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Commentary

Weight Gain after Tonsillectomy: Myth or Reality? Interpreting Research Responsibly

Julie L. Wei, MD

Abstract

Excessive weight gain after tonsillectomy has been described by a handful of studies since as early as 1988 and, in recent years, mostly with variable study design, methods, and baseline weight of the subjects. Although most otolaryngologists have likely been asked whether tonsillectomy may lead to weight gain by parents and caretakers, there has been very limited research on this issue, and certainly no causal effect has been established by existing research. Awareness and counseling based on what has been described are relevant as a part of preoperative counseling. However, it is critical that our national epidemic of excessive weight gain in children and adolescents not be simply reduced to a matter of tonsillectomy but be understood as a multifactorial and complex issue. To study this topic well requires commitment to well-designed studies assessing caloric intake and expenditure, metabolic changes, and prospective growth measurements. Mechanisms for weight gain, even if excessive during the 12 months after tonsillectomy surgery, are far from being elucidated.

Keywords

tonsillectomy, weight gain, obesity

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In the February 2011 issue of Otolaryngology–Head and Neck Surgery, Dr Jeyakumar and colleagues published their study, “A Systematic Review of Adenotonsillectomy as a Risk Factor for Childhood Obesity.” The authors reviewed 9 articles, published between 1988 and 2009, that assessed weight gain after tonsillectomy. This review separated the 9 articles into 3 groups of 3 studies each: group 1 included 3 studies that measured pre- and postoperative body mass index (BMI), group 2 included 3 studies that measured change in weight pre- and postoperatively, and group 3 included 3 studies that measured percentage of weight gain and compared it with local controls. Group 3 studies were analyzed individually as their control groups varied between each study. In group 3 studies, the majority of patients gained weight, whereas some subjects lost weight and others were weight neutral postoperatively. All 9 articles were given a quality assessment of grade C, as they were all before-and-after observational studies. Jeyakumar et al stated that the goals of their review were (1) to review the evidence for tonsillectomy and adenoidectomy as a risk factor for childhood obesity and (2) to suggest avenues for future research so that the risks of obesity following tonsillectomy and adenoidectomy in children are reduced.

The first goal is ambitious and challenging because the best way to statistically identify whether something is a “risk factor” in a research question requires that all other potential variables be eliminated or controlled such that the “factor” of interest is the only variable in all subjects studied. To state that tonsillectomy is a risk factor for childhood obesity, one should design a prospective trial in which children who are matched by age, gender, medical history, preoperative BMI, eating habits, caloric intake, and other baseline characteristics are divided such that one group undergoes tonsillectomy whereas the other does not. If the group of children who underwent tonsillectomy is found to have statistically significant weight gain for the ensuing months to years after surgery compared with controls, such data may suggest that tonsillectomy may truly be a “risk factor.” As for the second goal, the authors summarized various proposed mechanisms as stated by authors of the studies reviewed, including catabolic vs anabolic metabolism, reduction in hyperactivity leading to reduction in caloric expenditure, and possibility of tonsillectomy surgery leading children to attain “predestined weight” earlier.

As an academic pediatric otolaryngologist, I have encountered the question of whether children will get “fat” after tonsillectomy many times during both fellowship and the years since I have been in practice. Anecdotally, in my experience, I was asked this question most often by parents and families of...
Hispanic descent. I had simply discredited the question until 2009, when I came across several of the studies reviewed by Jeyakumar et al.\(^1\) I reviewed those articles with great interest and concern because, as someone who performed many tonsillectomies, I needed to know if I could possibly be contributing to the obesity epidemic. In April 2010, Dr Stacey Ishman and I co-published an article, “Weight Gain after Adenotonsillectomy Warrants Further Research,” in the AAP News “Focus on Subspecialty” section as the featured otolaryngology article.\(^2\)

Our takeaway points were that (1) growth acceleration has been demonstrated in infants, preschool-aged children, and school-aged children regardless of preoperative weight status; (2) research has showed an increase in insulin-like growth factor 1 (IGF-1) and IGF binding protein 3 (IGFBP-3) in children after tonsillectomy (especially those with growth failure preoperatively), both of which correlate with an increase in growth hormone secretion; and (3) primary care providers and otolaryngologists must be aware of the likelihood of increased growth after adenotonsillectomy (AT). We also recommended pre- and postoperative counseling, surveillance of dietary habits, and weight gain after AT, especially in obese children.

Despite my own awareness of these studies and the possibility that somehow tonsillectomy may influence and accelerate growth, I challenge myself with the following questions:

1. Why is it that the pre–World War I and II generations, of whom a significant number of children underwent tonsillectomy as a routine prophylaxis against complications of rheumatic fever from streptococcal tonsillitis in an era of antibiotic absence, did not become the obese generation that we and our children have become? Did they also face the same changes in growth hormone fluctuations but lacked the means and access to more calories, processed food, and “supersize” options and so were more likely to be spared the fate of obesity?

2. All patients I encounter whose parents I gently coax to confess that their child has gained 20, 30, or 40 pounds in the previous 6, 12, or 18 months are patients who have not yet undergone tonsillectomy. They have surely exceeded their expected weight gain, so post-tonsillectomy, they are at risk for continuing to gain excessive weight, making it extremely difficult to discern weight gain related to tonsillectomy from their already excessive weight gain.

