Type 1 diabetes mellitus and bulimia nervosa: insulin restriction does not always represent purging of unwanted calories

Heike Zander¹
PsyD
Johannes Beneke¹
MD
Daniel Vagedes²
MD
Astrid Müller¹
MD, PhD
Martina de Zwan¹
MD

¹Department of Psychosomatic Medicine and Psychotherapy, Hannover Medical School, Hannover, Germany
²Department of Clinical Immunology and Rheumatology, Hannover Medical School, Hannover, Germany

Correspondence to: Heike Zander, PsyD, Hannover Medical School, Department of Psychosomatic Medicine and Psychotherapy, Carl-Neuberg-Str 1, 30625 Hannover, Germany; email: zander.heike@mh-hannover.de

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Introduction
Type 1 diabetes mellitus (T1DM) is one of the most common chronic diseases in adolescence with a prevalence of 0.3–0.6%.¹ Data suggest a two- to three-fold increase in bulimia nervosa (BN) in a population of patients with T1DM, a two-fold increase in eating disorders not otherwise specified, and a two-fold increase in subclinical eating disorders.¹⁻³ An eating disorder is characterised by a persistent disturbance of eating or eating-related behaviour that results in the altered consumption of food and that significantly impairs physical health or psychological functioning. BN consists of three essential features: recurrent episodes of binge eating, recurrent inappropriate compensatory behaviours to prevent weight gain, and self-evaluation that is unduly influenced by body weight and shape.¹ T1DM has been shown to be a risk factor for the development of disturbed eating behaviour.¹⁻⁵ Patients with T1DM have to plan their meals, the size of the food portions and the content of carbohydrates related to insulin doses. This can lead to a labelling into ‘good’ or ‘bad’ food and guilt and anxiety around eating can occur.¹⁻³ Thus, the persistent focus on food makes patients more prone to issues around food and might promote the development of an eating disorder.⁵ In many cases, insulin is reduced or omitted, resulting in glucosuria and subsequent weight loss, a behaviour that is called insulin purging. This leads to an increased risk of poor diabetes outcome. This behaviour is fairly common and also occurs in patients who do not meet criteria for an eating disorder. Insulin purging has been reported in 31–37% of women with T1DM.⁶

Another reason for taking less insulin than needed is the fear of hypoglycaemia (FoH). According to the American Diabetes Association working group, hypoglycaemia is defined as a blood glucose level below 70mg/dl (3.9mmol/L).⁷ Hypoglycaemia can lead to various aversive affective, cognitive, physiological and social consequences (‘symptomatic hypoglycaemia’), which in turn can lead to the development of possible phobic avoidance behaviours. There is evidence that patients with FoH intentionally maintain higher blood glucose levels to avoid a recurrence of severe hypoglycaemia. Individuals who have repeatedly experienced significant physical consequences or social embarrassment due to hypoglycaemic episodes are at increased risk for FoH.⁸ To our knowledge, there is no evidence that FoH is
more prevalent in patients with T1DM and eating disorders compared to T1DM patients without eating disorders.

We present a patient with BN and T1DM who reported FoH. However, it turned out that she was not afraid of the typical and potentially life-threatening symptoms of hypoglycaemia as described by other patients with FoH.

Case history
The 31-year-old female patient was first diagnosed with T1DM in 1993 at the age of 12. Therefore, control of food intake has since been an issue for the patient. After the diagnosis she had to follow a strict dietary plan which forced her to eat five meals a day regardless of whether she was hungry or not. Starting at the age of 13, the patient accidentally experienced hypoglycaemic episodes with blood glucose levels ranging from 30–70mg/dl (1.7–3.9mmol/L) at least once a week which was regularly associated with objectively large binge eating episodes until her blood glucose level was back to normal (20–30 minutes).

In 2007, after a break-up, the patient lost 10kg in about two months due to a depressive episode with lack of appetite. To sustain the weight loss, she then consciously tried to influence her weight by restricting her food intake and the amount of calories she would consume during meals. Later, she skipped breakfast and lunch at work. Most likely due to this restrictive eating pattern, she experienced objective binge eating episodes (for example, 500–1000g of muesli) after returning home from work. Binge eating was followed by self-induced compensatory vomiting. The patient denied ever having engaged in insulin purging, excessive exercising, or any other compensatory behaviour.

In addition, she continued to experience a binge eating episode at least once a month during documented and symptomatic hypoglycaemia. In addition to binge eating episodes, the patient described nausea and mood swings as the symptoms from which she suffered most during hypoglycaemia, as this would make her irritable and touchy towards her husband and her son. She started to intentionally restrict her insulin intake, keeping her blood glucose level strictly above 150mg/dl (8.3mmol/L) in order to prevent her blood glucose level from dropping even below 100mg/dl (5.6mmol/L). She denied being afraid of the physical and affective symptoms caused by hypoglycaemia; she was only concerned about binge eating in the hypoglycaemic state. The patient did not report any difficulties in feeling and recognising the warning signs of hypoglycaemia.

In 2010, the patient received an insulin pump. Insulin pumps are a way of providing more flexibility in food intake, but they have also been reported to have a higher potential for misuse. With this device an insulin pump user has the ability to influence the profile of the rapidly acting insulin by shaping the bolus and therefore improving control of the blood glucose. This was neglected by the patient who frequently and intentionally did not adapt the bolus shape to her needs.

