Obesity Surgery (2025) 35:4889–4916
https://doi.org/10.1007/s11695-025-08206-8

EDITORIAL

International Federation for Surgery for Obesity and Metabolic Disorders Position Statement on the role of Upper Gastrointestinal Endoscopy Before and After Metabolic Bariatric Surgery

Wendy A. Brown[1,2] · Oliver M. Fisher[3,4] · Yazmin Johari[1,2] · Jessica Au[1,2] · Christine Stier[5] · Rachel Moore[6] · Chetan Parmar[7,8] · John B. Dixon[9] · Paulina Salminen[10,11]

Received: 18 August 2025 / Revised: 18 August 2025 / Accepted: 20 August 2025 / Published online: 18 October 2025
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Abstract

Background The International Federation for Surgery for Obesity and Metabolic Diseases (IFSO) provides Position Statements to assist clinical decision making. The use of upper gastrointestinal endoscopy (UGIE) before and after MBS is a topic of debate in clinical practice. This Position Statement updates two previous Position Statements on this issue.

Methods A taskforce undertook a systematic review of available literature according to PRISMA guidelines. Critical appraisal of the methodology of each paper was performed according to the Joanna Briggs Institute. Recommendations based on the derived data were generated and then approved by the Scientific Committee of IFSO.

Results The rate of abnormal findings on pre-MBS UGIE was 61% (95% CI 55%-67%; I^2 98.99%). However, less than 1% (I^2 58.39%) of people undergoing a pre-MBS UGIE were found to have a condition that precluded MBS; although, 35% either needed treatment for their condition and in 23% there was a Change of the planned MBS procedure type. Despite the frequency of abnormal pathology on pre-MBS UGIE, symptoms were a poor predictor of abnormal findings. The post-operative incidence of BE after MBS was estimated at 2.4% (95% CI 1.66–3.45; $I^2 = 92.1\%$). The rates of both regression and progression of known BE present prior to MBS were poorly defined.

Conclusions Noting the heterogenous nature of the data, high likelihood of bias, variability of definitions of UGIE detected pathology and Limited follow-up beyond 2 years, seven recommendations for clinical practice are provided, with a caveat that the data should be re-explored in 3 years.

Preamble

The International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) has played an integral role in educating both metabolic bariatric surgery (MBS) community and the medical community about the best management of patients who have undergone surgery for adiposity-based chronic disease.

The use of endoscopy before and after MBS remains a topic of debate in clinical practice. In response to this, IFSO established task forces to evaluate whether routine endoscopic procedures should be conducted before and after MBS as well as to consider the risk of Barrett's esophagus (BE) considering the literature that was available at that time.

The 2020 IFSO position statement on esophago-gastroduodenoscopy (EGD) 1 recommended:

1. EGD should be considered for all patients with upper GI symptoms planning to undergo MBS due to the frequency of pathology that may alter management.
2. EGD should be considered for patients without upper GI symptoms who are planning to undergo MBS due to the 25.3% chance of an unepected finding that may alter management or contra-indicate surgery.

Oliver M. Fisher and Yazmin Johari are joint second authors as both authors contributed equally.

Previous Communication to Society or Meeting?
Update of two previous position statements from IFSO:.
- Brown WA, Johari Halim Shah Y, Balalis G, et al. IFSO Position Statement on the Role of Esophago-Gastro-Duodenal Endoscopy Prior to and after Bariatric and Metabolic Surgery Procedures. Obes Surg 2020;30(8):3135–3153.
- Fisher OM, Chan DL, Talbot ML, et al. Barrett's Oesophagus and Bariatric/Metabolic Surgery-IFSO 2020 Position Statement. Obes Surg 2021;31(3):915–934.

Extended author information available on the last page of the article

3. EGD should be routinely considered in populations where the community incidence of significant gastric and esophageal pathology is high, particularly when the procedure will lead to part of the stomach being inaccessible, for example Roux-en-Y gastric bypass (RYGB) and one anastomosis gastric bypass (OAGB).
4. EGD should be undertaken routinely for all patients after MBS at one year and then every 2–3 years for patients who have undergone sleeve gastrectomy (SG) or OAGB to enable early detection of BE or upper GI malignancy until more data is available to confirm the incidence of these cancers in practice.
5. EGD should be performed following adjustable gastric banding (AGB) and RYGB on the basis of upper GI symptoms.

The 2020 IFSO position statement on BE[2] recommended:

1. Patients presenting for MBS need to be carefully assessed for the presence of gastro-esophageal reflux disease (GERD) and complications from GERD such as BE. Particular focus should be placed on the duration of symptoms, any previous upper endoscopies and the use of anti-acid medication. If the patient reviewed represents a potential "at-risk" population according to conventional gastro-enterological guidelines, this patient should undergo pre-operative screening endoscopy. However, given that BE patients typically are void of symptoms indications for pre-operative screening endoscopy should be made generously.
2. If a patient has the presence of "salmon-coloured" mucosa and/or an irregular *z*-line upon upper endoscopy, then the exact length and circumference according to the Prague classification needs to be documented as well as the segment of BE systematically biopsied according to the Seattle protocol to capture any potential areas of dysplasia.
3. If the patient has any dysplastic BE, then the patient should be considered for evaluation of pre-operative BE-therapy.
4. In the presence of long-segment or dysplastic BE, then procedures where the distal esophagus may subsequently be exposed to higher concentrations of acid or bile (such as SG or OAGB) should not be performed.
5. If the patient has short-segment BE, then after careful discussion with the patients the benefits of SG vs. RYGB should be discussed. In general, RYGB is the preferred procedure due to evidence of BE regression; however, a SG cannot be categorically discouraged due to the potential long-term health benefits of MBS. However, given the lack of high-quality data, the 2020 Task Force recommends practitioners proceed with *extreme caution* if considering this option together with their patients and it is recommended that all such cases be systematically captured and screened in a prospective fashion. This statement cannot be viewed as a blanket approval to perform SG in patients with BE, but is reflective of the paucity of data regarding the outcomes of patients with BE undergoing potentially refluxogenic bariatric procedures.
6. Given the current evidence suggesting higher incidence rates of BE following SG compared to the general population, a single screening Endoscopy at 1 year post-operatively and then every 2–3 years, depending on it's outcome.
7. The current analysis mainly includes studies comprising of Caucasian, Middle-Eastern or South-American populations. Accordingly, how the present findings apply to patients of Asian heritage/undergoing MBS in Asian countries is unclear and warrants further research.
8. IFSO supports further high-quality studies in the field, mainly prospective and/or population-based studies to help elucidate the exact magnitude of the issue as well as provide further guidance to the community as necessary.

Given the overlap with these position statements, the Executive Committee of IFSO established a taskforce to consider both issues in one updated position statement approved by the IFSO Scientific Committee. It is informed by current clinical insights, expert consensus and evidence from peer-reviewed scientific research, and will be subject to regular updates.

Introduction

Whilst metabolic bariatric surgery (MBS) has been proven to be a durably effective treatment for obesity, leading to improved health, longevity and well being [1–3], the subsequent alterations in the anatomy of the gastrointestinal tract may result in chronic conditions such as gastro-esophageal reflux disease (GERD) [4–7], which may in turn confer a risk of changes in the distal esophagus such as Barrett's esophagus (BE) or esophageal adenocarcinoma (EAC) [7, 8]. Equally, people living with obesity have higher rates of pre-existing GERD [9, 10] and obesity itself is a recognised risk factor for both BE and EAC [11]. Thus, patients evaluated for MBS may already bear changes in their distal esophagus putting them at increased risk of EAC formation.

