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Case Report

Anorexia Nervosa and Family Relations: A Case Report

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Abstract

In clinical practice, when a patient exhibits idiopathic vomiting, a differential diagnosis can be performed to check for gastrointestinal diseases. After making in-depth inquiries about the patient's medical history and conducting physical assessments, a major mental disorder may instead be identified. This case report presents a 20-year-old female who spent her adolescent years being verbally abused by her peers for being plump. She then developed feelings of dejection and engaged in self-harm and was subsequently diagnosed with anxiety and given medications to regulate her behaviors. A year ago, her mother's passing and her father's remarriage had such a great impact on her that she started attempting to lose weight through improper methods. Two weeks ago, she exhibited idiopathic vomiting after her meals and was forced to seek treatment by her family. Based on in-depth inquiries, physical assessments, mental state examinations, and psychological tests, the patient was found to have an obsessive fear of gaining weight and was diagnosed with anorexia nervosa. The medical team's main treatment approach included several measures such as cognitive behavioral therapy, nutritional therapy, family therapy, and drug therapy, which led to improvements in the patient's cognitive dysfunction and abnormal mental/physical behaviors. She was discharged after her body weight steadily returned to 34 kg. The patient was also tracked post-discharge to check her and her family members' compliance with cognitive behavioral therapy exercises. For patients who exhibit repetitive idiopathic vomiting patterns, if their clinical symptoms do not line up with those of internal medicine diseases, then a differential diagnosis of anorexia nervosa should be conducted to enable timely treatments.

Keywords: *Anorexia Nervosa; Cognitive Behavioral Therapy; Family Relations*

Introduction

Anorexia nervosa (AN), also known as self-starvation, is a psychosomatic disorder in which an individual is critical of their weight and body to the point where they would become confused and start to restrict their diets, which results in marked physiological, psychological and social consequences [1]. Based on global gender statistics, adolescent and young females are most likely to develop AN, which has a mortality rate of 1.7 per 1,000 people, 5.35 times higher than the standardized mortality rate of general diseases; the morbidity rate among women ranges from 1.2% to 2.2%, while that among men is 1/8 of women [2,3]. As the symptoms of AN begin to appear when one reaches maturity, those with a poor response to treatment have a higher risk of mortality [3].

Patients with AN may experience physiological abnormalities such as amenorrhea, excessive exercise, and weight loss of up to 10 to 20% [4], combined with psychological abnormalities such as the fear of gaining weight, the denial of hunger, the pursuit of thinness, self-perceived incompetence, and a need to have control. Moreover, dangerous behaviors such as controlling or refusing food intake, withdrawal from interpersonal interactions, suicidal thoughts, and drug abuse could also exist as well [1,5]. There are many potential factors which cause AN, including extrinsic factors such as having an obsessive dissatisfaction with one's body image, having a need to sustain one's self-control, being body shamed, and family-related factors such as having the need to gain a sense of identity from one's parents, experiencing relationship changes with one's parents or close-knit family members, sadness, and loss [6,7].

Case Presentation

This report presents a 20-year-old unmarried female who is a high school dropout. For two weeks, she experienced recurring bouts of idiopathic vomiting after meals and sought treatment at our hospital. When the patient was 15, she was derided and verbally abused by her classmates for being plump, and she began to develop anxiety, a loss of appetite, and self-harm. She was diagnosed with anxiety and began taking medications orally. A year ago, her mother's passing and her father remarriage had given her tremendous stress. In addition to dejection and insomnia, she relapsed into refusing food, exercising excessively, taking laxatives, and stopping her medications. Consequently, her body weight fell from 70 kg to 34 kg and she had to drop out of school due to her physical condition. In order to help the patient regain her appetite and seek for treatment, her father and stepmother adopted an authoritative parenting approach which leads to constant parent-child conflicts and estrangement. This condition causes exacerbation in food refusal and purging phenomenon (self-induced vomiting). The patient even has to stimulate her gag reflex by sticking her finger down to her throat. Two weeks before being hospitalized, she was inducing vomiting after her meals and was severely malnourished.

