

Prevalence of vasovagal syncope following bariatric surgery

ABSTRACT

Background: Obesity is a major global public health problem. Observational studies have shown an increasing incidence of syncope and pre-syncope following bariatric surgery in obese patients. However, there is paucity of the true incidence of syncope following bariatrics sugary in the literature.

Methods: We have randomly surveyed 200 patients who underwent bariatric surgery between 2016-2018 using Calgary Syncope Score (CSS).

Results: Of the 200 patients enrolled, 107 (53.5%) were female with 167 patients (83.5%) between 18 and 50 years of age. The most-reported comorbidities were diabetes mellitus 26 (13%) hypertension 25 (12.5%) and pulmonary disease 18 (9%). The majority 98 (49%) of the patients had pre-operative body mass index (BMI) of 40–50 kg/m², and most of them had laparoscopic sleeve gastrectomy (LSG). Sixty-two (31%) patients had vasovagal syncope (VVS), 52 (26%) patients had non-VVS and 86 (43%) had no syncope.

Conclusion: Vasovagal syncope in patients following bariatric sugary is quite common and affects 15% of bariatric patients in our series in the first year postoperatively. Further randomized controlled trials are required to prove our results.

Key words: Autonomic dysfunction, bariatric surgery, vasovagal syncope

Introduction

The prevalence of obesity has increased globally in the last fifty years reaching pandemic levels. Obesity is a major public health challenge. Therefore, nowadays bariatric medicine is very popular.¹⁻³ Bariatric surgery is the most efficient and enduring treatment for obesity, particularly morbid obesity.⁴ Currently, there are three primary weight-loss

surgical procedures being performed, namely laparoscopic Roux-en-Y gastric bypass (RYGBP), LSG, and adjustable gastric banding. However, LSG which is considered as a restrictive type of surgery is the most popular performed procedure nowadays. On the other hand, RYGBP gastric bypass is considered the gold standard procedure (mal-absorptive type) but the number of cases declined and dominated by

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LSG procedure. The same applied to the decline of adjustable gastric band procedure.

Syncope is a transient brief loss of consciousness accompanied by loss of postural tone. It is a common problem following bariatric surgery which needs more attention by a physician. There are multiple procedures that can adapt the gastrointestinal tract in reducing its absorbing capacity as well as volume. Commonly performed procedures include RYGBP and sleeve gastrectomy.^[5] The benefits of such interventions have been well-documented in the literature as well as the reduction in its related co-morbidities.^[6] Furthermore, several reports showed changes in the autonomic nervous system function following weight loss surgery.^[7] However, as surgical intervention grows in popularity subsequently the incidence of complications increased.

Several studies reported side effects in the form of VVS and pre-syncope attacks.^[1,8] VVS reflects the failure of the autonomic nervous system to react to the orthostatic stress of gravity resulting in inadequate cerebral perfusion with subsequent syncopal attack.

The symptoms of VVS usually manifested upon standing upright and may include syncope, near syncope, and lightheadedness.^[9] Several case studies reported incidences of VVS and near syncopal events.^[10] Nonetheless, the true and exact incidence and prevalence remain to be undetermined. That warrants an urge to further investigate the pathophysiology behind the development of VVS following bariatric surgery. Due to limited studies on the prevalence of syncope following bariatric surgery the aim of the current study is to assess the incidence of syncope following weight loss surgery in morbid obese patients.

Patients and Methods

We have evaluated the records of 200 patients who underwent bariatric surgery in King Khalid University Hospital between the years 2016 and 2018 from an existing surgical database. Subjects were randomly selected using the random number generator. Institutional review board approval was obtained, date 20.11.2018, no 18/0726/IRB.

The study subjects were divided into two major arms based on the type of surgery they underwent either laparoscopic RYGBP or LSG. Each arm was further subdivided into 2 subcategories; subjects who are medically free versus subjects with comorbidities such as diabetes mellitus (DM), hypertension (HTN), and or pulmonary diseases diagnosed by pulmonologist with low risk for surgery.

Subjects' hospital records were reviewed in addition to telephone-based interviews. The interviewers used a questionnaire that included demographic data, BMI prior to the surgery, time of surgery, amount of weight loss since the operation, the onset of symptoms, and CSS. The CSS consists of seven diagnostic questions depending on the answer points are added or subtracted. The points for individual questions are then summed yield a total score ranging from - 14 to + 6, a total score of + 2 or above is considered diagnostic for VVS.^[11]

Results

There were 107 females (93 males), majority aged between 18 and 50, 28 subjects were between ages 50–60, with 5 subjects only being above 60 years old. Majority of subjects were medically free 147, 13 subjects had DM, 9 had HTN, 15 had pulmonary diseases and 13 subjects had a combination of both HTN and DM. Furthermore, BMI ranged between 40 and 50 kg/m², 98 subjects. Forty-one subjects had a BMI above 50 kg/m² and 14 subjects had BMI of less than 35 kg/m². Bulk of the study subjects had their surgery preformed more than 12 months ago with 142 subjects in this category. The average weight loss was between 40 and 60 kgs, 46 subjects had weight loss of more than 60 kgs and only 10 had less than 20 kgs.

