BOMSS Position Statement on Endoscopic Bariatric Therapies

BOMSS Bariatric Endoscopy Subcommittee

The global prevalence of obesity is increasing, and it is estimated that the number of individuals who are either overweight or obese exceeds 2.1 billion[1]. The metabolic complications of obesity, including type 2 diabetes (T2DM), hyperlipidaemia, and hypertension, are well recognised[2, 3]. Metabolic surgery remains the most efficacious and cost-effective means of treating patients living with obesity by producing profound and sustained weight loss[4, 5], as well as improvements in metabolic health. Despite this, only a small proportion (approximately 0.25%) of eligible patients living with obesity undergo metabolic operations[6]. The reasons for limited access to surgery are numerous and multifactorial but include patient preference and the stigma surrounding using surgery to treat obesity[6, 7]. The search for an intermediate treatment modality between medical intervention and surgical procedures has led to the development of several therapeutic endoscopic bariatric therapies (EBTs) for obesity[8], which principally involve duodenal exclusion, gastric restriction and/or altering the delivery of gastric content to the duodenum.

The purpose of this position statement is to set out the British Obesity and Metabolic Surgery Society position on the use of EBTs in the clinical practice in the United Kingdom to support both patients and clinicians.

Intragastric balloon

Intragastric balloons(IGB) occupy space in the stomach altering gastric motility[9]. They can be used as a primary treatment modality or as a bridge to bariatric surgical intervention in patients who are not immediately suitable for surgery. There currently are 3 IGBs available in the United Kingdom —Orbera (Apollo Endosurgery, Austin, Texas, USA), Obalon (Obalon Therapeutics, Carlsbad, California, USA), Spatz FGIA (Great Neck, New York, USA) and Allurion (formerly known as Elipse) (Allurion Technologies, Wellesley, Massachusetts, USA) [10]. Orbera is a single fluid-filled balloon that is placed and removed endoscopically at 6 or 12 months. Obalon is a 3-balloon system, filled with nitrogen gas, swallowed 4 weeks apart, with positioning confirmed via x-ray or magnetic resonance. The Allurion swallowable balloon is a capsule that is swallowed and inflated via a small catheter within the stomach cavity. The Orbera and Obalon balloons are removed endoscopically but the Allurion

degrades naturally within the stomach at around 4 months and passes spontaneously via the gastrointestinal tract.

An Orbera meta-analysis (17 studies/1,638 patients) demonstrated a 13.2% total body weight loss (TWL) at 6 months and 11.3% TWL at 12 months[11]. The most common adverse events (AEs) were pain and nausea (33.7%). More serious AEs rate were noted in 1.6%, including migration (1.4%), perforation (0.1%), and death (0.08%). For Obalon, a randomized sham-controlled trial revealed a 6.9% TWL at 12 months with a serious adverse event (SAE) rate of 0.4%[12]. However, the real-world experience (1,343 patients) showed a 10% TWL with an SAE rate of 0.15% including severe abdominal pain and gastric perforation[13]. The Spatz3 adjustable balloon (Spatz FGIA, Great Neck, New York, USA) was developed to address issues with balloon intolerance which commonly lead to early removal[14]. A recent randomised trial of 288 patients (187 in the balloon arm versus 101 controls) demonstrated mean TBW of 15.0% at 32 weeks in the balloon population[15]. Weight loss maintenance was defined as 40% of TBW at 6 months after balloon removal and was seen in 101 (74%) patients. Balloon adjustment allowed 75% (21 patients) who had considered balloon removal for intolerance. For Allurion, a systematic review of 2013 patients (6 studies) showed 12.9% TWL at end of treatment (4-6 months) and 10.8% TWL at 12 months[16]. SAEs were noted in only 4 patients (0.2%). A further study from 2020 with 1770 patients demonstrates 14% total body weight loss at 6 months[17]. More recently, Ienca and colleagues report on 226 patients (78 with T2DM and 148 with prediabetes) who enrolled in the Allurion Program and were followed for a period of 4 months[18]. After 4 months, mean glycated haemoglobin A1c (HbA1c) decreased from 7.0% to 5.5% with a mean weight loss of 19.3kg in patients with T2DM. Remission of T2DM is typically defined as lowering HbA1c to below 6.5%, indicating that the average patient in the T2DM group achieved remission after just 4 months. In patients with prediabetes, mean HbA1c decreased from 6.0% to 4.9% with a mean weight loss of 16.9kg. The Allurion balloon has received a positive recommendation from the Interventional Procedure Committee of the National Institute for Health and Care Excellence (NICE) including that all outcomes should be audited or undergo assessment as part of a clinical trial.