3. Weight is gained by caloric consumption, regardless of the cause of an increase in appetite, type of food eaten, source of calories, and rate and method of subsequent caloric expenditure. Even if one undergoes tonsillectomy, and there are increases in IGF-1 and IGFBP-3, weight gain must occur through ingestion of calories and positive balance between intake and expenditure, not by divine intervention. There must be hope, then, for the prevention of excessive weight gain through controlled dietary intake and habits before “too much” weight has been gained, even after tonsillectomy.

4. Although children with sleep-disordered breathing (SDB) who also exhibit hyperactive behavior may in fact have more restful sleep after alleviation of their SDB by tonsillectomy and become perhaps less “fidgety,” can that alone lead to obesity? How still does a child have to be to become obese without the weight gain occurring as a result of excessive caloric intake? In our Western culture that heavily emphasizes sports, are all the non-“jock” members of our population more likely to be obese?

I am thankful to have the opportunity to express my opinions in this commentary. The last thing we need is for tonsillectomy to become a scapegoat for a culture and society with temptations too great for excessive sugar consumption, minimal physical activity because of addiction to handheld gaming devices for children, socioeconomic disparities such that 1 US dollar can afford to purchase 1000 calories in “Mac ‘n’ Cheese” but only 100 calories in select fresh produce, and emphasis on convenience such that fast foods and processed foods are a necessity. One US dollar can easily purchase at least 500 calories or a quarter of one’s daily caloric allowance, as reported by ABC News in 2009 in a report titled “Top 7 Calorie-Rich Foods for the Dollar.”\(^3\)

The greatest risk for the current generation of children facing the obesity epidemic is not that otolaryngologists are performing more tonsillectomies for SDB but unfortunately the ease with which people can obtain such an unhealthy lifestyle.

The media have embraced headlines such as “Children Seem to Gain Extra Weight after Having Their Tonsils Removed”\(^4\) in the weeks after the publication of the study by Jeyakumar et al.\(^1\) These headlines undoubtedly pique reader interest and have the potential for creating a strong, misguided message to the lay public. Even though the authors state clearly in their manuscript that “[a] causal relationship cannot be established by our study,”\(^5\) the public unfortunately will not likely ever read this sentence or have the opportunity to read the entire article, including its self-declared limitations.

Dr Jeyakumar and colleagues are to be commended for bringing to our attention the need to gain awareness of this possible dilemma. Although I am not sure that our decisions to recommend tonsillectomy should be “tempered with the real possibility that tonsillectomy and adenoidectomy could cause further weight gain and obesity,”\(^6\) I agree wholeheartedly with their concluding statement that “a healthy diet and exercise should be implemented to treat overweight and obese children.”\(^7\)

Often obese children diagnosed with obstructive sleep apnea (OSA) by polysomnography who are referred to otolaryngologists for consideration of tonsillectomy are not good candidates for surgery because they often have extremely small, endophytic, and nonobstructing tonsils. Clearly, weight loss and continuous positive airway pressure (CPAP) use are much more likely to be successful, and surgical risks are not justifiable when OSA is unlikely to be cured in this population.

The relationship between tonsillectomy and weight gain may be controversial and difficult to explain, similar to the relationship between tonsillectomy and poliomyelitis. Barsky and
Lauer published in 1957 an article in which they reviewed all cases of the 1953 outbreak of poliomyelitis in Manitoba and concluded the following: (1) persons with bulbar and bulbo-spinal poliomyelitis are more likely to have had their tonsils removed than those with spinal or nonparalytic forms, and (2) there is a greater incidence of tonsillectomy in all forms of poliomyelitis than in the family controls who do not develop the disease. The authors concluded that there may be some local condition of the pharynx, which is an indication for tonsillectomy but makes a child more liable to bulbar poliomyelitis after the operation. Similarly, perhaps the factors that lead to tonsil hypertrophy also lead to excessive weight gain. Is it possible that poor dietary habits can contribute to excessive weight gain, and also contribute to gastroesophageal/laryngopharyngeal reflux, both of which then somehow may lead to adenotonsillar hypertrophy, such that poor dietary habits may indirectly influence adenotonsillar hypertrophy? Questions such as these are obviously difficult to answer but may deserve our best attempts.

Healthy children may only see their pediatrician once or twice per year, hardly frequent enough for effective counseling on healthy diet and exercise habits. Furthermore, unless questions are asked about what they are consuming, children and families may not be receiving enough guidance for avoiding excessive sugar intake in the form of soda or snacks. As an otolaryngologist who treats children, I may be the only physician the child and family encounter in a 12-month period, and therefore each encounter for me is an opportunity to discuss healthy diet and exercise. Currently, many children are followed by a phone call or clinic visit only if necessary after their tonsillectomy, so to truly accomplish effective counseling and observation on potential excessive weight gain posttonsillectomy would require an acceptance of this issue as well as change in our clinical practice. Most important, further understanding of this “myth” should be achieved by collaborative research among otolaryngologists, endocrinologists, nutritionists, pediatricians, and basic scientists.

Author Contributions
Julie L. Wei, substantial contributions to conception and design, acquisition of data, analysis and interpretation of data, drafting the article or revising it critically for important intellectual content, and final approval of the version to be published.

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