 mg/dl
MCHC	33	32-36 gr/dl	**Amylase**	52	Up to 90 U/L
Platelets	215	140-440 thsd/CU MM	**Alkaline Phosphatase**	1021	64-306 IU/L
Reticulocyte	0.7	0.5-1.5% all RBCs	**AST**	21	Up to 40 IU/L
Blood sugar	63	80-110 mg/dl	**ALT**	13	Up to 40 IU/L
BUN	10	5-23 mg/dl	**Calcium**	6.5	8.6-10.3 mg/dl
Creatinine	0.8	0.6-1.2 mg/dl	**Phosphorus**	2.3	2.5-5 mg/dl
Iron	78	39-142 micg/dl	**Folic acid**	17.6	3.1-17.5 ng/ml
T.I.B.C	305	230-440 micg/dl	**Vitamin B12**	85	197-866 pg/ml
Ferritin	10.7	13-150 ng/ml	**PTH**	424	15-65 pg/ml
Total protein	6	6.6-8.8 g/dl	**D3 (25-OH Vitamin D)**	<6.25	Poor level: <20 ng/ml
Albumin	3	3.5-5.2 g/dl	**LDH**	517	Up to 480 IU/l
Magnesium	1.7	1.9-2.5 mg/dl	**ESR 1hr**	106	<30 mm/hr
Urine analysis	SG: 1.005 No proteins	No glucose No blood			

Fig. 1: Small bowel series of the anorexic-schizophrenic patient.

diet rich in vitamins and mineral supplements, meat, eggs, and dairy products was started. The patient was weighed daily. Along with weight gain, treatment efforts that focused on modifying thoughts and beliefs about food, weight, self-concept, and control, as well as developing relapse-prevention strategies were utilized.

Abdomino-pelvic ultrasound, upper gastrointestinal endoscopy, small bowel transit, and colonoscopy were normal (Figure 1). Duodenal biopsy revealed a mild inflammation in the duodenal mucosa without any change in villousity. Breast mammograms showed some fibrocystic changes. Lumbosacral and pelvic radiography did not show any lytic lesions, but decreased bone density was present. Bone mineral densitometry was performed, which showed severe osteoporosis.

During her admission, discharge and first follow-up, positive symptoms of schizophrenia were not evident;

however, negative symptoms such as anhedonia and social withdrawal were noted. After the recovery of her poor nutritional state, the treatment team decided to follow her without intervening, as her weight was close to normal. After discharge from the hospital, the patient returned to work; however, there was a marked decline in her performance, which improved after two months. She continues her new diet given by a dietitian and exercise regime, which keeps her BMI in normal range.

DISCUSSION

To the best of our knowledge, there are only few previous case studies of a comorbid anorexia-schizophrenia diagnosis(5). Obstacles in conducting research on AN(6). such as relatively low incidence and prevalence, lack of consensus on most appropriate treatments, variable presentation within the patient population based on age and illness factors, high costs of providing treatment, and the complex interaction of medical and psychiatric problems associated with the illness are highlighted in previous studies(1). Therefore, our case is unique in the literature.

The comorbidity of AN with other psychiatric disorders, especially depression and anxiety, is quite high(6). However, comorbidity of AN and schizophrenia is relatively rare, and currently understudied.7 Studies show that the prevalence of comorbid schizophrenia in anorexic patients is between 0% and 12%(8,9).

Many authors have discussed the possible role of starvation and metabolic disturbances in the etiology of psychosis that may develop concurrently with an eating disorder(10).

Better knowledge of the comorbidity of eating disorders with psychosis is important for treatment. First, the outcome in patients who have co-morbid eating disorders and psychosis is expected to be poor,(10)on the other hand, patients with AN co-morbid with psychosis may be more responsive to therapeutic drugs that act on the dopaminergic system(11). Increased dopamine activity at the central dopamine receptors is believed to play a role in the pathophysiology of schizophrenia, and some reports also indicate dopaminergic pathway abnormalities in eating disorders(12). There are various theories about the comorbidity of AN-schizophrenia. Eating disorders and psychoses interact with each other, but are separate disorders. Transient psychosis can develop based on feeling better after some weight gain(13). Over-involvement with food and eating can be a defense against psychosis. In fact, Hugo and Lacey proposed a reverse relationship between the two disorders after observing that remission in eating disorders triggers or exacerbates psychotic symptoms. These two disorders are in fact different phenotypes of the same illness process, and distorted thoughts about eating and body image can be related to the cognitive disorder that is the result of schizophrenia(14). AN and schizophrenia exist on a continuum. Schizophrenia is at one end of this continuum and neuroses or personality disorders are at the opposite end(15).