Treatment

The patient's height and weight were 160 cm and 29 kg, respectively, corresponding to a body mass index (BMI) of 11.3 kg/m^2. She had a nine-year history of anxiety which was not controlled through routine medication. She had a family history of cancer but no family history of mental disorders. She did not have a history of smoking, drinking or drug abuse. Her menstrual cycle stopped half a year ago. She was conscious but was physically frail and had thinning hair, multiple dental caries and tooth discoloration, noticeably swollen cheeks, and protruding collar bones. A palpation revealed that her extremities were cold and pale; her skin was dry, cracked and inflexible; pitting edema and sensory abnormalities were absent; the capillary refill time of her fingernail was delayed by 3 to 4s; the score of her upper and lower extremity muscle strength was 3 points each; and her deep tendon reflexes were weak. The results of her routine laboratory blood tests are as follows: hemoglobin = 10.2 g/dL (Female normal: 12 - 16), platelet count = 444 x 10^3/ul (Normal: 130 - 400 x 10^3), hematocrit = 31.2% (Female normal: 38 - 47), serum potassium = 2.6 mmol/L (Normal: 3.5 - 5.1), albumin = 2.2 gm/dL (Normal: 3.5 - 5.0), thyroid-stimulating hormone = 1.89 uIU/mL (Normal: 0.27 - 4.2), free T4 = 1 ng/dL (Normal: 0.8 - 1.9) and aldosterone = 28.1 ng/dL (Normal: 2 - 9). Her electrocardiography and chest x-ray revealed negative findings. Based on the taken history, physical examination, laboratory and image results, it seemed likely that she had anxiety recurrence or AN.

After hospitalization, the patient's acute hypokalemia was treated with spironolactone, potassium gluconate, and potassium chloride, while olanzapine was used to stabilize her mood. The nurse practitioner conducted a mental assessment of the patient using various assessment tools, and the results are presented in table 1. Based on these results, anxiety was excluded and the patient was diagnosed with very severe binge eating/purging type AN. The nurse practitioner then convened a multidisciplinary team meeting to determine the treatment approach for the patient. The decision was made to help the patient gain 1 to 1.5 kg every week, return the patient her control over her diet, and her to build a healthy body image while also assisting her to mend her relationship with her family members to prevent an AN relapse.

Assessment tool	Range	Classification	Patient's result
Mental Status Examination (MSE)	Subjective descriptions given by the patient.		Clear consciousness, cooperative attitude, fair attention, mild depressed mood and anxious mood, coherent and relevant speech, no psychomotor agitation or psychomotor retardation, no suicidal ideation, obsessive thought about fear of weight gain, guilty feeling about feeding, self-induced vomiting could attenuate anxiety and powerlessness, no visual and auditory hallucination, 7~8 hours total sleep time, intellectual insight, self-induced vomiting worsen under low mood.
Wechsler Adult Intelligence Scale-Fourth Edition (WAIS-IV)	≧ 130	Very superior	110 points, average to high average IQ.
	120 - 129	Superior	
	110 - 119	High average	
	90 - 109	Average	
	80 - 89	Low average	
	70 - 79	Borderline	
	≦ 69	Extremely low	
Tennessee Self-Concept Scale (TSCS)	Psychologist judgments from self-report of patient.		Low self-esteem, poor social skill, feeling about being disliked and abandoned, distorted body image and self-doubt, sensitive to negative information, feeling of alienation and disappointment toward family
Millon Clinical Multiaxial Inventory-III (MCMI-III)	75 - 84	Has a clinically significant personality style or syndrome	83 points, negative thinking, need affirmation, anxious, depressive, dependent personality
	≧ 85	Personality style or syndrome is prominent for the individual	

