CASE REPORT

Factitious Hypoglycemia Post-bariatric Surgery: Self -harm Behavior Two Case Reports and Literature Review

Raya A Almazrouei, Fatima M Alkaabi, Bachar Afandi

Endocrinology Division. Department of Medicine. Tawam Hospital in affiliation with Johns Hopkins Medicine, Al Ain. United Arab Emirates.

Corresponding author: Dr. Raya A Almazrouei Email: rmazrooei@seha.ae
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Abstract
Hypoglycemia after bariatric surgery is currently recognized as a common post-surgical complication. Here we present two cases of post-surgical factitious hypoglycemia secondary to insulin administration. This report recommends comprehensive evaluation of post-bariatric hypoglycemia and highlights the potential self-harm behavior in patients undergoing bariatric procedures.

Keywords: hypoglycemia, factitious, bariatric surgery, sleeve gastrectomy, gastric bypass, self-harm.

Introduction

The rising prevalence of obesity related comorbidities has led to wide utilization of bariatric surgery as an effective treatment strategy. Although bariatric procedures have favorable outcomes and safety profiles, there is an increasing recognition of related nutritional and metabolic complications. While post-bariatric surgery hypoglycemia is a common metabolic complication, factitious hypoglycemia secondary to insulin administration is rarely reported (1). Self-harm behavior, on the other hand, has been extensively reported in morbidly obese patients before and after bariatric surgery necessitating a thorough mental health evaluation before undergoing surgery in most institutions.

Case presentations

Case 1

Thirty-one year-old Emirati lady was admitted for evaluation of three episodes of loss of consciousness within one month before admission. Episodes were not related to food intake and were preceded by blurred vision, palpitations, dizziness and excessive sweating. Consciousness was fully regained with sugar administration in her mouth by surrounding relatives. Her past medical history revealed hypertension and morbid obesity with baseline body mass index (BMI) of 55.4 kg/m^2 before bariatric procedure. Surgical history

included laparoscopic sleeve gastrectomy four years before presentation. Preoperative psychiatric assessment was not documented in her medical record. Family history was significant for type 2 diabetes in her mother, brother as well as her husband, all were treated with insulin. Her medications consisted of irbesartan/hydrochlorothiazide 150/12.5mg once daily and multivitamins supplements. Within 24 hours of admission, patient developed recurrent symptomatic hypoglycemia in the fasting and postprandial states. Labs during one episode revealed glucose of 2.1 mmol/L, insulin level (UniCel DXI 800, Beckman Coulter) of 51.06 milli IU/L (1.9-16.1) and C-peptide level of 0.16 nmol/L (0.37-1.47) (Table 1). When trying to discuss findings, she denied taking insulin. She refused psychiatric evaluation and demanded to be discharged.

Table 1. Investigation results during hypoglycemia

	Case 1	Case 2	Reference Values
Plasma glucose (mmol/L)	2.1	1.9	
Plasma insulin concentration (milli IU/L)	51.06	244.3	(1.9-16.1)
Serum C-peptide level (nmol/L)	0.16	0.33	(0.37-1.47)

Case 2

Twenty-six year old Emirati lady with two years history of type 2 diabetes and morbid obesity was admitted for evaluation of recurrent symptomatic hypoglycemia. Surgical history revealed laparoscopic gastric bypass three months prior to presentation. Preoperative BMI was 40 kg/m^2 and diabetes medications included metformin and premixed insulin. Pre-surgical psychiatric assessment cleared the patient for the procedure. She reported stopping all medications and losing 11 kilograms of her weight since operation. The hypoglycemia episodes started three weeks before admission and were in the fasting as well as the postprandial states. She had visited the emergency room twice before and was also evaluated by a primary care physician who advised diet modification. Physical examination was unrevealing.

Investigations during symptomatic hypoglycemia revealed blood glucose of 1.9 mmol/L, insulin level (UniCel DXI 800, Beckman Coulter) of 244.3 (1.9-16.1) milli IU/L and C-peptide level of 0.33 (0.37-1.47) nmol/L. Her HbA1c was 5.5% (Table 1). When confronted, she admitted injecting herself with both long acting (glargine) and short acting (aspart) insulin.

Discussion

Laparoscopic sleeve gastrectomy (SG) and laparoscopic Roux-en-Y gastric bypass (RYGB) are the most common bariatric surgical procedures performed worldwide. RYGB is the procedure most commonly associated with the development of post-bariatric surgery hypoglycemia. Usually, the hypoglycemia develops 1-3 years postoperatively and is typically observed 1-3 hours postprandial (2). The reported prevalence of post-bariatric surgery hypoglycemia of < 1% (3,4), might be underestimated. Although SG is not usually associated with postsurgical hypoglycemia, recent studies using the 75-g OGTT reported symptomatic hypoglycemia in 33–37.5% of patients one year after SG surgery (5, 6). In a questionnaire-based survey of 1174 patients who had undergone either RYGB or SG at the Johns Hopkins center for bariatric surgery, 34.2% had a high suspicion for symptoms of post-bariatric surgery hypoglycemia. Predictors included RYGB procedure, female gender, lack of diabetes, longer time since surgery and preoperative symptoms of hypoglycemia (7).