Upper gastrointestinal endoscopy (UGIE)—a term now preferred to EGD given the duodenum is not accessible in many MBS procedures—serves as a vital diagnostic tool, permitting direct visualisation and histopathological assessment with tissue biopsies of the upper gastrointestinal (GI) tract, which after MBS may include the esophagus, stomach, duodenum or jejunum.

UGIE prior to MBS can identify conditions that may contraindicate MBS, such as malignancies or varices, as well as identify other conditions that require treatment prior to MBS, such as *Helicobacter pylori*. It can also uncover conditions that might modify the MBS procedure choice, such as BE, esophagitis or hiatal hernia [12].

Abnormal UGIE findings were likely to be present in up to half of patients prior to MBS according to the systematic review of the literature performed to inform the previous IFSO UGIE position statement. The most common abnormal findings were gastritis, HH and esophagitis. Conditions leading to modification or delay of MBS were found less commonly, with 16.5% having a finding that would modify or delay the planned procedure and 0.2% having surgery cancelled. A pooled mean of 25.3% of asymptomatic patients had abnormal UGIE findings. The frequency of abnormal findings was thought to be clinically significant enough to warrant the recommendation that all patients undergoing MBS consider a pre-operative UGIE [13].

According to the systematic review performed to inform the previous IFSO BE position statement, the risk of BE in people presenting for and undergoing MBS was 3.8% with 1.9% risk of de novo BE after MBS. For people undergoing SG, the incidence of de novo BE was as high as 4.6% within 5 years of the MBS procedure. This compares a general population risk of BE of 1–2% [14]. Given this potential increased risk of BE, there was concern that this could translate to an increased risk of EAC.

Noting these concerns were hypothetical, given the magnitude of the consequences if the hypothesis was realised, and the large numbers of people potentially affected, it was considered prudent to recommend that patients be offered a screening Endoscopy at 1 year following a "high-risk" bariatric procedure such as SG and then every 2–3 years. It was, however, noted this recommendation warranted further investigation in prospective clinical trials [15]. A similar rationale applied for recommending ongoing surveillance of people with OAGB due to the potential risk of stomal cancer [13, 16, 17].

For those with known BE prior to MBS, it was recommended that the BE be properly classified and documented. For those with dysplastic BE, it was recommended that the patient be considered for evaluation of BE-therapy, such as ablation or endoscopic resection [18], prior to the MBS procedure. For those with long-segment or dysplastic BE, procedures where the distal esophagus may subsequently be exposed to higher concentrations of acid or bile (SG and OAGB) should not be performed. For those with short segment BE, shared decision making with the patient was recommended with a preference for RYGB over SG; however, the paucity of high-quality information to inform this issue was noted [15].

The resources required to providing routine pre-MBS UGIE and ongoing high-level surveillance UGIE to an ever-increasing number of people undergoing MBS [19] are significant, and the cost-effectiveness of the currently recommended approach has been called into question, particularly in light of newer data that suggests that the risk of BE after SG and stomal cancer after OAGB may have been overstated in early studies [8, 17, 20]. In addition, the recommended frequency of surveillance no longer aligns with the recommended frequency of endoscopic surveillance for BE according to most international guidelines (Table 1) [21–25].

A recent survey found that whilst 53.7% surgeons routinely offer pre-operative UGIE and 14.3% routinely offer post-operative UGIE for patients at 1 year after MBS, the majority do not routinely offer UGIE every 2–3 years as proposed by the previous IFSO position statement [12]

Table 1 Comparison of international guidelines for Barrett esophagus (BE) surveillance

	ACG (USA, 2022)	NICE/BSG (UK, 2023)	ESGE (Europe, 2023)
Non-dysplastic BE	Every 3–5 years	< 3 cm with intestinal metaplasia: every 3–5 yrs < 3 cm without intestinal metaplasia (confirmed on two endoscopies): no surveillance ≥ 3 cm: every 2–3 yrs	≥ 1 cm and < 3 cm: 5 yrs ≥ 3 cm and < 10 cm: refer to BE expert centre Irregular Z-line/columnar-lined esophagus < 1 cm: no routine biopsies or endoscopic surveillance
Low-grade dysplasia	Endoscopic ablative therapy preferred If not: 6–12 month surveillance depending on risk profile	Expert pathology review Endoscopic therapy preferred if low-grade dysplasia confirmed on two biopsies Indefinite dysplasia - 6 monthly surviellance	Endoscopic eradication therapy if confirmed on two biopsies that have been reviewed by two experienced pathologists
High-grade dysplasia	Endoscopic eradication (RFA/EMR) strongly recommended	Endoscopic resection of visible lesion with endoscopic ablation of residual BE preferred.	Endoscopic ablation therapy strongly recommended

Comparison of international guidelines from American College of Gastroenterology (ACG) [21], British Society of Gastroenterology (BSG) and National Institute for Health and Clinical Excellence (NICE) [22, 24], and European Society of Gastroenterology (ESGE) [23]

suggesting that clinicians are not being influenced by the arguments presented in the previous position statements, or do not have sufficient resources to support such a program.

The rapidly changing evolution and development of our understanding of the pathophysiology of MBS procedures as well as the best management of people who undergo MBS mean that IFSO position statements are intended to be reviewed regularly. This current review of the two position statements updates both systematic reviews, and provides new updated recommendations.

Methods

Literature Search

A comprehensive review of the literature was performed to identify studies that reported on outcomes relating to UGIE performed prior to and following MBS with a second search addressing BE. The search method adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines as shown in Fig. 1.

Searches were carried out across several databases, including EMBASE, MEDLINE, PubMed and the Cochrane Library. A wide range of search terms were utilised to ensure all relevant studies were captured. All studies published between January 1990 and October 2024 were considered. Additional studies were identified by manually reviewing reference lists from key reviews and primary research articles.

Search Terms UGIE and MBS

The search included terms related to endoscopic procedures (esophago-gastro-duodenoscopy, esophago-gastro-duodenoscopy, upper gastrointestinal endoscopy, gastroscopy), and the MBS technique (bariatric surgery, metabolic bariatric surgery, MBS, lap band, laparoscopic adjustable gastric band, LAGB, sleeve gastrectomy, SG, gastric bypass, Roux-en-y gastric bypass, RYGB, mini gastric bypass, MGB, single anastomosis gastric bypass, SAGB, one anastomosis gastric bypass, OAGB, loop anastomosis gastric bypass).