Table 1: *Mental assessment results.*

For weight control, the dietician formulated a 1000 kcal/day high-protein diet plan, in which the calorie intake was gradually increased by 50 to 60 kcal/day after every three days. Regular discussions and health education sessions about proper food intake concepts were conducted as well. To strengthen the patient's control over her diet, the nurse practitioner implemented cognitive behavioral therapy (CBT) as an intervention, and jointly formulated an in-hospital behavioral therapy plan with the patient (See table 2). The patient was monitored on a daily basis to check whether she had implemented the contents of the plan, and regular discussions with her were conducted to understand her food intake situation as well as her opinions about food, so as to enhance her body image and improve her awareness of the concept of a healthy weight. After one week of treatment, the patient's weight merely increased by 0.5 kg to 29.5 kg. Upon further examination, her serum potassium level (2.4 mmol/L) was still too low (Normal: 3.5 - 5.1), while other findings were as follows: total protein = 4.0 g/dL (Normal: 6.4 - 8.9), serum osmolality = 295 mOsm/kg (Normal: 275 - 295), urine potassium = 17 mmol/L (Normal: 25 - 125); urine osmolality = 867 mOsm/kg (Normal: 300 - 900); urine creatinine = 119.1 mg/dL (Female normal: 28 - 217). Since renal disease could not be ruled out as a cause of the patient's hypokalemia, we first increased potassium gluconate and potassium chloride (KCl) doses and arranged a nephrologist consultation for the patient. The results indicated that her transtubular potassium concentration gradient was 2.07 and her urinary potassium excretion was normal, thereby ruling out the loss of potassium ions as a cause of her renal problems, which were either a result of vomiting or diarrhea.

Condition	Execution plan	Rewards
Weight gain ≧ 1.5 kg/week	1. Normal activity, go to toilet by yourself 2. Eat in the room, sit for 1 hour and bed rest for 2 hours after meals 3. Can eat three meals with father)	Go out with father for 1 hour
Weight gain ≧ 1 kg/week	1. Normal activity, go to toilet by self 2. Eat in front of the nurse station, sit for 1 hour and bed rest for 2 hours after meals 3. Can eat three meals with father	Go out with father for 0.5 hour
Weight gain ≦ 1 kg/week	1. Absolute bed rest 24 hours per day, go to toilet with others 2. Take a sponge bath and intake on bed 3. Can eat three meals with father	No
Weight loss	1. Absolute bed rest 24 hours per day, go to the toilet others' accompany 2. Take a sponge bath and intake on bed 3. Can not make a telephone call, watch TV, nor receive visitors 4. Can not do anything except for eating	No

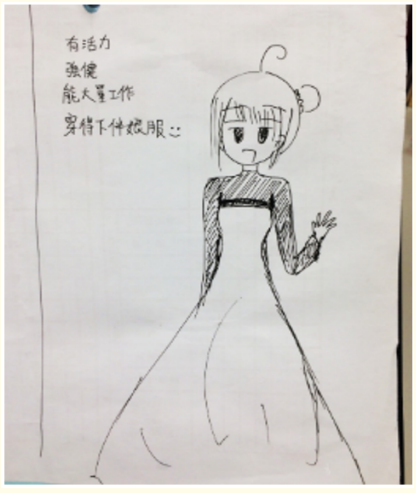
Table 2: *Cognitive behavioral therapy treatment plan.*

The patient admitted in the interviews that she "would vomit once or twice a day even though not much food came out"; "felt anxious after having regular meals and would vomit involuntarily due to the fear of gaining weight"; and "the components in the treatment plan were too rigorous." Based on evaluations, the medical team decided that the patient continued to vomit to resist weight gain, her mentality remained obdurate, and her symptoms of anxiety had aggravated. The team then informed the patient that they must be strictly implemented the cognitive behavior therapy plan and increase the olanzapine dose to improve and regulate her appetite.

The psychotherapist conducted individual counseling sessions with the patient on a weekly basis, during which the patient was given instruction on self-understanding and techniques to cope with stressful events in life. Social workers also assessed the patient's family interactions and level of family support and provided grief counseling so that she could express her thoughts about her mother. Family therapy techniques were adopted as well - the patient's father was advised to spend more time and connect with her (instead of only criticizing and controlling her) as doing so would help to rectify the problems arising from his high-pressure parenting style and their estranged relationship. Through such interactions, both parent and child can express their own opinions and acceptable methods. Meanwhile, the team also assisted the patient's father in learning the routine care models for the patient in order to facilitate the control of her diseases after being discharged.