Endoscopic sutured plications (ESG/POSE)

Gastric remodelling may be performed via endoscopic suturing or plication. Currently, there are 2 devices that are CE-marked for tissue approximation and are used for this purpose, however, without specific weight loss claims—Overstitch (Apollo Endosurgery) and Incisionless Operating Platform (USGI Medical, San Clemente, CA).

Endoscopic sleeve gastroplasty is the most common gastric remodelling procedure that involves placing sutures to narrow and shorten the stomach but leaving proximal fundus open to create a pouch[19]. The mechanism of action is well demonstrated with the

creation of satiety and delayed gastric emptying[20]. A recent meta-analysis (8 studies/ 1859 patients)[21] reported the pooled mean percent total weight loss at 6, 12, and 24 months a 14.86 (95% confidence interval [CI]: 13.83-15.90), 16.43 (95%CI: 15.23-17.63), and 20.01 (95%CI: 16.92-23.11), respectively. The pooled incidence of serious adverse events was 2.26% (95%CI 1.25-4.03) including pain/nausea, bleeding, perigastric leak, and fluid collection and no mortality was reported.

In comparison, gastric plication, also known as Primary Obesity Surgery Endoluminal (POSE), involves placement of tissue plications in the stomach, predominantly in the fundus. A meta-analysis (7 studies/613 patients) demonstrated that traditional POSE was associated with 13.5% and 12.7% TWL at 6 and 12–15 months, respectively, with an SAE rate of 2.8% including chest pain, low-grade fever, perigastric bleeding, and hepatic abscess[22]. The large sham-controlled ESSENTIAL trial did not demonstrate clear long-term efficacy of the POSE procedure indicating a risk of early weight regain[23]. Consequently, the procedure has been altered and instead of focussing solely on fundal plications, it now incorporates the distal and proximal gastric body to reduce gastric volume and alter gastric motility[24]. Now known as distal POSE or POSE 2.0, a small number of early studies indicate promising 6–12-month follow-up data[25, 26], but these need to be explored in larger clinical trials.

Transoral stomal reduction for gastrojejunostomy

Transoral outlet reduction (TORe) is endoscopic sutured narrowing of the gastrojejunostomy and has been proposed as a method of treating weight regain and type II dumping after RYGB. A recent systematic review of the effect of TORe as a revisional procedure for weight regain (13 studies/850 patients)[27] demonstrated the pooled percent TWL at 3, 6, and 12 months was 6.69, 11.34, and 8.55, respectively. The pooled rate of adverse events was 11.4 % of which abdominal pain was the most common. A recent multcentre study of TORe for type II dumping following RYGB demonstrated in 105 patients that 97% could be successfully treated with significant mean reductions in Sigstad scores[28].