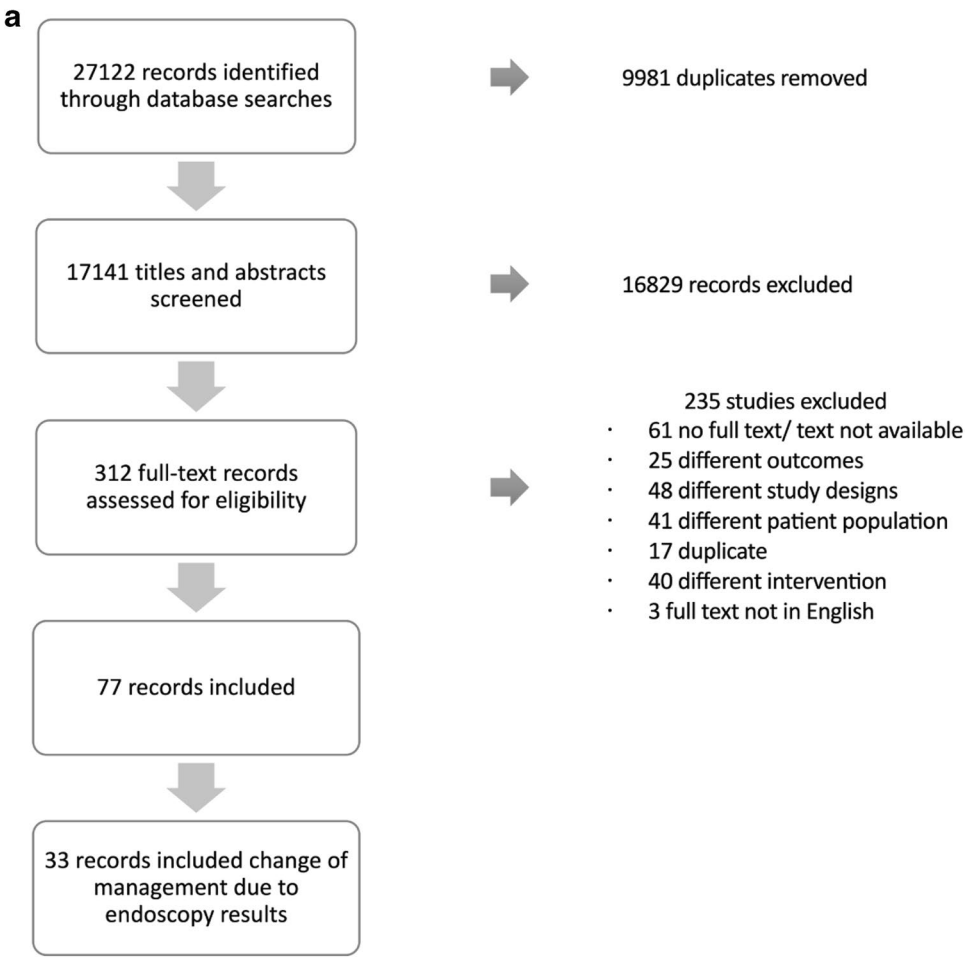
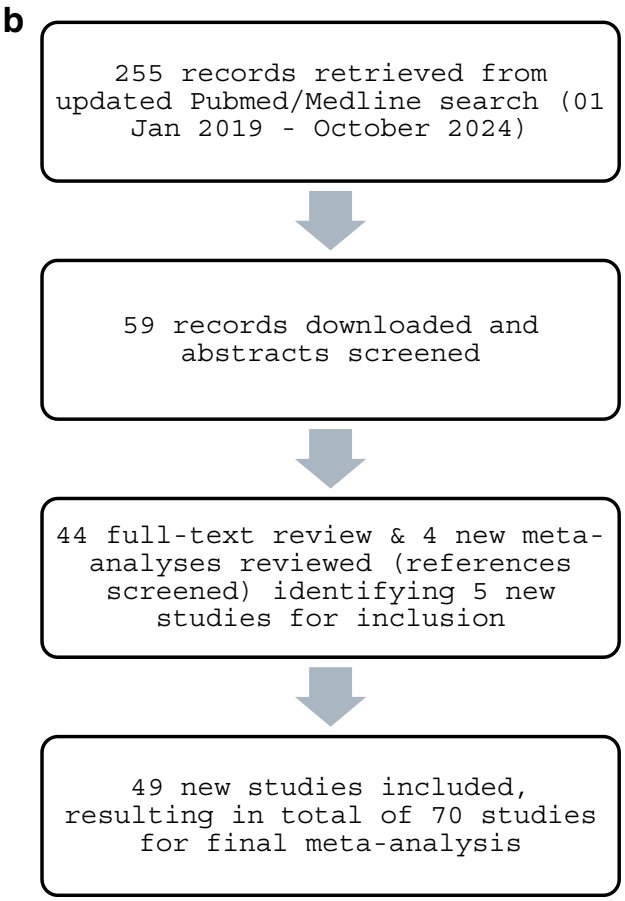


Fig. 1 **a** PRIMSA flow chart upper GI endoscopy and MBS. **b** PRISMA flow chart Barrett's esophagus and MBS

Fig. 1 (continued)



Search Terms BE and MBS

The search strategy for this systematic review was adapted from the previous search used for the 2019 Position Statement [15]. The search terms related to BE (((barrett's OR barrett s OR barretts OR barrett OR dysplasia OR metaplasia)) and weight (obesity OR morbid obesity OR overweight)) and the MBS technique (obesity surgery OR bariatric surgery OR gastric band OR sleeve gastrectomy OR gastric bypass).

Selection Criteria

Only English language studies were included for both systematic reviews.

Selection Criteria for the Role of UGIE with MBS

Eligible studies incorporated those that examined UGIE findings and the subsequent Changes in patient management both prior to and post MBS. All comparative study designs with more than 20 participants, with any follow-up period was included. Studies were excluded if they involved patients < 15 years old, there had been a previous diagnosis of BE (given the overlap with the second systematic review), if they included patients who had undergone procedures such as hiatus hernia repair, fundoplication, reflux surgery, vertical band gastroplasty, gastroplasty, gastric cancer resection or revision MBS. Those studies focusing exclusively on patients with either normal or abnormal UGIE findings were omitted as they were not a true representative of the entire pre-MBS population. Additionally, studies were excluded if they did not perform pre-operative UGIE, reported fewer than three endoscopic findings or failed to document how UGIE findings influenced management decisions (Table 2).

Selection Criteria for BE and MBS

Studies were included if they provided information on the occurrence or regression of BE either pre- or post-operatively in patients who presented for or underwent MBS. All types of study designs, sample sizes, surgical procedures and follow-up durations were eligible for inclusion. For the updated analysis, no abstracts were included. As per the previous position statement, case reports detailing the occurrence of esophageal adenocarcinoma (EAC) were excluded. Studies that lacked sufficient data to determine eligibility for inclusion (such as clear definitions of BE or

Table 2 Search terms and exclusion criteria EGD systematic review

Search terms				
Population		**Intervention**	**Comparison**	**Outcome**
Bariatric surgery	LAGB	Oesophago-gastro-duo-denoscopy	N/A	N/A`
Lap band	SG			
Laparoscopic adjustable gastric band	RYGB			
Sleeve gastrectomy	MGB	Esophago-gastro-duo-denoscopy		
Gastric bypass	SAGB			
Roux-en-y gastric bypass	OAGB			
Mini gastric bypass		Upper gastrointestinal endoscopy		
Single anastomosis gastric bypass				
One anastomosis gastric bypass				
Loop anastomosis gastric bypass		Gastroscopy		
Excluded				
Population		**Intervention**	**Comparison**	**Outcome**
Hiatus hernia repair		No pre-operative gastroscopy performed	N/A	Less than 3 endoscopy findings reported
Fundoplication				Does not document endoscopy changes that does not alter management
Reflux surgery				
Vertical band gastroplasty				
Gastroplasty				
Gastric cancer resection				
< 15 year				
Only include symptomatic/asymptomatic/oesophageal dysfunction (not representing the entire population)				
Secondary/revision bariatric surgery				
Pre-operative Barrett oesophagus or hiatus hernia excluded (not representing the entire population)				
Only include patients with abnormal endoscopy or only include patients with normal endoscopy (not representing the entire population)				
Asymptomatic or symptomatic patients excluded (not representing the entire population)				
Any patients with premorbid condition (eg diabetes) excluded (not representing the entire population)				
Less than 20 patients				

how this was identified pre/post-operatively) or information to assess potential risk of bias were also excluded. In instances where multiple reports from the same research group (based on author names and institutions) covered overlapping patient recruitment periods, data from the most recent publication with the largest sample size were used to prevent duplication of information.

Data Extraction

Data extracted from the selected studies included basic study details (year, location, design, sample size), patient demographics, surgical methods, duration of follow-up, endoscopy findings and reported complications. Critical appraisal of the methodology of each paper was performed according to the Joanna Briggs Institute (supplemental material).

Recommendations were formulated by the taskforce and then modified after review by the IFSO Scientific Committee.

