

Change in form of compulsive behavior after bariatric surgery is a phenomena best describe by deficiency of reward cycle in the brain

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Abstract

The prevalence of obesity related comorbidities has reached epidemic levels in the USA, 34.9% of people are obese. Surgical intervention is the most efficient management of morbid obesity. Between 2003 and 2010, 113,000 cases per year underwent bariatric surgery. Some studies suggest long-term total mortality rate is reduced after surgery, particularly deaths from heart disease, diabetes, and neoplasms. However, the rate of death from other causes was higher; suicide is the main contributing factor. Here we present a case of 41-year-old female with recurrent psychiatric hospitalizations due to Alcohol abuse and suicidal attempts after bariatric surgery. She was admitted to our service after she attempted to jump from the roof of her building while intoxicated with Alcohol. A month prior, she was hospitalized in another hospital for the same reason. She responded well to psychosocial support, psychoeducation, learning coping skills, and group supportive therapy. Her treatment regimen included the use of acamprosate, lithium, and risperidon. She reported a decrease in anxiety and anger, an improved sleep cycle, and improved judgment and impulse control. We use this case to illustrate the great need to identify the risk factors for psychiatric morbidity after bariatric surgery and encourage clinicians to be mindful of this potential development after bariatric surgery and ensure psychiatric follow up for these at risk patients.

Introduction

Obesity and related medical comorbidities are the most common problems seen in health care in the Western hemisphere. More than 68% of adults and 33% of children and adolescents in the United States suffer from obesity [1]. The concern about the impact of obesity in the United States has resulted in a national health initiative by the White House to encourage healthy eating and promotion of exercise in schools across America. While prevalent and on the rise, obesity has been documented in the medical literature for centuries. The first described attempts at treating obesity were documented in the 2nd century AD. Soranus of Ephesus, a Greek physician, prescribed laxatives and purgatives, as well as heat, massage, and exercise to those patients who were noted to be overweight [2]. In the last century thyroid hormone [2,4] Dinitrophenol (DNP), and stimulants have been studied to treat obesity and while promising for their effects on weight, the side effects of these agents presented with the biggest challenge [3].

Currently, bariatric surgery is the most efficient management of morbid obesity. Eligibility for bariatric surgery is based on having a body mass index (BMI) of 40 kg/m² or BMI of 35 kg/m² with significant obesity related health problems [4]. The jejunoileal bypass is considered the first surgery designed solely for the purpose of weight loss. It was initially performed in the 1950s. Since then, numerous techniques and procedures have been developed

including the gastric bypass (1960s), the gastroplasty (1970s) and the biliopancreatic diversion and duodenal switch (1980) [5].

Several studies have suggested a decrease in mortality and improvement of medical conditions after bariatric surgery [6]. However in those that have had a surgical procedure for obesity studies have noted an increase in deaths from accidents and suicide [7]. While the long-term psychiatric sequel after bariatric surgery is currently understudied, the rising literature suggests that some patients stop overeating and instead acquire a new compulsive disorder such as alcoholism, gambling or other addiction like compulsive shopping. This concept of adopting a new addictive habit in exchange for compulsive eating is referred to as addiction transfer [8-10]. Here we present the case of Ms. A. a woman who presented to our hospital in the context of an aborted suicide attempt. Upon further examination, she was noted to have no prior psychiatric history before her bariatric surgery. Post-surgery, she developed chronic suicidality and an alcohol addiction. We explore the evidence for psychopharmacological management of such a complicated case and further discuss the concept of addiction transfer.

Case presentation

Ms. A is a 41-year-old single woman who lives with her parents, brother, and two daughters who are minors. She is unemployed and currently supported by her family. She has a psychiatric

history significant for seven past admissions which all began in her 30s after having bariatric surgery for morbid obesity. During this admission, she presented to the emergency room by emergency medical services, which were activated by her father who stopped her from trying to jump off the roof of their apartment building. While in the emergency room, she was noted to have an alcohol level of 236 mg/dL and reported feeling hopeless, helpless with difficulty sleeping, anhedonia, shame and guilt. She was also noted to be anxious, hyper vigilant and have flashbacks of past trauma related to molestation as a child and domestic violence by the father of her two children. Since her surgery she reported chronic suicidal ideation and fantasies of jumping off her building and overdosing on pills. She also began to drink alcohol heavily and reported drinking ½ liter of liquor daily (or until she passed out). In addition, she engaged in self-injurious behavior like cutting. Patient described these behaviors as being out of her control and resulted in her feeling hopeless and helpless about her future.

