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Endoscopic Sleeve Gastroplasty- Bridging the Scope to Obesity Management

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Description

Since its addition to the International Diseases Classification (ICD) in 1948, obesity has been rightfully acknowledged as a global health concern affecting all ages and genders with severe medical, social, and psychological complications [1]. Almost seven decades since it was first classified, the new ICD-11 categorizes obesity under endocrine, nutritional, or metabolic diseases, citing it as a chronic, relapsing, multifactorial disease [2]. The most common medical complications associated with obesity include; diabetes, hypertension, and musculoskeletal disorders [3]. Being a multifaceted diagnosis, obesity proves increasingly challenging to overcome despite global initiatives from world-renowned healthcare organizations.

The global prevalence of obesity has risen from 1% in 1975 to 8% in 2016 respectively [4]. In 2010, the World Health Organization (WHO) targeted to halt the increasing number of obesities by 2025 through numerous global initiatives. However, with all nations falling behind in their target goals for the WHO initiative; it became clear that the targets would not be met. The World Obesity Federation (WOF) predicts that by 2030, 1 billion people worldwide will be affected by obesity [5], with no downward trend in sight. Amid obesity affecting so many, the healthcare burden is as expected to be outstanding, totaling US$990 billion per year, equating to 13% of global healthcare expenditure [6].

A growing, preventable, complexity is that between obesity and diabetes. It has been well understood that diabetes causes detrimental macrovascular and microvascular complications. In 2019 alone, diabetes was the cause of 1.5 million deaths [7]. The prevalence of type 2 diabetes is three to seven times higher in obese individuals, than in normal weight adults, and is 20 times more likely in those with a body mass index (BMI) greater than 35 kg/m^2 [8]. The intertwining of insulin resistance with increased weight brings forth the notion that in eliminating obesity, we may also eliminate -to an extent- type 2 diabetes. With this significant observation, it is imperative that global initiatives are adhered to, to combat the rise in obesity.

Previous genetic and twin studies have shown that our genes play a significant role in the development of obesity, classifying obesity into monogenic and polygenic forms. Monogenic obesity is quite rare, following a Mendelian pattern of inheritance [9]. Monogenic obesity presents with an early onset, owed to either chromosomal deletions or single gene defects. On the other hand, Polygenic obesity, the most common form, is owed to hundreds of polymorphisms which each have a small effect. Collectively, these polymorphisms make up the majority of what causes obesity today. With genetics playing a role, unfortunately many patients are unable to lose weight with lifestyle measures alone. In those who manage to lose weight, a significant proportion rebound with concomitant reductions in leptin levels being a key factor in weight regain. Obesity should therefore be considered as a chronic disease rather than a patient choice of ''overeating''.

Type 2 diabetes has long been treated with lifestyle modifications and glucose lowering medications. It is well known that weight loss equates to improvement and/or treatment of type 2 diabetes. In those taking glucose lowering medications side effects can lead to non-compliance and daily life disturbances.

Recently, there have been numerous advances in weight loss regimens which also aid in lowering blood glucose levels. Most recently, the FDA approved Lilly's Mounjaro™ (Tirzepatide) injection, the first class of glucose lowering agents approved in the last decade [9]. Tirzepatide is a novel glucose-dependent insulinotropic polypeptide and glucagon-like peptide-1 receptor agonist [10]. While initially made to combat diabetes, Tirzepatide has shown to cause significant weight loss in patients, averaging 12lbs for those on a 5 mg dose regimen and 25lbs for those on a15 mg dose regimen [10].

For those who are unable to lose weight with lifestyle measures or pharmacotherapy, historically bariatric surgery has been the next alternative option. Unfortunately, waiting lists tend to be several months to years in most countries with strict eligibility criteria required to be met. In the United Kingdom for example, eligibility for bariatric surgery requires patient to have a BMI >35kg/m^2 with metabolic related comorbidities (I.E type 2 diabetes, hypertension) or a BMI >40 kg/m^2. It is therefore important to note that those with a BMI >30 kg/m^2 (who are still within the obesity range) are not eligible for bariatric surgery. Furthermore, many patients either refuse surgery or are declined the option of surgery due to significant anesthetic risk. It is in these three groups of patients (BMI >30kg/m^2 but <40kg/m^2 with no metabolic related complications, patient refused surgery, declined surgery due to anesthetic risk) where metabolic endoscopy can potentially play a significant role for the management of obesity [11].

Endoscopy is an ever evolving field which provides minimally invasive diagnostic and therapeutic options for various gastrointestinal and hepatobiliary disease.

In 2013, the overstitch endoscopic suturing system (Overstitch; Apollo Endosurgery, Austin, TX, United States) was reported. Endoscopic sleeve gastroplasty (ESG) allowed full thickness sutures to be placed from the pre-pylorus to the gastroesophageal junction [12]. It has the added advantage of being minimally invasive with no visible scars, fewer complications and the possibility same day discharge. In a study performed by Sharaiha et al, 91 patients all with a BMI >30 kg/m^2 and failed to lose weight with lifestyle measures alone or BMI >40 kg/m^2 and were not considered candidates for surgery underwent ESG

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[13]. Statistically significant reductions were found in HbA1C (p=0.01), waist circumference (p<0.001), serum triglycerides (p=0.02) and systolic blood pressure (p=0.02) [13]. When compared to Laparoscopic sleeve gastrectomy (LSG), Fayad L et al. found patients who underwent ESG had significantly adverse events (5.2% vs 16.9% p<0.05) compared to LSG [14].

More recently, Abu Dayyeh et al published the results of the first multicenter randomized clinical trial comparing the efficacy and safety of ESG with lifestyle modifications compared with lifestyle modifications alone [15]. At 52 weeks, the mean percentage of estimated weight loss (EWL) was 49.2% (SD 32.0) in the ESG group compared to 3.2% (SD 18.6) in the control group (p<0.0001) [15]. Mean percentage of total body weight loss was 13.6% in the ESG group compared with 0.7% in the control group (p<0.0001) [15]. 80% (n=41) from 51 participants in the ESG group had improvement in one or more of the metabolic comorbidities compared to 45% (n=28) of 62 participants having similar improvements in the control group [15].

Serious adverse events only occurred in 2% of participants without mortality or need for emergency surgery or admission to the intensive care [15].

In summary, obesity is a complex chronic disease with strong genetic variability and is associated with significant morbidity and mortality. As rates of obesity continue to rise globally, other metabolic associated diseases such as diabetes and hypertension will also continue to rise in parallel, posing significant strain on global healthcare systems. It is therefore imperative that reducing obesity prevalence is a top priority for all public health services.

For patients who are unable to lose weight with lifestyle modification measures alone, refuse bariatric surgery or are declined bariatric surgery due to anesthetic or surgical risks, other novel treatment options need to be considered. Metabolic endoscopy may potentially bridge the gap in the treatment of obesity and obesity related diseases such as type 2 diabetes for these patients.

Ethical Approval

This article does not contain any studies with human participants or animals performed by any of the authors.

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Conflict of Interest

The authors have no conflict of interest

Informed Consent

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