Results

UGIE and MBS

A total of 77 studies were included in this analysis, with 51 studies contributed to the last IFSO position statement, encompassing 29,260 patients (Table 3). Notably, only 11 studies documented negative Endoscopic findings, and 13 studies specifically focused on esophageal abnormalities. The mean age of the patient population was 41.3 years (range 27.8–54.0 years). Most of the cohort were female, with a mean percentage of 71.4% (range 25.0–92.0%). The mean pre-operative BMI was 45.5 kg/m2 (range 36.3–57.0 kg/m2).

Among the studies included in the analysis, 60 papers reported on abnormal endoscopic findings, with a pooled effect size (ES) of 61% (95% CI 55–67%), and a high level of heterogeneity ($I2 = 98.99\%$).

Twenty-seven studies reported symptomatic manifestations associated with Endoscopic abnormalities with pooled ES of 33% (95% CI 26–40%, $I2 = 98.7\%$). In cases where

Table 3 Demographic data on all studies included in review of upper gastrointestinal endoscopy ($N=77$)

Year	*First author (country)*	*Study design*	*Procedure*	*N*	*Mean age (years)*	*Female gender (%)*	*Pre-operative BMI (kg/m^2)*	*Abnormal findings (%)*	*Change in management documented*
2001	Frigg (Switzerland) [32]	Prospective	LAGB	104	39.0	84.0	45.0	46.2	Yes
2004	De Jong (Netherland) [33]	Prospective	LAGB	26	41.3	88.5	47.0	NS	No
2004	Suter (Switzerland) [34]	Prospective	Any bariatric procedure	345	38.1	79.7	44.7	NS	No
2006	Korenkov (Germany) [35]	Prospective	LAGB	145	40.0	73.0	48.3	10.3	Yes
2007	Merrouche (France) [36]	Prospective	Any bariatric procedure	94	NS	NS	45.3	NS	No
2010	Küper (Germany) [37]	Prospective	Any bariatric procedure	69	43.4	62.3	47.6	79.7	No
2012	Humphreys (UK) [38]	Retrospective	LAGB	371	44.0	72.2	50.4	55.8	No
2013	D'Hondt (Belgium) [39]	Retrospective	RYGB	652	39.5	70.9	42.8	68.1	Yes
2013	Peromaa-Haavisto (Finland) [40]	Retrospective	Any bariatric procedure	412	NS	60.8	NS	53.6	No
2013	Pilone (Italy) [41]	Prospective	LAGB	78	35.4	78.2	44.9	78.2	No
2014	Schigt (Netherland) [42]	Retrospective	LSG, RYGB	523	44.3	76.5	46.5	51.0	Yes
2014	Tolone (Italy) [43]	Prospective	Any bariatric procedure	124	36.0	42.0	44.2	47.6	No
2015	Baysal (Turkey) [44]	Prospective	Any bariatric procedure	127	38.9	73.2	48.0	80.4	No
2015	Carabotti (Italy) [45]	Prospective	Any bariatric procedure	142	41.0	83.1	44.0	47.2	No
2015	Estévez-Fernández (Spain) [46]	Retrospective	Any bariatric procedure	331	39.9	82.0	47.5	52.6	Yes
2015	Wiltberger (Germany) [47]	Retrospective	Any bariatric procedure	159	46.0	65.0	52.0	76.7	No
2016	Fernandes (Portugal) [48]	Retrospective	Any bariatric procedure	613	46.5	77.8	44.7	56.3	No
2016	Mihmanli (Turkey) [49]	Retrospective	RYGB, LSG	157	43.0	68.8	48.0	67.5	Yes
2016	Mora (Spain) [50]	Prospective	Any bariatric procedure	196	39.5	75.4	50.2	62.7	No
2017	Heimgartner (Switzerland) [51]	Prospective	Any bariatric procedure	100	40	68.0	44.9	38.0	No
2018	Hutopilã (Romania) [52]	Prospective	Any bariatric procedure	448	41	70.1	39.9	NS	No
2018	Saarinen (Finland) [53]	Retrospective	Any bariatric procedure	1275	48.5	72.6	46.1	49.2	No
2018	Schneider (Switzerland) [54]	Retrospective	RYGB, LSG	1190	42.2	71.3	NS	60.3	Yes
2018	Yardimci (Turkey) [55]	Retrospective	LSG	755	39.6	65.6	42.9	80.5	No
2020	Garcia-Gómez-Heras (Spain) [56]	Retrospective	LSG, RYGB	790	45	67.8	NS	89.6	Yes
2020	Lorentzen (Norway) [57]	Prospective	LSG, RYGB	188	NS	67.6	NS	NS	No
2020	Şen (Turkey) [58]	Prospective	LSG	819	38	57.0	43.2	77.9	Yes
2021	Ferrer (Spain) [59]	Prospective	LSG	105	51	70.5	46.3	NS	No

Table 3 (continued)

Year	*First author (country)*	*Study design*	*Procedure*	*N*	*Mean age (years)*	*Female gender (%)*	*Pre-operative BMI (kg/m²)*	*Abnormal findings (%)*	*Change in management documented*
2021	Sierżantowicz (Poland) [60]	Prosprective	Any bariatric procedure	112	47.3	70.9	43.5	NS	No
2023	Wölnerhanssen (Switzerland) [61]	Prospective	LSG, LRYGB	169	NS	69.2	NS	NS	No
2004	Madan (USA) [62]	Retrospective	RYGB	102	NS	85.3	48.2	91.0	No
2004	Sharaf (USA) [63]	Retrospective	Any bariatric procedure	195	41.2	78.5	48.9	89.7	Yes
2006	Vanek (USA) [64]	Retrospective	RYGB	94	NS	NS	NS	84.0	No
2006	Zeni (USA) [65]	Retrospective	RYGB	159	42.1	82.0	49.7	66.7	Yes
2008	Loewen (USA) [66]	Prospective	Any bariatric procedure	447	40.6	87.0	47.0	18.0	Yes
2008	Mong (USA) [67]	Retrospective	RYGB	272	43.2	87.0	48.7	12.1	No
2009	Dutta (USA) [68]	Prospective	RYGB	101	NS	92.0	47.5	38.6	No
2014	Gómez (USA) [69]	Retrospective	Any bariatric procedure	232	51.0	82.3	42.2	61.6	Yes
2017	Sun (Canada) [70]	Retrospective	RYGB	113	46.2	71.7	46.8	61.9	Yes
2019	Kavanagh (USA) [71]	Prospective	Any bariatric procedure	51	NS	NS	NS	NS	No
2019	Ozeki (USA) [72]	Retrospective	RYGB, LSG	260	54.0	25.0	44.9	66.9	Yes
2020	Chang (USA) [73]	Retrospective	LSG, RYGB	631	44.0	72.0	46.0	NS	Yes
2020	Ghaderi (USA) [74]	Retrospective	SG, RYGB (laparoscopic or robotic)	209	43.1	83.3	46.4	87.6	Yes
2020	Makiewicz (USA) [75]	Retrospective	LAGB, LSG, RYGB	1000	47.2	78.9	48.6	95.2	No
2021	Elkassem (Canada) [76]	Prospective	SG	58	48.0	79.0	49.1	NS	No
2022	Chen (USA) [77]	Retrospective	LSG, RYGB	885	43.9	75.9	44.1	83.2	Yes
2022	Cheng (USA) [78]	Retrospective	LSG, RYGB	753	49.0	74.1	43.9	NS	No
2022	Rioux (Canada) [79]	Retrospective	Gastric bypass, SG, LAGB	737	43.3	78.8	48.1	61.2	Yes
2023	Allotey (USA) [80]	Prospective	Any bariatric procedure	200	42.0	90.5	44.2	NS	No
2024	Owen (USA) [81]	Retrospective	LSG/Robotic SG	373	43.0	84.0	42.0	NS	No
2007	Teivelis (Brazil) [82]	Retrospective	RYGB	42	NS	NS	NS	45.2	No
2008	De Moura Almeida (Brazil) [83]	Prospective	RYGB	162	36.7	69.8	44.1	77.2	
2009	Muñoz (Chile) [84]	Retrospective	RYGB	626	38.5	72.0	42.0	46.0	Yes
2012	Dietz (Brazil) [85]	Prospective	Any bariatric procedure	126	42.1	82.5	51.2	57.9	No
2016	Czeczko (Brazil) [86]	Retrospective	RYGB	110	37.3	73.6	40.6	73.6	No
2017	Schlotmann (Argentina) [87]	Retrospective	RYGB, LSG	193	46.0	63.7	44.5	36.3	No
2019	Mazzini (Brazil) [88]	Prospective	Any bariatric procedure	93	37.0	80.6	41.7	NS	No
2020	Ferraz (Brazil) [89]	Retrospective	SG	459	40.4	85.6	39.7	26.8	No
2013	Tai (Taiwan) [90]	Prospective	LSG	66	37.2	71.2	36.3	NS	No
2015	Wong (China) [91]	Retrospective	RYGB	180	NS	54.4	39.0	NS	Yes
2017	Lee (China) [92]	Retrospective	Any bariatric procedure	268	39.1	63.1	40.3	51.1	Yes
2019	Endo (Japan) [93]	Retrospective	LSG, LAGB, LSG + DJB	155	40.0	60.0	45.0	65.8	Yes

