

BIOELEMENTS AND EATING DISORDERS – ASPECTS OF THE QUALITY OF LIFE

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Abstract

Anorexia nervosa and bulimia are emotional disorders which are a serious hazard to the physical health or life. They most often affect girls and young women and disorganize their mental and social life. In this paper, complications caused by eating disorders as a result of deficiency or excessive loss of bioelements by an organism are reviewed along their influence on the quality of life. The symptoms of anorexia nervosa are the following: weight loss over 15% of the standard body mass for the age and height, severe fear of body weight gain despite clear evidence of weight deficiency. The main symptoms of bulimia involve uncontrolled overeating and counteracting weight gain which could occur after overeating episodes by self-induced vomiting or overuse of laxatives and diuretics.

Medical complications of bulimia are related to the method and frequency of purgation, while in anorexia they are caused by starvation and weight loss. The following deviations are observed in both restrictive and bulimic forms on anorexia: hypokalemia, hypocalcemia, hypophosphatemia and sometimes also hyponatremia, hypomagnesemia and hypochloremic alkalosis. Many electrolytic and acid abnormalities are found in bulimia depending on the method for laxation (self-induced vomiting, misuse of laxatives or diuretics). Most patients adapt well for a relatively long time to low levels of potassium in plasma but sometimes the situation may cause life threatening consequences, like dysrhythmia, paralytic ileus, neuropathy, muscle weakness and paresis. Physicians and patients should understand that anorexia nervosa is a systemic disease and can affect all body organs. Full knowledge about possible complications of anorexia nervosa allows physicians to achieve precise assessment and conduct appropriate treatment of patients when the diagnosis has already been made.

Key words: anorexia nervosa, bulimia, bioelements, somatic complications

BIOPIERWIASKI A ZABURZENIA ODŻYWIANIA – ASPEKTY JAKOŚCI ŻYCIA

Abstrakt

Jadłowstręt psychiczny i bulimia to zaburzenia emocjonalne, które poważnie zagrażają zdrowiu fizycznemu, a nawet życiu. Przeważnie występują u dziewcząt i młodych kobiet, dezorganizując ich funkcjonowanie psychospołeczne. W pracy omówiono powikłania zaburzeń odżywiania wynikające z niedoborów lub nadmiernej utraty biopierwiastków przez organizm oraz wpływ tych powikłań na jakość życia. Do objawów jadłowstrętu psychicznego należą: utrata masy ciała powyżej 15% w stosunku do masy należnej dla wieku i wzrostu, nasilony lęk przed zwiększeniem masy ciała, mimo znacznych rzeczywistych niedoborów wagi. Główne objawy bulimii to niekontrolowane objadanie się i przeciwdziałanie przytyciu, które wynikałoby z napadów objadania, czyli prowokowanie wymiotów, nadużywanie środków przeczyszczających, moczopędnych.

Komplikacje medyczne bulimii wiążą się ze sposobem i częstością przeczyszczania się, podczas gdy w anoreksji powstają na skutek głodzenia się i utraty wagi. Zarówno w postaci restrykcyjnej, jak i bulimicznej jadłowstrętu wykrywa się następujące odchylenia: hipokaliemię, hipokalcemię, hipofosfatemię, rzadziej hiponatremię, hipomagnezemię i zasadowicę hipochloremiczną. Wiele nieprawidłowości elektrolitowych i kwasowych może pojawić się w bulimii w zależności od tego, czy stosowaną metodą przeczyszczającą jest prowokowanie wymiotów, stosowanie środków moczopędnych lub środków przeczyszczających. Większość pacjentów przez stosunkowo długi czas dobrze przystosowuje do niskich stężeń potasu w surowicy krwi, lecz niekiedy mogą one powodować groźne następstwa: zaburzenia rytmu serca, niedrożność porażenną jelit, neuropatię, osłabienie siły mięśni i ich niedowład. Lekarze i pacjenci powinni zrozumieć, że jadłowstręt jest chorobą układową, która może dotknąć właściwie wszystkie narządy ciała. Pełna wiedza na temat potencjalnych komplikacji jadłowstrętu pozwala lekarzom na dokładną ocenę i prowadzenie odpowiedniego leczenia pacjentów, kiedy już postawi się diagnozę.