To date, most evidence on the comorbidity of eating disorders with psychosis comes from clinical case studies (Table 2)(6). In our case, her eating behavior during the 10 years before hospitalization was very similar to anorexic patients. Her eating disorder, in the form of restricting food intake, skipping meals, and preferring low calorie and vegetable foods resulted in marked weight loss. In addition to changes in her eating behavior, she also exercised intensely. This weight loss method is very common among anorexics. The intense mental effort expended on body image and food observed in anorexics was also evident in our patient's behavior. She was amenorrhic for six months while an inpatient in our clinic. According to the DSM-IV classification, this case is diagnosed as

Table 2: Cases of patients diagnosed with eating disorders presenting with schizophrenia or schizophrenia-like symptoms.

Source	Type of study	Diagnosis	Characteristics of cases
Korkina et al. (1975)	Clinical case series	Anorexia nervosa	34 cases of patients with anorexia nervosa comorbid with schizophrenia; at onset with symptoms of dysmorphobia that evolved in anorexia nervosa, and progressed to the personality deterioration of a schizophrenic nature.
Hudson et al. (1984)	Clinical case series	Anorexia nervosa and bulimia nervosa	In 130 consecutive cases of eating disorders, 17 developed symptoms of psychosis: 16 attributable to major affective disorder or schizo-affective disorder; no case of schizophrenia.
Korkina et al. (1992)	Clinical case series	Anorexia nervosa	In a sample of 800 patients diagnosed with anorexia nervosa, about 25% had associated schizophrenia.
Gothelf et al. (1995)	Clinical case series	Anorexia nervosa	One case of anorexia nervosa comorbid with schizophrenia in a sample of 37 inpatient female adolescents with anorexia nervosa (2% of the sample).
Striegel-Moore et al. (1999)	Clinical case series	Eating disorders	98 men with eating disorders: men with anorexia nervosa were at high risk of comorbid schizophrenia/psychotic disorder (9 out of 25 cases, 36%); those with no otherwise specified eating disorders were at special risk of comorbid organic mental disorder and schizophrenia/psychotic disorder.

Data were retrieved from PubMed/Medline and PsychInfo/Ovid search (December 10, 2007), using the following terms: "schizophrenia and/or psychosis" and "anorexia nervosa", "bulimia nervosa", "eating disorders". Single case reports were not considered.

eating disorder AN (American Psychiatric Association, 1994) (Appendix A).

Our case had previously exhibited psychosis, an organic etiology was assessed and ruled out. Substance abuse, another factor that might lead to psychosis, was excluded based on her history; however, no additional laboratory assessments related to substance use were performed, as the family's statements were reassuring. This may be a limitation of the study.

It can be quite difficult to differentiate the mental preoccupation of an anorexic patient whose body image is distorted from the delusional thinking of a schizophrenic patient. At this point, it is important to evaluate each psychiatric symptom within the complete clinical presentation of the patient by considering the time dimension. When considered in terms of the time of onset, course, and characteristics of the symptoms of both disorders, we concluded that ZK's anorexia and schizophrenia developed independently but interacted. In conclusion, further studies are needed in order to understand the complex interaction between psychosis and eating disorders.

Appendix A

DSM IV Criteria for Anorexia Nervosa (307.10)

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

Specify type:

- **Restricting Type:** During the current episode of anorexia nervosa, the person has not regularly engaged in binge-eating or purging behavior (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas).
- **Binge-Eating/Purging Type:** During the current episode of anorexia nervosa, the person has regularly engaged in binge-eating or purging behavior (i.e., self-induced vomiting or the misuse of laxatives, diuretics, or enemas).

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