Table 3 (continued)

Year	*First author (country)*	*Study design*	*Procedure*	*N*	*Mean age (years)*	*Female gender (%)*	*Pre-operative BMI (kg/m²)*	*Abnormal findings (%)*	*Change in management documented*
2015	Praveenraj (India) [94]	Retrospective	Any bariatric procedure	283	42.3	58.0	43.8	81.0	No
2018	D'Silva (India) [95]	Prospective	Any bariatric procedure	675	45.0	56.7	43.9	78.5	Yes
2021	Bhambri (India) [96]	Retrospective	SG, RYGB, OAGB	211	NS	73.9	46.2	40.0	No
2016	Ng (Singapore) [97]	Retrospective	Any bariatric procedure	208	40.0	55.0	42.2	66.3	Yes
2023	Sawathanon (Thailand) [98]	Retrospective	Any bariatric procedure	461	35.1	63.8	47.7	57.5	Yes
2008	Al Akwaa (UAE) [99]	Retrospective	Any bariatric procedure	65	34.6	64.6	57.0	76.9	No
2018	Salama (Qatar) [100]	Retrospective	LSG	1369	35.6	69.7	47.1	50.1	Yes
2019	AlEid (Saudi Arabia) [101]	Retrospective	LSG, RYGB	356	37.0	56.0	48.1	59.0	Yes
2019	Sharara (Lebanon) [102]	Prospective	Any bariatric procedure	242	37.8	53.7	40.4	NS	No
2021	Al Sabah (Kuwait) [103]	Retrospective	LSG	92	34.9	NS	46.8	31.4	No
2021	Zacharakis (Saudi Arabia) [104]	Retrospective	Any bariatric procedure	717	27.8	65.0	44.3	64.0	Yes
2022	Alimadadi (Iran) [105]	Retrospective	LRYGB	637	34.3	52.4	45.1	75.7	Yes
2023	Aljaroudi (Saudi Arabia) [106]	Retrospective	Any bariatric procedure	684	36.4	63.0	44.6	68.0	No
2016	Abd Ellatif (Egypt) [107]	Retrospective	Any bariatric procedure	3219	37.0	79.0	43.0	25.0	Yes
2021	Moustafa (Egypt) [108]	Prospective	RYGB, LSG, OAGB	70	41.2	80.0	52.3	81.4	Yes

LAGB laparoscopic adjustable gastric band, *RYGB* Roux-en-Y gastric bypass, *LSG la*paroscopic sleeve gastrectomy, *SG* sleeve gastrectomy, *LSG + DJB* LSG + duodeno-jejunal bypass, *OAGB* one anastomosis gastric bypass, *NS* not state

patients had both symptoms and abnormal Endoscopic findings, the pooled ES was 29% (95% CI 16–44%, $I2 = 99.41\%$.) across 14 studies. In contrast, asymptomatic patients with abnormal findings had a higher pooled prevalence of 36% (95% CI 20–53%, $I2 = 99.5\%$) in 15 studies.

Pooled percentages of abnormal findings on gastroscopy are documented in Table 4. The most common Endoscopic findings were gastropathy, reported in 33% of patients (95% CI 28–39%), followed by hiatal hernias (22%) and esophagitis (16%). De novo BE had a pooled prevalence of 2% (95% CI 1–3%).

Pre-MBS UGIE findings that may preclude MBS were rare. There were less than 1% of patients diagnosed with esophageal cancer (10 patients across five studies) and gastric cancer (19 patients across eight studies). No duodenal malignancies were reported. Other uncommon but significant findings that alter management included gastrointestinal stromal tumours (GISTs) (four patients across three studies) and neuroendocrine tumours (14 patients across seven studies), both of which had a pooled prevalence of less than 1%. Additionally, esophageal varices and gastric antral vascular ectasia (GAVE)/portal hypertensive gastropathy (PHG) were also rare, with pooled prevalences of less than 1% in the respective studies.

The impact of endoscopic findings on the management of patient undergoing a MBS procedure was categorized into four groups based on the need for intervention (Table 5 and Fig. 2). Group 1 included patients with either normal Endoscopies or abnormal findings that did not lead to any management Change, representing 35% of the patients (95% CI 28–41%). Group 2, which consisted of patients with abnormal Endoscopic findings requiring medical management, also accounted for 35% of the patients (95% CI 26–45%). Group 3 included patients whose abnormal findings led to delays or Changes in their MBS, with a pooled percentage of 23% (95% CI 16–32%). Group 4 involved patients with findings contraindicating metabolic bariatric surgery and represented less than 1% of the cohort.

Table 4 Pooled percentages of abnormal findings on gastroscopy in patients undergoing bariatric procedures (77 studies)

Abnormal findings	The number of studies included	Pooled effect size (95% confidence interval)	Variation in effect size attributable to heterogeneity (I^2)
Oesophagus			
- Hiatus hernia	67	22% (19–26)	97.85%
- Oesophagitis	73	16% (14–19%)	97.31%
- Barrett's oesophagus	50	2% (1–3)	90.56%
- Oesophageal varices	4	< 1%	70.00%
- Oesophageal ulcer	4	1% (0–3%)	70.59%
Stomach			
- Gastropathy	51	33% (28–39)	98.69%
- Erosive gastritis	31	9% (6–11)	95.80%
- Gastric ulcer	46	3% (2–4)	87.80%
- Submucosal benign lesions	12	1% (0–1)	74.03%
- GAVE/portal hypertension gastropathy	6	< 1% (0–1)	92.47%
Duodenum			
- Duodenitis	34	6% (4–7)	93.05%
- Erosive duodenitis	10	2% (1–3)	87.05%
- Duodenal ulcer	24	1% (1–2)	82.24%
Malignancy/lesion with malignant potential			
- Oesophageal dysplasia	5	< 1%	NA
- Oesophageal adenocarcinoma/SCC	13	< 1%	49.73%
- Gastric adenocarcinoma	16	< 1%	69.33%
- Duodenal adenocarcinoma	8	0	NA
- Gastrointestinal stromal tumours	9	< 1%	14.78%
- Neuroendocrine tumours	13	< 1%	59.95%
Polyp/s	46	4% (3–5)	93.33%
Helicobacter pylori	47	21% (16–26)	98.64%
Other non-significant findings	21	4% (1–7%)	97.97%

Post-operative Incidence of BE

As of the updated search in October 2024, 56 studies including 60,173 patients provided sufficient data for the calculation of the post-operative incidence of BE following MBS (Table 6).

