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Case Report

Obesity in Autism: 2 Case Reports and Review of the Literature

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Introduction

Obesity in childhood has been linked to increased risk for various metabolic disorders and diseases [1,2]. Unhealthy weight is reportedly more prevalent in children with Autism Spectrum Disorder (ASD) than in typically developing children [3]. Individuals with ASD often have persistent deficits in social communication and social interaction across multiple contexts [4]. Contending with obesity in autism is a considerable challenge due to the unique causes of obesity, specific food preferences, and communication difficulties of these patients, which may make them more vulnerable to risk factors and more complicated to treat. We describe 2 cases of patients with ASD who were treated for obesity in our outpatient clinic and who experienced marked weight and Body Mass Index (BMI) reduction and maintenance. The model for weight reduction that we crafted for them emphasizes the need for patience in carrying out gradual, multidisciplinary (physician, dietician, psychologist, and caretaker), and individually tailored dietary interventions according to the concept of a low carbohydrate model. We also conducted an updated literature review on the causes of obesity in this unique population.

Abbreviations: ASD: Autism Spectrum Disorder; BMI: Body Mass Index; LDL: Low-Density Lipoprotein

Case Presentation 1

This 22-year-old man had first presented to our nutrition clinic in June 2007 at age 9 years due to obesity (BMI 27.7, >99% percentile), hypercholesterolemia, and non-alcoholic fatty liver disease. Upon admission to our clinic his total cholesterol level was 199 mg/dL, and his Low-Density Lipoprotein (LDL) level was 135 mg/dl. Until the age of 6 years, he had consumed only puréed foods and had a very limited carbohydrate-heavy diet that was difficult to change. Overall, he functions at a low- moderate level, and the clinic has followed his development closely through adolescence into adulthood. His mother has been an important factor in his development and progress. One of the clinic's psychologist's goals was to empower his mother to initiate and implement the proposed modifications to her son's dietary habits. Our suggestion to the mother on the patient's initial presentation to our services was to make small-to-moderate changes in his diet, while staying as much as possible within the range of foods he found acceptable.

We focused upon decreasing carbohydrate intake and allowing free access to proteins and fats while changing the fat quality. We suggested less bread intake and the substitution of regular bread with low calorie varieties, serving more cheese and hummus, adding pastrami, and exchanging canola or olive oil for margarine. Bourekas (potato- or cheese-stuffed fila dough) and pastries were eventually to be excluded altogether. The patient's BMI increased steadily from December 2008 to December 2011, giving us the impression that that accepting and incorporating our suggestions would take a substantial amount of time (Figure 1). We introduced our recommendations gradually and with patience. Finally, by December 2011, his diet had improved significantly and his BMI stabilized at 29-30 for the ensuing 2 years.

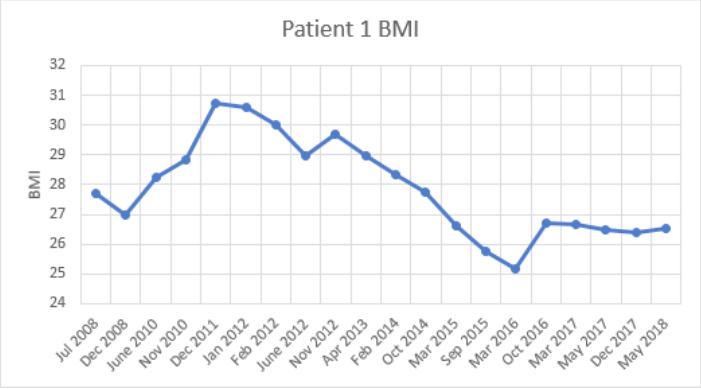

Figure 1: Change in Body Mass Index (BMI) of Case 1 over time.

After dietary modifications and a further decrease in his BMI, his LDL level was normal (110 ng/ml) and his total cholesterol was 173 ng/ml. At this point, however, he was not very physically active in spite of our reminders of the importance of physical activity. In addition to keeping with our dietary suggestions, he eventually adopted a routine of cycling on a stationary bike a few times per week. His BMI continually decreased and then stabilized at 26-27 over the next 2 years. Tight clinical follow up while empowering the mother to initiate and implement the proposed modifications allowed the patient to gradually accept dietary changes and even improve even though his autism level did not change.

Case Presentation 2

This 29-year-old man presented to our nutrition clinic due to obesity in 2013 at the age of 22 years. He was diagnosed as high functioning ASD at the age of 5. He finished 12 years of studying at a special school for autistic children. Upon admission to the clinic, his total cholesterol level was 201 mg/dl and his BMI was 29.2. We accepted him to the pediatric facility due to the juvenile level of his behaviour patterns. His ASD manifested in the form of very specific preferences that were expressed by his difficulty with cooperation and change. As in Case 1, the patient's mother played a large role in implementing our suggestions and in providing invaluable assistance in her son's development.

When he first presented in 2013, the patient's diet had consisted of large amounts of carbohydrates and sweets. Our initial goal was to decrease sugar consumption and to increase the variety of sugar-free products in his diet. We again collaborated with a psychologist to combine nutrition and psychology in forming a tailored weight loss plan. Instead of introducing a new menu or making drastic changes, we adjusted his existing preferences by gradually decreasing carbohydrates and increasing proteins. For example, he liked pasta with no sauce, but eventually agreed to adding 2 spoons of olive oil to each serving for added nutrients. We used his preference for pizza to introduce him to the idea of tomato sauce, and he agreed to try it on his pasta as well. He liked French toast, and instead of eliminating it, we suggested using 2 eggs instead of one for increased protein.