Upon interviewing the patients 114 responded with positive postoperative syncope, 11 subjects out of the 114 had the symptoms before surgery. Most of those who developed symptoms after surgery reported it occurred either less than 1-month postoperatively with 32 subjects or between 1 and 3 months' postoperatively with again 32 subjects. Only 7 subjects had syncope one year after surgery.

Subjects were further stratified into those who underwent RYGBP and sleeve gastrectomy, 36 subjects vs. 164 respectively. In the RYGBP group, 72.2% developed VVS while 49% in the sleeve group had VVS based on the CSS. However, when stratifying subjects based on gender it has been noted the more females underwent RYGBP 20 subjects compared to 16 in the male arm. Thirty-nine subjects in the male group had a weight loss of more than 60 kgs in comparison 7 in the female arm. But when looking into average weight loss between 31–40 kgs and 40–60 kgs, females were more with 31 females/13 males and 33 females/29 males, respectively.

Discussion

In the current study, 31% of the patients had VVS following bariatric surgery and 26% of patients had non-VVS rendered

an incidence of 57% of syncope following bariatric surgery. Vasovagal syncope occurs when the autonomic nervous system regulating the cardiovascular system is dysfunctional leading to subsequent bradycardia and hypotension. It has been a subject of interest with conflicting results. Few proposed mechanisms are thought to play a major role in its development. Autonomic insufficiency in combination with a reverse course of obesity-related hypertension is a proposed mechanism of postoperative VVS. It is not surprising that a massive increase in the popularity of bariatric surgery as a treatment for obesity has been observed in recent years. There are only a few studies available that have explored the long-term postoperative consequences of bariatric surgery other than weight loss. Most studies primarily focused on postoperative hypoglycemia.^[12,13] In recent years, multiple reports have documented the occurrence of orthostatic intolerance (OI) in patients after bariatric surgery.^[2,14] However, the prevalence and incidence of VVS has not been explored.

A recent longitudinal study by Jakobsen *et al.*,^[15] which followed a bariatric surgery patient cohort (n = 1888) for six years post-operation focused mainly on medications prescribed and procedures done to examine adverse events related to surgical complications and did not report vasovagal syncope as a significant adverse event. Another study was done in 2019, which evaluated the data from 4547 patients who underwent bariatric surgery estimated that 4.2% of patients developed OI within five years of their operation. In addition to this, 16.5% of those OI cases had severe symptoms and required treatment with vasopressor agents.^[16]

Researches have shown that obesity results in an increased sympathetic nervous system (SNS) activity, decreased parasympathetic nervous system (PNS) activity, and altered baroreflex sensitivity. Previous studies^[17] have shown that bariatric surgery notably reduces sympathetic activity, with vertical sleeve gastrectomy (VSG) decreasing SNS as measured by direct sympathetic nerve recording at 6 and 12 months postoperatively. Similarly, RYGB reduces SNS at 3 and 6 months postoperatively. Comparable observations were made in our research, patients who underwent LSG and RYGB confirmed OI. Although the mechanisms underlying these changes were not completely understood, these might be attributed to a decrease in visceral fat^[18] and leptin levels.^[19]

Regardless of the mechanisms involved, the reduction in SNS activity induces a decrease in blood pressure in postsurgical patients, which can have deleterious effects.^[20] The decrease in SNS could also result from the significant weight loss that occurred after the operation. Previous studies have shown

that weight loss from hypocaloric diet results in decreased sympathetic activity as measured by muscle sympathetic nerve activity, which contributes to decreased orthostatic tolerance.^[21]

Comparable results were seen in an observational retrospective study that reviewed fifteen patients who had bariatric surgery for evaluation of OI. It was concluded that approximately all patients 100% of them presented with lightheadedness, 11 (73%) near-syncope, and 9 (60%) presented with syncope.^[1]

There are several limitations of the current study include: 1. Lack of control group of patients, 2. Lack of sample size calculation. We believe with the increasing use and success of bariatric surgery for obesity there is a need to investigate and elicit the mechanism of OI so it can be remedied in the future to provide maximum benefit to the patients undergoing this surgery.

In conclusion, VVS could be a disabling complication that affects quite high percentage of patients following bariatric surgery. We believe that further randomized controlled studies are required to emphasize on the true incidence of VVS, its mechanism, and treatment following bariatric surgery.

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Conflicts of interest

There are no conflicts of interest.

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