Overall, the post-operative incidence of BE was estimated at 2.4% (95% CI 1.66–3.45%) (Fig. 3). However, significant interstudy heterogeneity was noted ($I^2 = 92.1\%$, $p < 0.0001$); although, no single study contributing to this could be identified. When the studies were stratified by MBS procedure, we found the following pooled post-operative incidence rates for BE: SG 29.17% (95% CI 3.15–83.88%; *n* studies = 1), LAGB 0.66% (95% CI 0.03–12.67%; *n* studies = 1), RYGB 1.9% (95% CI 0.66–5.37%; *n* studies = 6), SG 2.86 (95% CI 1.7–4.75%; *n* studies = 27) and OAGB 2.07% (95% CI 0.92–4.58%; *n* studies = 14).

Two studies reported on post-operative incidence rates of BE following SG + fundoplication procedures (pooled post-operative incidence rate of 1.18% [95%CI 0.13–9.74%]), and one study on OAGB + fundoplication (0.78%; 95% CI 0.06–9.37%).

To define the de novo incidence of BE after MBS, a separate analysis was performed including only studies with patients who had undergone pre-operative screening UGIE and had a follow-up URIE at a minimum of 2 years after their MBS procedure. For SG, the pooled post-operative de novo incidence of BE was 3.53% (95% CI 2.05–5.99%; *n* studies = 17; 10,251 patients) (Fig. 4a). For OAGB, the pooled post-operative de novo incidence of BE was estimated at 3.5% (95% CI 1.3–9.0%; *n* studies = 6; 304 patients) (Fig. 4b). For RYGB, the pooled post-operative de novo incidence of BE was estimated at 1.7% (95% CI 0.8–3.8%; *n* studies = 3; 8533 patients).

Post-operative Regression of BE

Thirteen studies including 267 patients provided information regarding regression rates of patients diagnosed pre-operatively with BE who underwent MBS. Regression was

Table 5 Random pooled effect size of classification of management change based on gastroscopy (32 studies)

Groups	Descriptions	Endoscopy findings	Random pooled effect size (95% confidence interval)	Variation in effect size attributable to heterogeneity (I^2)
1	Normal endoscopy or abnormal endoscopy that did not lead to a change in management	Normal endoscopy Non erosive gastropathy Benign polyps	35% (28–41)	98.74%
2	Abnormal endoscopy requiring medical management	(H pylori) Oesophageal webs LA grade A and B oesophagitis Non erosive duodenitis	35% (2–45)	99.41%
3	Abnormal endoscopy leading to delays or changes to the MBS management	(Hiatus hernia) LA grade C and D oesophagitis Barrett oesophagus Ulcers (any location) Erosive oesophagitis/gastritis/duodenitis Mass lesions mucosal/submucosal, Gastrointestinal stromal tumours, Neuroendocrine tumour Bezoar Peptic stricture Zenker's diverticulum Arteriovenous malformations	23% (16–32)	99.39%
4	Abnormal endoscopy contraindicated to MBS	Upper gastrointestinal cancer Varices GAVE/portal hypertension gastropathy	< 1%	58.39%

defined as either a reduction in length of BE (or complete resolution) or down-grading of dysplasia (e.g., from dysplastic to non-dysplastic BE). The overall pooled regression rate estimate was 46.73% (95% CI 31.4–62.69%; $I^2 = 67.1\%$; $p = 0.0003$).

When only RYBG studies were analyzed (n studies = 9; 164 patients), the pooled regression estimate was 53.23% (95% CI 36.6–69.11, $I^2 = 67.0\%$, $p = 0.0021$). Three studies (83 patients) provided data on the effect of performing a fundoplication with an SG with an estimated pooled BE regression rate of 40.45% (95% CI 7.78–84.5%; $I^2 = 60.4\%$; $p = 0.0798$).

No dedicated studies were identified that included data on progression/regression rates of BE after SG. However, in the paper by Johari et al., investigating the anatomical and manometric abnormalities that occur following SG, the authors reported that 5/13 patients had histopathologically confirmed BE prior to SG of which three demonstrated a reduction in BE length, and two had complete remission of the BE at follow-up endoscopy [20]. Equally, the incidence of BE was the same post-operatively compared to on pre-operative endoscopy (4.1% vs. 3.4%; $p = 0.756$). Furthermore, in the study by Moulla et al., 20 patients with histopathologically conformed BE underwent SG. Over a period of follow-up of up to 5 years, six patients demonstrated progression, whereas one patient showed regression of their BE upon follow-up endoscopy [26]. There was not sufficient data available to allow for pooled estimates of these progression/regression rates as of the updated search in 2024.

Discussion

In the previous IFSO position papers on the role of UGIE before and after MBS[1] and BE following MBS[2], it was suggested that UGIE be considered before any MBS procedure and then repeated at 1-year post-procedure and then 3-yearly thereafter. The reason for considering UGIE prior to any MBS procedure was the high frequency of unexpected findings that could change management (55.5%), even in asymptomatic patients (25.3%). The suggestion relating to routine UGIE surveillance was based on the high incidence of de novo BE reported after MBS, especially after SG, and were linked to the recommendations for BE surveillance in high-risk populations of professional organisations at that time.

This updated systematic review of the literature, combining both topics into the one paper is Limited by the heterogenous nature of the data, and the variable definitions used to define Endoscopic Changes and BE within the included papers. There are currently few studies with follow up beyond 5 years post-MBS. Given the evolution of BE is likely to take more than 5 years, data should be interpreted