Słowa kluczowe: jadłowstręt psychiczny, bulimia, biopierwiastki, powikłania somatyczne.

INTRODUCTION

Eating disorders like anorexia nervosa and bulimia are two emotional disorders that seriously threaten physical health or life. They mostly affect girls and young women and disorganize their mental and social life (NAMYSŁOWSKA 2000). In this paper, we discuss complications of eating disorders due to deficiency or excessive loss of bioelements by an organism and the influence of these complications on the quality of life.

ANOREXIA NERVOSA

The term “anorexia” originates from Greek and consists of two words: “an” – lack, “oreksis” – appetite. The oldest reports of girls starving until dangerous weight lost date back to the Middle Ages (RABE-JABŁOŃSKA 2006).

The most characteristic symptom of anorexia nervosa is persistent striving for weight loss. Patients do not stop to slim down even when they are seriously physically cachectic. Most cases of anorexia nervosa occur be-

tween the age of 13-14 and 17-25 years. About 1% of school girls are affected by this disorder. Despite numerous studies, precise causes of anorexia nervosa remain unclear. Most researchers assume a multifactorial model of this disorder, which involves individual, family, social and cultural factors.

Symptoms of anorexia nervosa are the following: weight loss more than 15% of standard body mass for the age and height, severe fear of body weight gain despite clear evidence of severe weight deficiency, an aberrated manner in which patients experience their body weight and dimensions; excessive influence of body weight and dimensions on self-estimate or negation of currently low body weight; lack of at least 3 menstrual cycles in menstruating women (NAMYSŁOWSKA 2000, DUBELT, SZEWCZYK 2007).

In 1993, Garner distinguished two types of anorexia: restrictive and bulimic. Restrictive type is characterised by body weight loss and persistent limiting of calorie supply; bulimic type is characterised by occasional overeating episodes and using of many purgation methods (vomitting, laxatives, diuretics, enemas) and intensive physical exercise (RABE-JABŁOŃSKA 2006).

Anorexia nervosa has the highest mortality among all psychiatric disorders. The index of annual mortality is 5.6%, which is 12-fold higher than the annual mortality index in women aged 15-24 years among the general population (ATHEY 2003). Unfortunately, very much time passes between the first occurrence of the symptoms and the diagnosis followed by a treatment. When anorectic patients finally present at the doctor's, they are usually urged to do so due to medical problems secondary to malnutrition and starving, e.g. lack of menstruation or infertility (BECKER et al. 1999). Physicians should remember the underlying reason for these symptoms (ATHEY 2003).

BULIMIA

Bulimia was first identified as a separate disorder by dr Gerald Russell in the late 1970s (MEHLER et al. 2004). Analogously to anorexia, bulimia is a disorder that affects mainly young women aged 12-34, although there is now more evidence of higher incidence of this disorder among middle-aged women. The morbidity rate is 1-4%, but can reach up to 19% in some groups of patients from secondary schools (KENDLER et al. 1991, GARFINKEL et al. 1995).

The main signs of bulimia are attacks of uncontrolled overeating and using methods of counteracting consequences of these attacks by provoking vomitting, overuse of laxatives, diuretics and starving. Another symptom is the self-assessment dependence of body weight and dimensions (NAMYSŁOWSKA 2000).

Excessive interest in body weight is the prevailing symptom of both anorexia and bulimia and many patients show a mixture of anorectic and bulimic symptoms. Up to 50% patients with initial bulimia develop anorexia symptoms later (MEHLER et al. 2004). Death risk is significantly lower in

bulimia compared to anorexia, although it is still higher than in the general population of women matched by age (KEEL, MITCHELL 1970). Pathogenesis of bulimia can be best understood with a biopsychosocial model.