Her body weight on admission was 76kg (BMI 25.5kg/m², height 172.5cm). The Eating Disorder Examination Questionnaire6 (EDE-Q) exhibited elevated scores for the subscales Restraint (5.6), Eating Concerns (5.0), Weight Concerns (6.0) and Shape Concerns (6.0), supporting the diagnosis of BN. Her HbA1c value on admission was 9.4% (79mmol/mol; normal 5% [31mmol/mol], good 6–7.5% [42–58mmol/mol]). No long-term, diabetes-related health consequences had been developed so far.

The patient participated in a day clinic eating disorder programme consisting of supervised mealtimes, an educational group for patients with eating disorders, and daily group and individual sessions with psychotherapists and nursing staff.

In a first treatment step, the patient was supported in giving up her restrictive eating pattern. After the necessity of regular breakfast, lunch and dinner intake was established, she ate breakfast and dinner on her own, lunch being the only meal she consumed under supervision. She started to actively involve her family in the meals eaten at home. The support of the patient’s husband was secured in two separate partner sessions which helped the couple to establish rules for common meals and for handling of binge eating episodes. The couple were also able to discuss how to approach the subject of the patient’s disorder and the concerns for her health and the family that go along with it. At the end of this treatment phase, the patient was able to abstain from weighing herself daily at home.

In a second step, the treatment focused on the putative association between low glucose levels and binge eating. The patient did not have severe hypoglycaemic episodes during treatment; however, her blood glucose dropped below 100mg/dl (5.6mmol/L) several times. This is not yet considered hypoglycaemia but – according to the patient – it has also triggered binge eating in the past.

Reframing catastrophic thinking, specifically with respect to binge eating, as well as relaxation techniques were implemented into the treatment. Her catastrophic thoughts focused on the inevitable connection between low glucose level and binge eating (‘Every time my glucose level is low I automatically have the urge to eat’), especially the underlying feeling of loss of control (‘Once I start eating I can’t stop’). These dysfunctional beliefs were critically questioned and tested by analysing relevant situations. In addition, when low blood glucose levels occurred, the patient was supported in using distraction after taking dextrose while waiting for it to take effect. Even though this usually takes only a couple of minutes, the patient described a period of 20–30 minutes, similar to her experiences as a teenager, until all of her symptoms of hypoglycaemia would subside.

Over time, the fear of hypoglycaemic episodes decreased and the patient was able to approach 100mg/dl (5.6mmol/L) on a regular basis. As a result, she was able to change her beliefs (‘I don’t have to binge eat; I can help myself’). She started to check her blood glucose level more frequently and was able
Insulin restriction does not always represent purging of unwanted calories. Therefore, exploring the underlying motivations is important in order to understand the patient’s behaviour and presented symptoms.

The fear of binge eating during hypoglycaemic episodes rather than the typical symptoms of hypoglycaemia is something physicians treating patients with type 1 diabetes (and bulimia nervosa) should be aware of, as it will help in choosing and adjusting treatment accordingly.

It is important to integrate the patient’s fears and motivations correctly, not only to secure the patient’s compliance but also to achieve the best long-term results during treatment while avoiding long-term effects of type 1 diabetes mellitus (and bulimia nervosa).

Discussion

In the aforementioned case study we present a female patient who reported experiencing loss of control over eating during hypoglycaemic episodes since the age of 13. She developed FoH which was, in her case, solely based on the fear of experiencing binge eating episodes leading to subsequent weight gain rather than based on the fear of physical consequences, social embarrassment, or the potentially life-threatening nature of severe hypoglycaemia as usually described by patients with FoH. We could not find any literature describing this special type of FoH. Overeating is usually described in the literature as an ‘over-compensatory behaviour’ to prevent hypoglycaemia before it occurs rather than the main concern underlying the FoH. Since the patient also perceived an urge to binge eat just below a blood glucose level of 100mg/dl (5.6mmol/L) and therefore to reduce the risk of binge eating episodes due to hypoglycaemia. Another goal was to subsequently improve her HbA1c and to reduce the risk of long-term, diabetes-related complications. At the end of the nine-week treatment, her HbA1c was 8.2% (66mmol/mol). Since the ability of the patient to recognise hypoglycaemic episodes was not impaired, blood glucose awareness training was not implemented.

The eating-disorder specific psychopathology was also significantly reduced at the end of treatment as could be confirmed on the four subscales of the EDE-Q 5.0 Restraint (2.8), Eating Concerns (3.0), Weight Concerns (4.4) and Shape Concerns (5.1). At the end of treatment, the patient’s weight was 78.8kg (BMI 26.6kg/m²).

Key points

- Insulin restriction does not always represent purging of unwanted calories. Therefore, exploring the underlying motivations is important in order to understand the patient’s behaviour and presented symptoms.
- The fear of binge eating during hypoglycaemic episodes rather than the typical symptoms of hypoglycaemia is something physicians treating patients with type 1 diabetes (and bulimia nervosa) should be aware of, as it will help in choosing and adjusting treatment accordingly.
- It is important to integrate the patient’s fears and motivations correctly, not only to secure the patient’s compliance but also to achieve the best long-term results during treatment while avoiding long-term effects of type 1 diabetes mellitus (and bulimia nervosa).

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Declaration of interests

There are no conflicts of interest declared.

References

References are available online at www.practicaldiabetes.com.
References