After two weeks of behavioral therapy, the patient gained another 0.5 kg and was now 30 kg. To elevate the effectiveness of the CBT, the nurse practitioner implemented interventions such as health education on body image awareness and training sessions on muscle relaxation techniques. The patient was given the opportunity to observe her dental caries, swollen cheeks, and emaciated body through a mirror. She was encouraged to express her views while learning how to appreciate her own body and lower her intrinsic anxiety and fear. After the third week, her weight increased to 31 kg and by the fourth week, she was no longer vomiting and her weight stood at 33 kg. She was also able to draw a self-portrait (See figure 1) depicting her progress of experiencing AN and her expected recovery during a projective test implemented as part of her occupational therapy. This indicated that the patient was on the right path to recovery. In the fifth week of hospitalization, she regained her body weight to 34 kg, which was her weight at admission. Her BMI increased to 13.2 kg/m^2, blood potassium, magnesium, and phosphorus levels were normal. Arrangements were made for her discharge and referral to an outpatient psychologist for continuous CBT. Two months after being discharged, the patient's weight increased to 38 kg and her condition was steadily improving (Therapeutic track see table 3).

Present self: Malnutrition, hyposthenia, clear consciousness



Future self in her expectation: Energetic, strong, can work a lot, can fit bridesmaid dress

Figure 1: *Self-portrait about present self and future self.*

Time point	Patients condition	Treatment
Admission	• BW 29 Kgs • Self-induced vomiting • Noticeably swollen cheek • K^+ = 2.6mmol/L • Mental assessment: Low mood, low self-esteem, and negative thinking	• Drug treatment (Spironolactone, Potassium Gluconate, Potassium chloride, Olanzapine) • Nutrition therapy • Formulated an in-hospital behavioral therapy plan with the patient for CBT intervention
Post CBT 1 week	• BW 29.5 Kgs • K^+ = 2.4 mmol/L • Continued to vomit to resist weight gain	• Increase the olanzapine dose • Intensive CBT plan • Individual counseling sessions • Grief counseling • Family therapy
Post CBT 2 weeks	• BW 30 Kgs • Continued to vomit	• Health education on body image awareness • Training sessions on muscle relaxation techniques • Keep CBT plan
Post CBT 4 weeks	• BW 33Kgs • No longer vomiting • Serum K^+ normal.	• Health education on body image awareness • Projective test of occupational therapy • Ready to be discharge and referral to outpatient psychologist for keep CBT plan
Post discharge 2 months	• BW 38 Kgs	• Positive improving under CBT plan

Table 3: *Therapeutic track.*

Discussion

Even though the pathogenesis of AN is still unclear at present, it could be associated with the genetic metabolism and hereditary matching of chromosome 12. Moreover, excessively low serotonin levels in the body may reduce one's appetite and thus inhibit the desire to eat. This suggests that AN is not fully caused by psychological factors [8,9]. There are two types of AN: Patients with restricting type AN go on diets, fast, or exercise excessively to achieve weight loss; those with binge-eating/purging type AN would repeatedly binge eat and engage in improper compensation and purging behaviors such as self-induced vomiting, misuse of laxatives, diuretics, enemas, fasting, or excessive exercise to the point that the body experiences prolonged starvation and malnutrition, which result in diseases of the physiological system and even death [10]. The three diagnostic criteria for AN are based on the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (DSM-5) and are as follows: (1) A patient refuses to maintain the minimum normal body weight expected for their age and height (less than 85% of their expected body weight). (2) Even if the patient is underweight, they still have a heightened fear of gaining weight and would exhibit repetitive behaviors against gaining weight. (3) They display three major core symptoms of having a distorted view of their body and weight, will deny or disregard the severity of being underweight or malnourished and are constantly harming their physical, psychological, and social health by adopting improper diets [11].