SOMATIC COMPLICATIONS OF EATING DISORDERS

Although anorexia and bulimia are originally psychological disorders, there are serious nutritional, biochemical and other somatic disturbances here. Medical complications in bulimia are related to the way and frequency of purgation, while in anorexia they are caused by starving and body weight loss (MEHLER et al. 2004). Metabolic disturbances are common, but usually they increase slowly and the patients may not experience any symptoms despite serious abnormalities (HERZOG et al. 1997). These disturbances occur mainly in patients with a great body loss in a few months, especially in the ones who were often vomiting and/or taking laxatives and/or diuretics. They can also occur in patients who have been ill for a long time, become extremely cachectic due to nutritional restrictions and sometimes, albeit much less often, due to restrictions in fluid intake (RABE-JABŁOŃSKA, MELCER 2006). Electrolyte abnormalities often occur in the disorder and are a risk factor leading to ventricular arrhythmia and sudden death (COOKE, CHAMBERS 1995, DUBELT, SZEWCZYK 2007). Other reported biochemical abnormalities involve increase in hepatic enzymes and loss of thiamin and zinc (KOVACS, WINSTON 2003). Hypoalbuminemia was proved to be the most valid biochemical marker of the risk of life loss in anorexia (HERZOG et al. 1997). Endocrinological abnormalities in anorexia involve decreased gonadotrophin secretion, hypocortisolemia and sick euthyroid syndrome (euthyroid is a state of normal thyroid function) (KOVACS, WINSTON 2003). Moreover, hyperthyroidism and Addison disease are important differential diagnosis in this disorder. The patients with serious eating disorders should be fully diagnosed clinically and via laboratory tests as part of the initial assessment (MITCHELL, SPECKER, DE ZWANA 1991, KOVACS, WINSTON 2003). Late complications of the disorder involve decrease of mineral bone density (osteopenia and osteoporosis), tissue composition disturbances and structural (atrophy) and functional changes in the central nervous system (RABE-JABŁOŃSKA, MELCER 2006).

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Pathogenesis of the water-electrolyte and acid-base equilibrium disturbances involve deficiency in nutritional intake, sometimes coupled with impaired nutrient absorption and also a fairly characteristic behaviour of anorectic patients, which provoke vomiting, use laxatives, limit fluid intake and use diuretics, but in some cases act adversely and drink too much fluid. All of these practices significantly influence the quality of life, but interestingly patients feel well for quite a long time. This is due to compensatory abilities of an organism. Both in the restrictive and bulimic type of

anorexia the following disturbances can be present: hypokalemia, hypocalcemia, hypophosphatemia, less often hyponatremia, hypomagnesemia and hypochloremic alkalosis. Most patients adapt to low potassium level in plasma for a long time, but sometimes it can cause dangerous consequences like cardiac arrhythmia, paralytic ileus, muscle weakness and paresis (RABE-JABŁOŃSKA, MELCER 2006).

Hypokalemic nephropathy occurs in patients taking laxatives or diuretics. Symptoms of chronic renal failure appear (decrease of specific weight of urine, poliuria, increase of creatinine level in plasma). These complications have a definitely negative influence on the quality of life.

Hyponatremia occurs in patients with hyponatremic dehydration during chronic purgation and can be manifested by orientation disturbances, muscle weakness and circulatory disturbances (CAREGARO et al. 2005). Hypophosphatemia was observed in extremely cachetic patients due to overuse of diuretics and renal failure, although it can also be caused by excessively rapid re-alimentation, especially with a high glucose supply, because it leads to increased penetration of phosphate ions into cells (HAGLIN 2001, RABE-JABŁOŃSKA, MELCER 2006).

Hypophosphatemia and hypocalcemia can also be caused by too little supply and absorption dysfunction. Hypophosphatemia is said to be a factor worsening prognosis, because it reflects depletion of body energetic resources and may be a predictor of sudden deterioration – due to rhabdomyolysis, congestive heart failure, red blood cells dysfunction secondary to adenosine-5'-triphosphate (ATP) and 2,3-diphosphoglycerate (2,3-DPG) deficits (RABE-JABŁOŃSKA, MELCER 2006). Hypocalcemia in anorexia nervosa can be caused by both alimentary deficits, absorption disturbances in intestines and alkalosis; it can result in heart dysfunction (visible in ECG) or in tetany symptoms. Hypomagnesemia can be increased by hypophosphatemia and alcohol and can result in abnormalities in ECG, muscle weakness and convulsions. It is also related to increased hypocalcemia and hypokalemia, which cannot be compensated until magnesium depletion is supplemented (ATHEY 2003). Electrolytic disturbances are rather seldom when purgation is absent.