Duodenal-jejunal bypass liner

The EndobarrierTM (GI Dynamics, Boston, Massachusetts, USA) is a 60 cm sleeve duodenual-jejunal bypass liner (DJBL) composed of ultraslim Teflon with proximal anchors designed to be implanted within the muscularis propria of the duodenal bulb. Food passes through the liner avoiding direct contact with the duodenum and biliopancreatic systems simulating the postoperative Roux-en-y anatomy. The device has an intended implantation duration of 12 months. A recent randomised trial has reported that the addition of the DJBL to intensive medical care was associated with superior weight loss, improvements in cardiometabolic risk factors, and fatty liver disease markers, but not glycaemic control. These benefits were lost at 12 months post-explantation of the DJBL[29]. The pivotal US ENDO trial was halted in 2015 due to significant hepatic abscess formation secondary to the

device[30]. As a result, this product is no longer commercially available, but is undergoing further trials in the US.

AspireAssist

Aspiration therapy removes a portion of food from the stomach after ingestion. The system consists of a large fenestrated gastrostomy tube (A-tube), an external port at the skin for aspiration, and a portable device to perform aspiration. The A-tube is placed endoscopically via a standard pull technique, and the port is attached at 1–2 weeks. A meta-analysis (5 studies/590 patients) demonstrated a 17.8% TWL at 1 year with an SAE rate of 4.1% including buried bumper, peritonitis, abdominal pain, and product malfunction[31].

Duodenal mucosal resurfacing

Revita™ duodenal mucosal resurfacing (DMR)TM (Fractyl Laboratories, Inc., Lexington, Massachusetts, USA) is a CE-marked small bowel EBT designed to treat T2DM in addition to promoting weight loss. This technology utilizes heat therapy applied to the duodenal intestinal barrier and results in surface change that is proposed to subsequently impact metabolic pathways to decrease insulin resistance. It is not approved by the Federal Drug Administration and is only undergoing investigational trials in the US. DMR is only available as a commercial procedure through private providers in the UK. A recent sham-controlled multicentre trial conducted in 108 patients with T2DM demonstrated small improvements in HbA1c but no significant impact on weight loss (1kg treatment difference to sham procedure in the European part of the study at 24-week follow-up). Two serious adverse events were reported (1.8%), one jejunal perforation and one gastrointestinal bleed.

Endoscopically deployable magnetic anastomoses

GI Windows™ ((incisionless magnetic anastomosis system [IMAS]; GI Windows, West Bridgewater, Massachusetts, USA) is a magnetic compression anastomosis system that can be deployed endoscopically. Initial first-in man studies have shown technical feasibility in partial jejunal diversion[32] and total jejunal diversion (duodeno-ileal anastomosis)[33]. This technology is currently in the very early phases of assessment and requires further study through larger and comparative trials.

Discussion

Obesity is a chronic disease, and many different interventions may be required over the lifetime of a patient to manage their condition. Whilst bariatric surgery is associated with the greatest health improvements, it does carry risk and some patients may elect to consider less invasive procedures. Bariatric endoscopic procedures may play a role in this paradigm. Currently, only intragastric balloons and endoscopic sleeve gastroplasty appear to have sufficient evidence to support their use outside of clinical trials. While intragastric

balloons are used in NHS bariatric units, NICE approval is being sought for ESG to allow wider NHS adoption. All EBTs should be delivered within the NHSE Tiered system of weight management, and all interventions should be provided after due discussion of alternative interventions within a Tier 4 bariatric MDT. All patients should be treated with appropriate dietetic, ancillary healthcare and psychological support as standard. Currently the quality of evidence supporting many of the EBTs is below the standard of evidence that supports the use of bariatric surgery. There are few gold standard randomised trials evaluating EBTs for instance[34]. BOMSS proposes collaborative working with the British Society of Gastroenterology and other endoscopic, surgical and metabolic medicine societies in the United Kingdom regarding this position statement. BOMSS supports the development of high-quality studies in EBT and recommends the use of the National Bariatric Surgery Registry to report the outcomes of all patients undergoing EBTs in clinical practice in the United Kingdom.

BOMSS Bariatric Endoscopy Committee
Jamie Kelly (Chair)
Devinder Bansi
Andrew Currie
Ahmed Ahmed

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