The intrinsic and complex psychological issues faced by AN patients will manifest externally as abnormal feeding behaviors. Since AN is largely linked to a patient's family circumstances, experiences while growing up, and cultural background [5], there is a need to inquire about the patient's gender, sexual orientation, education level, occupation, previous weight loss behaviors, modes of exercise, deficits in affective functioning, and other personal history items [12]. A physical assessment should emphasize whether a patient has an overly low BMI, cracked skin, dental caries, vocal cord inflammation, hoarseness, arrhythmia, hypotension, paleness, etc. or is constantly self-inducing or engaging in idiopathic vomiting until the parotid glands are noticeably swollen and there is hyperplasia of the salivary glands. During the process of losing weight, AN patients may develop anemia and dehydration, which stimulates the mass secretion of aldosterone, thus resulting in hypokalemia and pseudo Bartter syndrome. Therefore, serum aldosterone levels can be used to determine whether a patient's hypokalemia is caused by individual or disease-related factors [13].

As an essential tool for diagnosing AN patients, a comprehensive mental status examination should include the following components: the patient's appearance and behavior, emotional and mood changes, level of physical activity, thought content and cognition, thought process, and insight [14]. Before the onset of AN, about 75% of patients may already have developed anxiety or obsessive-compulsive disorder [7]. Therefore, psychological examination instruments that examine personality traits, such as the Millon Clinical Multiaxial Inventory-II (MCMI-II) can be used to assess a patient's personality traits and clinical symptoms and further identify various personality disorders such as obsessive-compulsive personality disorder and dependent personality disorder [15]. The Tennessee Self-Concept Scale (TSCS), on the other hand, can highlight the correlation between the self-concept of adolescent patients and their parent's improper parenting style [16].

An AN treatment plan should factor in a patient's individual condition. The main clinical treatment options include psychological treatment, drug therapy, nutrition therapy and repetitive transcranial magnetic stimulation (rTMS) [12]. CBT is the most common type of psychotherapy applied in clinical practice. It aims to correct a patient's distorted views and behavior with respect to food, dieting, body weight, and physical appearance. A behavioral therapy protocol is constructed according to the severity of the aforementioned components, so as to reduce a patient's purging behavior, limit the amount of exercise and energy consumption, and enforce bedrest when necessary, thus assisting the patient to develop the correct values and insight [12,17]. Psychoeducational programs can be implemented for patients with mild AN, in which emphases are placed on their feeding modes and views toward their body image, as well as strengthening their dignity and self-confidence [16]. Family therapy can be used as an intervention for adolescent and child patients with problems

interacting with their family, such that family members can interact with each other, understand each other's affection, thoughts, behavior, and dysfunctional family ties, encourage expressing oneself and listening to others, reinforce one's emotional autonomy and dietary management [6,18].

Drug treatment for AN mainly involves the use of antidepressants such as serotonin reuptake inhibitors and second generation antipsychotics such as olanzapine. Drug treatments reduce a patient's emotional anxiety and dysphoria as well as their obsessive thoughts and delusions about their weight and body image, and they can also effectively increase a patient's weight by 7% or more [17,19]. Nutritional therapy is directed at patients with moderate-to-severe AN, whereby care plans should be arranged based on the length of their weight loss and malnutrition period, age, complications, and severity of purging behavior. Ideally, the goal should be increasing their weight by 1 to 1.5 kg per week and gradually increasing their daily calorie intake in 30 to 40 kcal/kg increments [12]. Repetitive transcranial magnetic stimulation (rTMS) is a typical approach for adult patients, in which the electric current generated from the magnetic field induced by a probe coil is used to activate brain cells with decreasing function, thus alleviating a patient's distorted and obsessive thoughts [20].

Since AN is a chronic disease, aftercare should focus on relapse prevention following a successful treatment. Berends., *et al*. (2018) proposed that self-management strategies can be used as an effective means for relapse prevention. These strategies include identifying the risk factors for relapse, the potential triggers for relapse, and the signs of relapse; constantly supporting the patient to have positive thoughts and eliminate their negative emotions; increasing social interactions, identifying the motivation factors; and providing incentives [21].

Conclusion

AN is an uncommon disease with a high mortality rate. Therefore, we recommend that when first line clinical health care workers encounter patients with nausea, hypokalemia, low body weight, and other less distinctive symptoms, they should thoroughly examine whether the patient is suffering from psychological problems, utilize conversation techniques to assess the patient's mental state, and subsequently diagnose the patient with AN such that personalized CBT plans can be implemented for them in a timely manner.

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