During the course of hospitalization, Ms. A. was initially disconnected from affect when she would speak about her extensive trauma and chronic suicidality. In addition, despite seeing her alcoholism as a concern, she was ambivalent about taking steps to stop drinking. Patient was started on lithium, risperidone, buspirone and naltrexone, which were titrated, and patient became more open and emotionally expressive with a brighter affect and decreased anxiety. She was subsequently discharged to the community with outpatient follow up and group therapy for use.

Discussion

While obesity is one of the most easily to recognize diseases it remains one of the most difficult to treat of all medical conditions. Currently, bariatric surgery is the most effective treatment for morbid obesity. Scientific literature demonstrates that weight loss following bariatric surgery is accompanied by numerous positive outcomes including: (1) an improvement in quality of life, (2) reduction or even reversal of chronic medical conditions such as hypertension, sleep apnea and diabetes and (3) lengthening of life span [11]. After years of successful weight-loss surgeries, clinicians and researchers have begun to observe that some patients stop overeating and instead acquire new compulsive disorders such as alcoholism, gambling or other addictions like compulsive shopping. This phenomenon is referred to as addiction transfer [12].

While not all patients who have bariatric surgery develop addiction transfer, increasing literature is bringing this concern to light as it poses significant and sometimes lethal consequences for a subset of the population that choose this method as a form of weight reduction. Unfortunately, at this time there is no clear evidence for who may be at risk of developing addiction transfer post bariatric surgery.

Carbohydrate bingeing stimulates the brain's production of and utilization of dopamine. Dopamine, known to be involved in many neural pathways plays a direct role in mediating pleasure and controls feelings of well-being. The Reward Center in the brain depends on the complex interactions of many neurotransmitters including serotonin, enkephalins, and *gamma*-Aminobutyric acid (GABA) [13].

Reward Deficiency Syndrome is a previous term used to describe a genetic malfunction of D2 dopamine receptors which leads to a low pleasure state and compensatory substance (alcohol, drug, tobacco and food) seeking behavior [14]. It is becoming increasingly

more evident that people with Reward Deficiency Syndrome who undergo bariatric surgery experience the inability to maintain stable mental health due to the proposed hypo-dopaminergic state. This results in a decreased pleasure experience and may lead to abnormal craving behavior and patients are at risk of treating these symptoms with another form of addiction [15].

Numerous parallels exist between obesity and addictive behaviors, including genetic predisposition, personality, environmental risk factors, and common neurobiological pathways involving the reward center. Studies in this area have included narcotic withdrawal, alcohol abuse and other addictions but more empirical research is certainly needed. Most importantly, the relationship between overeating, and addiction have been discussed, debated and more recently investigated. Gold's group and others have hypothesized that drugs of abuse compete with food for brain reward sites.

Bariatric surgery reduces pleasure from eating and causes transfer of addiction with (impulsive-compulsive nature) substance abuse especially alcohol, gambling, excessive shopping, hypersexual behavior, impulsivity and increased risk of suicide.

Current literature is encouraging practitioners to target the pharmacological intervention for such patients who have all or a combination of: addiction, chronic suicidality and impulse control disorders with: acromprosate, serotonin norepinephrine reuptake inhibitors (SNRI), lithium, naloxone, and risperidone. These medications are hypothesized to act to decrease suicidality, improve impulse control and decrease the level of cravings [16, 17].

Prior to being able to have bariatric surgery, a psychiatrist or psychologist must conduct an assessment to ensure that the patient has the capacity and emotional stability to deal with the surgery and its consequences. Alcohol or drug addictions along with serious medical diseases that do not qualify for anesthesia are contraindications for bariatric surgery [18]. Currently there are no recommendations for who may require psychiatric assessment during bariatric surgery or following bariatric surgery. Given the growing body of literature suggesting that patients are at risk for developing psychiatric consequences following bariatric surgery, we strongly encourage surgeons who perform these surgeries and clinicians who screen such patients to be vigilant about referring patients for continued psychiatric follow up.

Conclusions

Obesity and its related health comorbidities are endemic. Currently morbid obesity is effectively managed with bariatric surgery. Eating is a pleasurable activity and may act as a protective agent against addiction with substances or alcohol in people with a defective reward system. Bariatric surgery diminishes pleasure from eating and transfers addiction from food to other impulsive-compulsive behaviors such as: suicide, substance use and gambling. There is evidence for the use of a combination of lithium and naltrexone as effective in the management of such patients. More studies and further research in this field would add to the literature and ensure enhanced treatment of this unique patient population. In addition, future studies identifying what patients may be at risk for developing addiction transfer are necessary as this may ensure mental health practitioners screening patients for bariatric surgery could then follow these patients post-surgery.

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