The patient's BMI fluctuated for the following 2 years, again supporting the impression that changing dietary habits in ASD can be expected to be a long and involved process. As he began to slowly incorporate our suggested dietary changes, we tried to get him involved in food preparation and were able to gradually extend the variety of foods that he consumed. We added physical activity to his schedule, and he was soon swimming or bike riding 2-3 times per week. He also became more independent, and increased his daily physical activity by being employed as a service and errands worker, in addition to working with a personal trainer. Until this point, his BMI had fluctuated, but it started to decrease steadily and then stabilized at 28 once he began regular exercise and continued to cut carbohydrates (Figure 2).

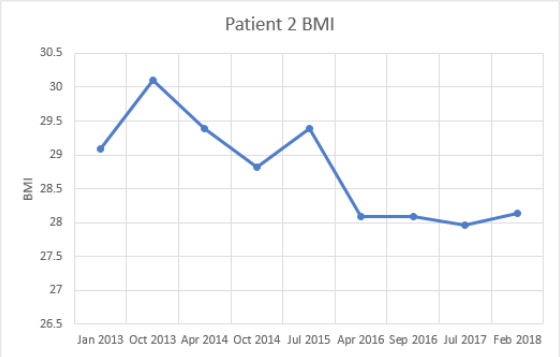

Figure 2: Change in Body Mass Index (BMI) of Case 2 over time.

Discussion

Childhood obesity is associated with an increased risk for several diseases later in life, and is more prevalent in children with ASD due to specific risk factors. These include selective eating behaviours, psychopharmacologic effects of medications, and a tendency toward sedentary behaviour. As such, treating obesity in autism poses a unique challenge. This study describes 2 patients with ASD and obesity who underwent marked improvement in weight and BMI following a multidisciplinary intervention and dietary modifications focused on decreasing carbohydrate intake. Not only did their weights and BMIs decrease, they also stabilized over a long period of follow-up. With gentle encouragement, each embarked upon routine physical exercise as well. Recent estimates suggest that approximately 32% of children and adolescents in the United States are overweight and that 16.3% are obese [5]. It is widely reported that the prevalence of overweight and obesity in children and adolescents with ASD may be at least as high as that in typically developing children [3]. Childhood obesity is likely to continue into adulthood, and its association with short- and long-term sequelae are well known [1].

Obesity poses a unique challenge in non-typically developing individuals because of the additional risk factors for energy imbalances, including selective eating behaviours, psychopharmacologic effects of medications, and a tendency toward sedentary behaviour [6-8]. Selective eating refers to a diet lacking variety, and may be associated with inadequate nutrient intake. In a comparison of food selectivity among 128 children with ASD and that of typically developing controls, Schreck et al. reported that the former group exhibited a significantly higher level of food selectivity [7]. Importantly, selective eaters in a population of autistic individuals preferred a smaller range of low-nutritional and energy-dense foods, which can lead to an increased calorie intake [8]. Evans et al. demonstrated that children with ASD consumed significantly fewer daily servings of fruits and vegetables and more daily servings of snack foods, carbohydrates,

and sweetened beverages compared to typically developing children [8]. This was our experience as well.

We implemented very gradual dietary modifications that were focused on decreasing high glycemic index carbohydrate intake, based on reported demonstrations of the efficacy of low carbohydrate diets [9]. We were deliberately restrained and highly flexible in our approach to dietary modifications, fully aware that strict limitations can have the opposite effects to those desired and influence the subjects to desire restricted foods more strongly, as is seen in typically developing children [10]. It is important to note that the pace of modification of the patient's already existing long-time diet is key: nothing was abruptly removed or suddenly added to our patients' menus, and all changes were meticulously made as alterations to familiar/acceptable products. In addition to selective eating behaviours, sedentary tendencies and a lack of physical activity can contribute to obesity, and those lifestyles are heightened in ASD. Based on parental reports, Must et al. observed that children with autism spent significantly more time in sedentary behaviours compared to typically developing children [6]. Those authors also documented a significant relationship between the BMI z-score and total sedentary behaviour time among autistic children, but not among typically developing children. Notably, although the 2 reported patients are not prescribed psychotropic medications, studies have shown that atypical (second generation) antipsychotics are twice as likely to be prescribed to children with ASDs and that they are significantly more likely to cause weight gain [11]. In a meta-analysis of 16 open-label and 6 placebo-controlled studies of risperidone in children with ASD, the most common adverse effect was rapid weight gain [12]. Weight gain is also a common adverse effect of aripiprazole, clozapine, and haloperidol when used by ASD patients [11].

Conclusion

It is well-accepted that the sequelae associated with obesity can potentially represent a significant threat to living a healthy life. Certain risk factors can be heightened in autism, making the management of obese autistic individuals a unique challenge. We focused on gradually decreasing carbohydrate intake and provided support and guidance, in collaboration with psychologists and caretakers, over an extended period of time. The changes were very slow to come, but each patient's BMI eventually decreased and stabilized after the patient accepted and incorporated small but significant modifications. We propose that an individually tailored, slowly implemented restrictive low-carbohydrate diet, when supported by the caretaker, is an effective and efficacious approach to the management of obesity in pediatric autistic patients.

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