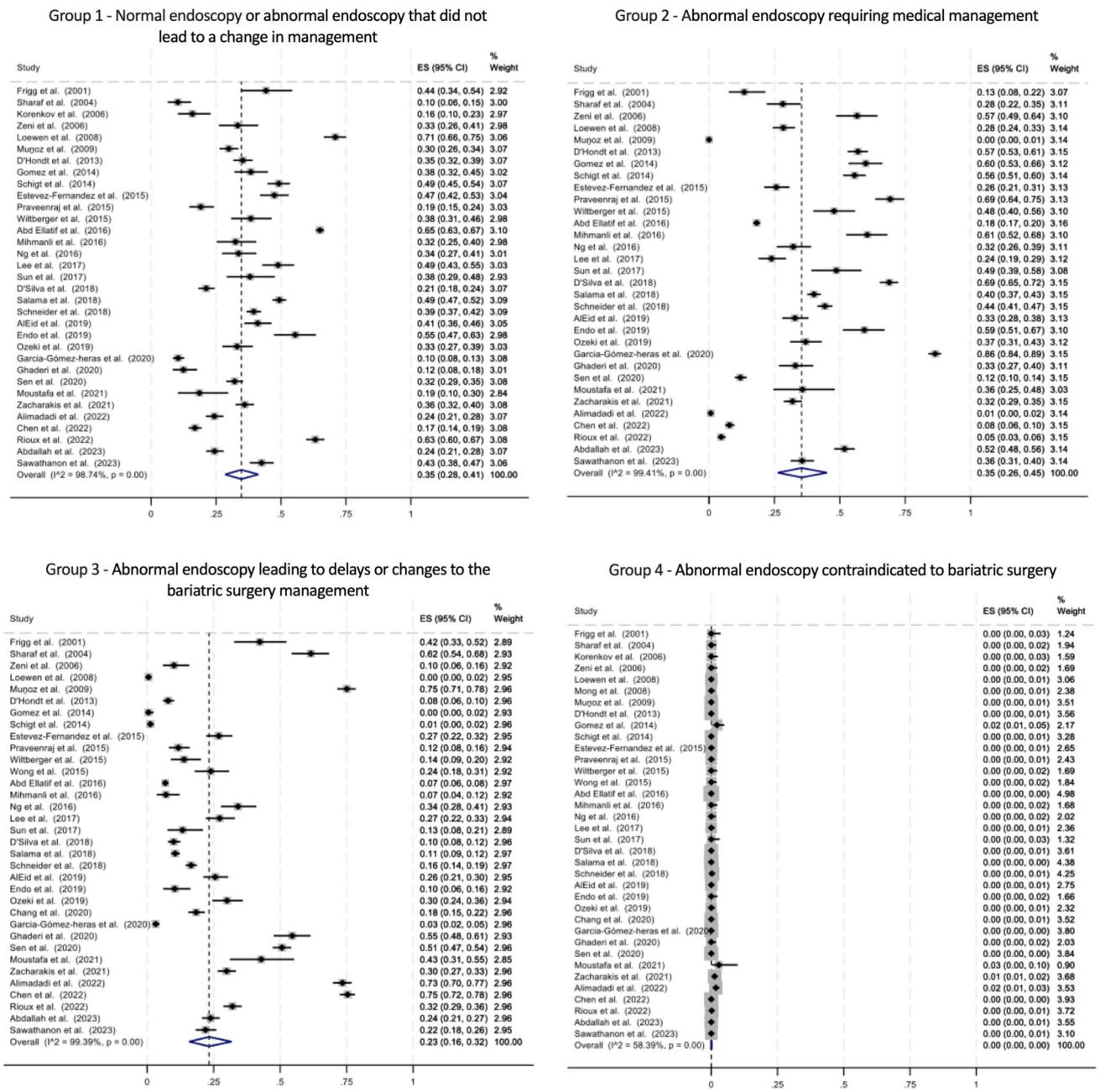


Fig. 2 Forest plots random pooled effects models of classification of management change based on gastroscopy

with caution. The reliance on case series, that are mostly retrospective, and the high likelihood of bias (according to JBI) means the evidence base for all recommendations would be considered low or very-low according to GRADE criteria [27].

Noting these important Limitations, this Position Statement again finds that the rate of abnormal findings on pre-MBS UGIE is relatively high at 61% (95% CI 55–67%; I^2 98.99%). However, less than 1% (I^2 58.39%) of people undergoing a pre-MBS UGIE were found to have a condition that precluded MBS; although, 35% either needed treatment for their condition and in 23% there was a change of the planned MBS procedure type. A recently published RCT (BYBAND-SLEEVE) [28] reported either GERD or hiatal hernia in 48% of participants, confirming the high frequency of pathology found on pre-operative UGIE.

Despite the frequency of abnormal pathology on pre-MBS UGIE, symptoms remain a poor predictor of these abnormal findings. When considering those papers that reported both symptoms and endoscopic findings (27

Table 6 Characteristics of papers included in the BE systematic review

Author and publication year	Country	Study design	Bariatric surgery procedure	N patients assessed	N patients diagnosed with BE	Preoperative screening endoscopy	BE confirmed with histopathology	Data allowing for analysis of progression rates	Data allowing for regression rates	Preoperative BMI (kg/m^2)	% female patients	Follow-up duration (months)
Almontashery A. 2017 [109]	Saudi Arabia	Retrospective cohort study	LSG	562	1	Not specified	Not specified	No	No	NA	NA	16
Balsiger B. 2000 [110]	USA	Retrospective cohort study	VBG	24	7	Yes	Yes	Yes	No	33	22	37
Berry M. 2016 [111]	Chile	Retrospective cohort study	LSG	252	2	Yes	Not specified	No	No	32.3	188	N/A
Braghetto I. 2016 [112]	Chile	Prospective cohort study	LSG	231	3	Yes	Yes	No	No	38.4	168	60
Chen G. 2017 [113]	USA	Retrospective cohort study	RYGB	132	14	Yes	Yes	Yes	Yes	45.4	NA	78
Csendes A. 2006 [114]	Chile	Prospective cohort study	RYGB	557	12	Yes	Yes	Yes	Yes	43.2	NA	24
Endo Y. 2019 [93]	Japan	Retrospective cohort study	Multiple	155	1	Yes	Not specified	No	No	45	93	43
Felsenreich D. 2018 [115]	Austria	Retrospective cohort study	LSG	44	6	Yes	Yes	No	No	48.7	33	131.8
Gorodner V. 2017 [116]	Argentina	Retrospective cohort study	RYGB	1681	19	Yes	Yes	Yes	Yes	44	6	41
Naslund E. 1996 [117]	Sweden	Retrospective cohort study	Multiple	290	6	Not specified	Yes	No	No	43	5	83
Rosenthal R. 2006 [118]	USA	Retrospective cohort study	LAGB	152	1	Not specified	Not specified	No	No	40.2	NA	N/A
Salama T. 2017 [100]	Egypt	Retrospective cohort study	OAGB	50	0	Yes	Not specified	No	No	NA	32	18

Table 6 (continued)

Author and publication year	Country	Study design	Bariatric surgery procedure	N patients assessed	N patients diagnosed with BE	Preoperative screening endoscopy	BE confirmed with histopathology	Data allowing for analysis of progression rates	Data allowing for regression rates	Preoperative BMI (kg/m^2)	% female patients	Follow-up duration (months)
Saleh M. 2017 [119]	USA	Population-based study (retrospective)	Not specified	16,620	270	Not specified	Not specified	No	No	NA	NA	12
Sebastianelli L. 2019 [120]	France & Italy	Prospective cohort study	LSG	90	17	Yes	Yes	No	No	46	66	N/A
Silva L. 2014 [121]	Brazil	Retrospective cohort study	OAGB + Fundoplication	512	4	Not specified	Not specified	No	No	44	NA	N/A
Soricelli E. 2018 [122]	Italy	Prospective cohort study	LSG	144	19	Yes	Yes	No	No	46.2	NA	66
Teiveilis M. 2007 [82]	Brazil	Prospective cohort study	RYGB	52	1	Yes	Not specified	No	No	51.4	NA	16.8
Velotti N. 2017 [123]	Italy	Prospective cohort study	OAGB	80	0	Yes	Not specified	No	No	NA	NA	28.5
Matar R. 2020 [124]	USA	Retrospective cohort study	Multiple	517	16	Not specified	Yes	No	No	NA	434	48
Felsenreich D. 2020 [125]	Austria	Prospective cohort study	RYGB	10	10	Yes	Yes	Yes	Yes	45.1	10	33.4
Signorini F. 2020 [126]	Argentina	Retrospective cohort study	RYGB	64	9	Yes	Yes	Yes	Yes	44.3	37	15
Braghetto I. 2019 [127]	Chile	Retrospective cohort study	LSG	167	2	Yes	Not specified	No	No	38.3	93	15
Boru C. E. 2019 [128]	Italy	Prospective cohort study	LSG	84	0	Yes	Not specified	No	No	NA	NA	59.7
Csendes A. 2019 [129]	Chile	Retrospective cohort study	LSG	97	4	Yes	Yes	No	No	NA	NA	126

Table 6 (continued)

