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LETTER TO THE EDITOR

When is the "Right" Timing?

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Patient A is a 17-year-old female on follow-up for obesity complicated by pre-diabetes, non-alcoholic fatty liver disease, polycystic ovarian syndrome, and hyperlipidemia. On initial review, her weight was 98.3 kg and body mass index (BMI) was 37.6 kg/m^2. The various options for weight loss were discussed including bariatric surgery, although she was not keen due to concerns of disrupting her studies. The patient was referred to the dietician and physiotherapist for intensive lifestyle modifications.

Patient B is a 34-year-old female on follow-up for obesity and type 2 diabetes mellitus (DM) of 4 years. She was initially referred by her gynecologist due to difficulty conceiving for 2 years. On initial review, weight was 84.6 kg, BMI was 31.8 kg/m^2, and glycemic control was fair with HbA1c 7.4–7.8%. The various options for weight loss were discussed—bariatric surgery has the benefit of potentially inducing remission of DM, although conception should be temporarily deferred. The patient instead opted for pharmacotherapy with liraglutide and phentermine. She lost up to 11% of weight over the next 2 years but remained unsuccessful in conception. In view of concerns regarding advanced maternal age, she decided to undergo in-vitro fertilization (IVF).

In the course of managing the two aforedescribed patients, I pondered about the important question of the optimal timing for bariatric surgery. Does a "right" timing exist, and if so, what are the relevant factors we should consider?

First and foremost, as illustrated by patient A, the key factor of central importance to consider is age. Childhood obesity, already a major public health crisis, has been worsened by the clash of the dual pandemics—obesity and COVID-19 [1]. There are several advantages of performing bariatric surgery earlier in life. Children who have severe obesity are unlikely to be successful in losing weight through lifestyle modifications or pharmacotherapy—in addition, the latter has a limited role in the pediatric population [2]. Children who are obese are more likely to grow up to be adults with obesity, with this risk increasing with the child's age [3]. Indeed, obesity at 15 to 17 years of age, which is the age at which surgery is increasingly advocated, carries an odds ratio of 17.5 for obesity in adulthood [3]. Thus, it is logical that appropriate intervention strategies are undertaken as early as possible to reduce the time spent at high BMI, so as to ameliorate the additive burden of the multiple systemic complications in adulthood. Roux-en-Y gastric bypass (RYGB) and laparoscopic sleeve gastrectomy (LSG) are both approved for children under 18 years of age. Based on a transition model, for a hypothetical cohort of adolescents with BMI of 45 kg/m^2, gastric bypass at the age of 16 led to improved quality and quantity of life, with the absolute benefit of surgery increasing with greater delay of surgery into adulthood [4]. Several observational cohort studies of adolescents undergoing bariatric surgery have confirmed its efficacy in achieving weight loss and significant improvements in DM, hypertension, and dyslipidemia, as well as its safety with a low rate of major perioperative complications [5]. Although long-term data on cost-effectiveness is limited, studies suggest that surgery may become cost-effective around 5 years following surgery [5]. These factors all point towards the merit of surgery at a young age.

However, it is imperative to consider the other side of the coin. The crucial factor is whether the adolescent is mentally and physically prepared for the significant changes in his/her lifestyle that will occur following surgery. If the adolescent is non-compliant with post-operative recommendations including diet, physical activity, and supplements, the inevitable outcomes are nutritional deficiencies—the most pertinent being folate deficiency in females of the reproductive age group—and weight regain post-surgery. Psychological and social issues may arise—patients may struggle with newfound issues related to their weight including envy and unwanted attention from members of the opposite gender—at a time when they may not have adequate mental maturity to deal optimally with them.

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This inevitably raises ethical and moral concerns. What is the main motivation for the adolescent to undergo surgery? Does the adolescent think that surgery is a "quick fix" for his/her current problems? Here, we should keep in mind that adolescents with obesity are a particularly vulnerable population who are facing psychosocial burden from various angles including pressures from family, peers, and society at large. As physicians, weighing the pros and cons of beneficence and non-maleficence, we may find ourselves treading a tight rope—coming to a decision often requires psychological assessment and repeated engagement with the patient and family members. Indeed, as healthcare providers, we might ourselves unknowingly be the barrier to surgery due to concerns for complications related to surgery or lack of awareness of surgery as an option [5].

A second key factor to take into account are the obesity-related comorbidities—does the timing of surgery matter? The timing of surgery appears to be relevant for DM and hypertension. Consistent with its pathophysiology of progressive beta-cell failure with insulin deficiency, a shorter duration of DM is associated with higher probability of remission post-surgery—the duration of DM has been included in various risk scores including the ABCD score and individualized metabolic surgery score [6]. Earlier surgery is also associated with a lower risk of late relapse of DM following initial remission [7]. In patients with advanced microvascular and macrovascular complications, bariatric surgery has not been demonstrated to lead to benefit and might in fact result in progression of complications including retinopathy [8]. Similarly, increasing duration of pre-existing hypertension was associated with lower rates of remission post-surgery, which may be related to permanent arterial wall remodeling from chronic hypertension [9]. However, to put this into perspective, glycemic and blood pressure control improves in almost all cases following surgery.

A third key factor we should consider for female patients is conception planning. Weight loss not only improves fertility, but also reduces the risk of gestational diabetes and hypertensive disorders in the mother and large-for-gestational-age in the neonate [10]. However, in the initial period following bariatric surgery, due to markedly reduced caloric intake and rapid weight loss, there is a risk of malnutrition to the growing fetus [10]. In a retrospective analysis, Laura et al. demonstrated that pregnancy < 12 months after bariatric surgery was associated with lower gestational age at delivery, lower neonatal birth weight, and lower maternal gestational weight gain [10]. Thus, pregnancy should be deferred for at least 12 months after bariatric surgery [10]. However, as illustrated by patient B, a dilemma is balancing the risks associated with advanced maternal age brought upon by deferring conception post-surgery—compounded by the fact that conception may not be immediately successful—as opposed to adopting artificial reproductive technology such as IVF from the get-go and undergoing surgery only after completion of the family. In patient B, an additional consideration was the possible decrease in probability of successful DM remission with postponement of surgery. Clearly, these are difficult decisions for which there is no clear answer.

In summary, far from being able to propose the "right" timing for surgery as a rule, the optimal timing depends very much on the individual. Although there are many relevant factors to consider, these may be distilled into three key factors: age, duration of DM and hypertension, and for female patients, conception planning.

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