Hypomagnesemia is present in L of patients with anorexia nervosa and most often is related to treatment resistant hypocalcemia and hypokalemia. Patients with this kind of electrolytic disturbance have the following symptoms: cramps, crampy abdominal pains and cardiac dysrhythmia. Risk of development of nephrolithiasis is also increased, likewise renal and electrolytic disturbances (RABE-JABŁOŃSKA, MELCER 2006).

BIOELEMENTS AND BULIMIA

Many electrolytic and acid abnormalities can be present in bulimia, depending on the used purgation method (self-induced vomiting, misuse of diuretics or laxatives). Hypokalemia is the most common abnormality and

can result in arrhythmia, rhabdomyolysis, muscle weakness, hypokalemic cardiomyopathy and tetany. Hypokalemia is not often present (in 4.6% of bulimic patients) and it occurs first of all in people with a low body weight who vomit or use laxatives or do both (GREENFELD et al. 1995, MEHLER 1998). Some mechanisms are important for the occurrence of hypokalemia. These involve a direct loss of potassium caused by vomiting. Loss chloride ions and gastric acid accompanies hypokalemia and result in metabolic hypokalemic-hypochloremic alkalosis. Overuse of laxatives cause loss of potassium and bicarbonate with stools, which in turn results in hypokalemia and metabolic acidosis. Some diuretics cause renal loss of potassium. More significant potassium loss occurs when any of the purgation methods leads to a significant loss of volume. Then, renin-angiotensin system is activated, leading to high levels of these hormones. This in turn causes renal sodium retention in place of hydrogen and potassium ions loss, which are secreted to urine. The result is metabolic alkalosis in bulimic patients who excessively purge their gastrointestinal tract by self-induced vomiting or diuretic misuse. The most serious cases of metabolic alkalosis are observed in self-induced vomiting. Normotensive hypokalemic hypochloremic metabolic alkalosis, known as the pseudo-Bartter syndrome, is observed in many patients with bulimia, where it has some significant therapeutic implications. Effectiveness of potassium supplementation is low until normalization of hypovolemia is reached (MEHLER et al. 2004). Sometimes bulimic patients with who seek help in admission rooms are diagnosed with severe hypokalemia. Despite massive supplementation of potassium, these patients remain hypokalemic because the level of fluids is not normalized. Improvement of fluid volume improves metabolic alkalosis and inactivates renin-angiotensin axis, allowing for effective potassium supplementation.

The biochemical disturbances described above have an unquestionably very significant meaning for the patients' life quality, therefore the research conducted by KOVACS and WINSTON (2003) is very interesting. The authors assessed which diagnostic method of for electrolytic disturbances in people with eating disorders is the most suitable. They showed that potassium and calcium phosphate levels are often been measured in patients with anorexia, in some of them, regularly. Electrolyte levels are much less often measured in bulimia, especially as far as magnesium is concerned; levels of calcium and phosphates are also less often measured compared with patients suffering from anorexia. It is an important observation because electrolytic abnormalities (which are often caused by self-induced vomiting and laxative overuse) may be more frequently present in patients with bulimia than anorexia (especially in the restrictive type) (GREENFELD et al. 1995, KOVACS, WINSTON 2003). Physicians should check laboratory investigations every 1-2 days during the first stage of return to food intake (ATHEY 2003).

SUMMARY

When patients with anorexia finally come to the doctor, they are usually urged to do so because of medical problems secondary to malnutrition and starving, e.g. lack of menstruation or infertility (BECKER ET AL. 1999, ATHEY 2003). Physicians should remember about the true reasons for these symptoms. Physicians can more easily diagnose anorexia nervosa by recognizing a full spectrum of medical consequences of eating disorders. Both physicians and patients should understand that anorexia nervosa is a systemic disease and can affect all body organs. Full knowledge about possible complications of anorexia nervosa allows physicians to assess precisely the patient's condition and to conduct an appropriate treatment of patients when the diagnosis has already been made. It also allows doctors to educate patients about possible complications of anorexia. Objective data about medical complications of anorexia can even help patients who deny their disorder to accept it and to adhere to its treatment (APA 2000).

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