Atypical presentations of post bariatric surgery hypoglycemia might include night symptoms, lethargy, agitation, aggression and persistent fasting hypoglycemia. The evaluation of hypoglycemia in these patients should be systematic including careful detailed clinical history and full investigations. Physicians should consider the wide range of disorders that might result in hypoglycemia (Table 2).

In this report, we presented two cases of factitious hypoglycemia in patients with previous history of bariatric surgery. Lab evaluation in both patients confirmed exogenous insulin use. Hyperinsulinemia during hypoglycemia was confirmed using the UniCel DXI 800 (Beckman Coulter,

Table 2. Differentials of atypical presentations of hypoglycemia in post-bariatric state (2)

- Drug-induced hypoglycemia (insulin or insulin secretagogues)
- Alcohol intake
- Renal disease
- Liver disease
- Adrenal insufficiency
- Insulinoma
- Factitious hypoglycemia due to insulin injection

Fullerton, California) assay which cross reacts with human insulin, insulin lispro, aspart and glargine. This assay has a lower cross reactivity with insulin glulisine and detemir.

Mental health problems like substance misuse, depression and eating disorders are common in obese patients and those undergoing bariatric surgery. These problems can compromise surgical outcomes. Despite the fact that weight loss has positive influence on mental health parameters, these findings are mixed in patients undergoing bariatric surgery (8). A systematic review of 30 studies suggested that suicide risk for patients undergoing bariatric surgery was four times higher than the general population (9). In a group of more than 8000 patients who had undergone gastric bypass, accidental deaths and suicides were higher compared to non-operated controls (10).

A recent Canadian cohort studied 8815 adults who underwent bariatric surgery with a follow up of 3 years prior to surgery and 3 years after surgery. A total of 111 patients had 158 self-harm emergencies during follow-up. Overall, self-harm emergencies significantly increased after surgery (3.63 per 1000 patient-years) compared with before surgery (2.33 per 1000 patient-years). 72.8% (115/158) of the emergencies were attributed to intentional overdose, which was the most common self-harm mechanism (8).

A Swedish nationwide cohort study of 22,539 patients reported that the diagnosis of self-harm in the two years preceding RYGB surgery was associated with a hazard ratio of 36.6 for self-harm during the two years succeeding surgery, compared to RYGB patients who had no self-harm diagnosis before surgery. In addition, patients with depression diagnosis prior to surgery were found to have hazard ratio of 52.3 for depression-related hospitalization after RYGB compared to patients with no prior diagnosis of depression. Significant rise in the standardized mortality ratio for suicide in females post RYGB surgery was also reported (11).

Self-harm behaviors including accidental deaths, alcoholism and suicide after gastric surgery were reported in earlier decades after partial gastrectomy for ulcer disease in a cohort of more than 6000 Swedish patients followed up for 25–30 years (12). In another series of 1000 patients from Denmark, high incidence of suicide after Billroth II resection for management of duodenal ulcers was described (13). One hypothesis behind the potential mechanisms of self-harm in patients undergoing bariatric surgery include the changes in alcohol metabolism after surgery that may increase the likelihood of alcohol intoxication leading to self-harm after surgery (8). However, other mechanisms might include the neurohormonal changes provoked by the surgery that might be a possible mediator for generating self-harm and suicidal patterns of behavior (8, 14). Changes in ghrelin signaling pathways may provide one mechanism through which gastrointestinal surgery might have important central effects beyond the hypothalamic effects on energy homoeostasis. In addition to its role in learning, memory, reward and motivation, ghrelin signaling is also important in stress responses, anxiety, and depression (14). Sleeve gastrectomy, which is the most widely used bariatric procedure worldwide, leads to reduction in circulating ghrelin. Though its effects on depression and suicidal ideation or behavior have not been fully examined (14), data from the STAMPEDE study suggested that sleeve gastrectomy does not provide the improved mental components of quality of life seen with gastric bypass (15). Finally, it is worth mention that self-harm behaviors might vary in different cultures due to diverse religious and social beliefs. While we are unaware of any regional study on self-harm behavior changes after bariatric surgery, we postulate that patients in our culture are less likely to abuse alcohol or commit suicide.

In conclusion, self-harm behaviors including factitious

insulin intake should be entertained when evaluating hypoglycemia in patients who have undergone bariatric surgery. Pre-surgical mental assessment and active postoperative psychological support are essential to improve the outcomes of bariatric surgery.

Disclosures

Conflict of Interest: None

Authors' contribution: All authors contributed substantially to the clinical care of the patient and preparation of this report.

Compliance with ethical principles: Both cases are retrospective accounts of patients seen within normal clinical practice. No experimental work was involved. No prior IRB approval is required for such cases reports and no data included could possibly disclose the patients' identities.

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