Author and publication year	Country	Study design	Bariatric surgery procedure	N patients assessed	N patients diagnosed with BE	Preoperative screening endoscopy	BE confirmed with histopathology	Data allowing for analysis of progression rates	Data allowing for regression rates	Preoperative BMI (kg/m^2)	% female patients	Follow-up duration (months)
Ben Amor I. 2020 [130]	France	Retrospective cohort study	LSG + Fundoplication	70	0	Yes	Not specified	No	No	40	56	12
Olmi S. 2020 [131]	Italy	Retrospective cohort study	LSG + Fundoplication	220	4	Yes	Yes	Yes	Yes	42.58	167	24
Liagre A.2020 [132]	France	Retrospective cohort study	OAGB	46	0	Yes	Not specified	No	No	43.2	NA	96
Ferraz AAB. 2020 [89]	Brazil	Retrospective cohort study	LSG	459	0	Yes	Not specified	No	No	39.7	393	20.8
Lallemand L.2021 [133]	France	Retrospective cohort study	LSG	59	5	Yes	Yes	No	No	45.2	48	60
Boru C. E. 2020 [134]	Italy	Retrospective cohort study	LSG	55	1	Yes	Not specified	No	No	44	NA	50.9
Braghetto I, 2021 [135]	Chile	Retrospective cohort study	LSG	39	5	Not specified	Not specified	No	No	38.4	NA	26.8
Al Sabah S. 2021 [103]	Kuwait	Retrospective cohort study	LSG	92	2	Yes	Not specified	No	No	46.8	NA	60
Jaruvongvanich V. 2021 [136]	USA	Retrospective cohort study	RYGB	49	49	Yes	Yes	Yes	Yes	39.6	34	85
Leslie D. (RYGB) 2021 [137]	USA	Retrospective cohort study	RYGB	8362	93	Yes	Not specified	No	No	NA	6637	31.2
Leslie D. (LSG) 2021 [137]	USA	Retrospective cohort study	LSG	8362	60	Yes	Not specified	No	No	NA	6576	31.2
Elkassem S.2021 [76]	Canada	Retrospective cohort study	LSG	58	7	Not specified	Yes	No	No	49.07	46	36

Table 6 (continued)

Author and publication year	Country	Study design	Bariatric surgery procedure	N patients assessed	N patients diagnosed with BE	Preoperative screening endoscopy	BE confirmed with histopathology	Data allowing for analysis of progression rates	Data allowing for regression rates	Preoperative BMI (kg/m^2)	% female patients	Follow-up duration (months)
Znamirowski P.2021 [138]	Poland	Retrospective cohort study	LSG	35	3	Not specified	Yes	No	No	45.26	NA	N/A
Jedamzik J.2022 [139]	Austria	Retrospective cohort study	OAGB	64	7	Not specified	Yes	No	No	44.4	64	29.1
Szymanski M. 2022 [140]	Poland	Retrospective cohort study	OAGB	50	4	Yes	Yes	No	No	43.7	43	24
Ferrer J.2022 [59]	Spain	Retrospective cohort study	LSG	105	1	Yes	Not specified	No	No	46.3	74	60
Braghetto I. 2022 [141]	Chile	Prospective cohort study	RYGB	38	3	Not specified	Yes	No	No	45.2	33	N/A
Salminen P. (LSG) 2022 [8]	Finland	Randomised-controlled trial	LSG	91	4	Yes	Yes	No	No	47.3	NA	120
Salminen P. (RYGB) 2022 [8]	Finland	Randomised-controlled trial	RYGB	85	3	Yes	Yes	No	No	48.4	NA	120
Uccelli M.2022 [142]	Italy	Prospective cohort study	LSG+Fundoplication	127	2	Yes	Yes	No	No	42.4	95	60
Csendes A. 2022 [143]	Chile	Retrospective cohort study	RYGB	92	8	Yes	Yes	Yes	Yes	38.8	77	128.4
Felsenreich D.2022 [144]	Austria	Retrospective cohort study	LSG	16	2	Yes	Yes	No	No			180
Kermansaravi M. 2023 [145]	Iran	Retrospective cohort study	LSG	105	6	Yes	Yes	No	No	45.4	88	60
Braga JGR. 2023 [146]	Brazil	Retrospective cohort study	OAGB	39	1	Yes	Yes	No	No	37.6	36	24

Table 6 (continued)

Author and publication year	Country	Study design	Bariatric surgery procedure	N patients assessed	N patients diagnosed with BE	Preoperative screening endoscopy	BE confirmed with histopathology	Data allowing for analysis of progression rates	Data allowing for regression rates	Preoperative BMI (kg/m^2)	% female patients	Follow-up duration (months)
Hutopila I. 2023 [147]	Romania	Prospective cohort study	LSG	273	0	Yes	Yes	No	No	43.4	178	12
Felsenreich D.2023 [148]	Austria	Prospective cohort study	OAGB	21	2	Yes	Yes	No	No	44.7	15	61.2
Castagneto_ Gissey L. 2023 [149]	Italy	Retrospective cohort study	RYGB	2	2	Yes	Yes	Yes	Yes	46.5	2	12
Swei E. 2023 [150]	USA	Retrospective cohort study	LSG	453	29	Yes	Not specified	No	No	NA	367	60
Woelnerhanssen B. (LSG) 2023 [61]	Switzerland	Prospective cohort study	LSG	83	3	Yes	Yes	No	No	44.73	55	84
Woelnerhanssen B. (RYGB) 2023 [61]	Switzerland	Prospective cohort study	RYGB	86	2	Yes	Yes	No	No	42.93	62	84
Coupaye M. 2023 [151]	France	Retrospective cohort study	LSG	162	0	Yes	Not specified	No	No	43.2	147	54
Hurtado A. (LSG) 2024 [152]	USA	Retrospective cohort study	LSG	8924	35	Not specified	Not specified	No	No	41.8	5628	12
Hurtado A. (RYGB) 2024 [152]	USA	Retrospective cohort study	RYGB	8925	45	Not specified	Not specified	No	No	41.8	5628	12
Moulla Y. (RYGB) 2023 [26]	Germany	Retrospective cohort study	RYGB	54	54	Yes	Yes	Yes	Yes	47	32	N/A
Moulla Y. (LSG) 2023 [26]	Germany	Retrospective cohort study	LSG	20	20	Yes	Yes	Yes	Yes	55.5	12	N/A
Brinas P. 2024 [153]	France	Retrospective cohort study	LSG + Fundoplication	74	74	Yes	Yes	Yes	Yes	43.4	29	24

Table 6 (continued)

Author and publication year	Country	Study design	Bariatric surgery procedure	N patients assessed	N patients diagnosed with BE	Preoperative screening endoscopy	BE confirmed with histopathology	Data allowing for analysis of progression rates	Data allowing for regression rates	Preoperative BMI (kg/m^2)	% female patients	Follow-up duration (months)
Robert M. 2024 [154]	France	Randomised-controlled trial	OAGB	32	2	Not specified	Not specified	No	No	44	24	24
Dantas A. 2024 [155]	Brazil	Retrospective cohort study	LSG	68	0	Yes	Not specified	NA	No	47.97	63	73
Bege T. 2024 [156]	France	Retrospective cohort study	LSG + Fundoplication	22	5	Yes	Not specified	Yes	Yes	44	19	24
Saarinen T. 2020 [157]	Finland	Retrospective cohort study	OAGB	38	0	Yes	Not specified	No	No	45.2	29	6
Eldredge T. 2022 [158]	Australia	Retrospective cohort study	OAGB	19	0	Yes	Not specified	No	No	45.7	15	6
Haggag M. 2021 [159]	Turkey	Retrospective cohort study	OAGB	40	0	Yes	Not specified	No	No	54.1	31	18
Pizza F. 2020 [160]	Italy	Retrospective cohort study	OAGB	68	0	Yes	Not specified	No	No	44.93	44	24
Slagter N. 2021 [161]	Netherlands	Retrospective cohort study	OAGB	414	2	Not specified	Yes	No	No	42	340	13.5
Soprani A. 2021[162]	Italy	Retrospective cohort study	OAGB	2087	5	Not specified	Not specified	No	No	41.95	1774	60

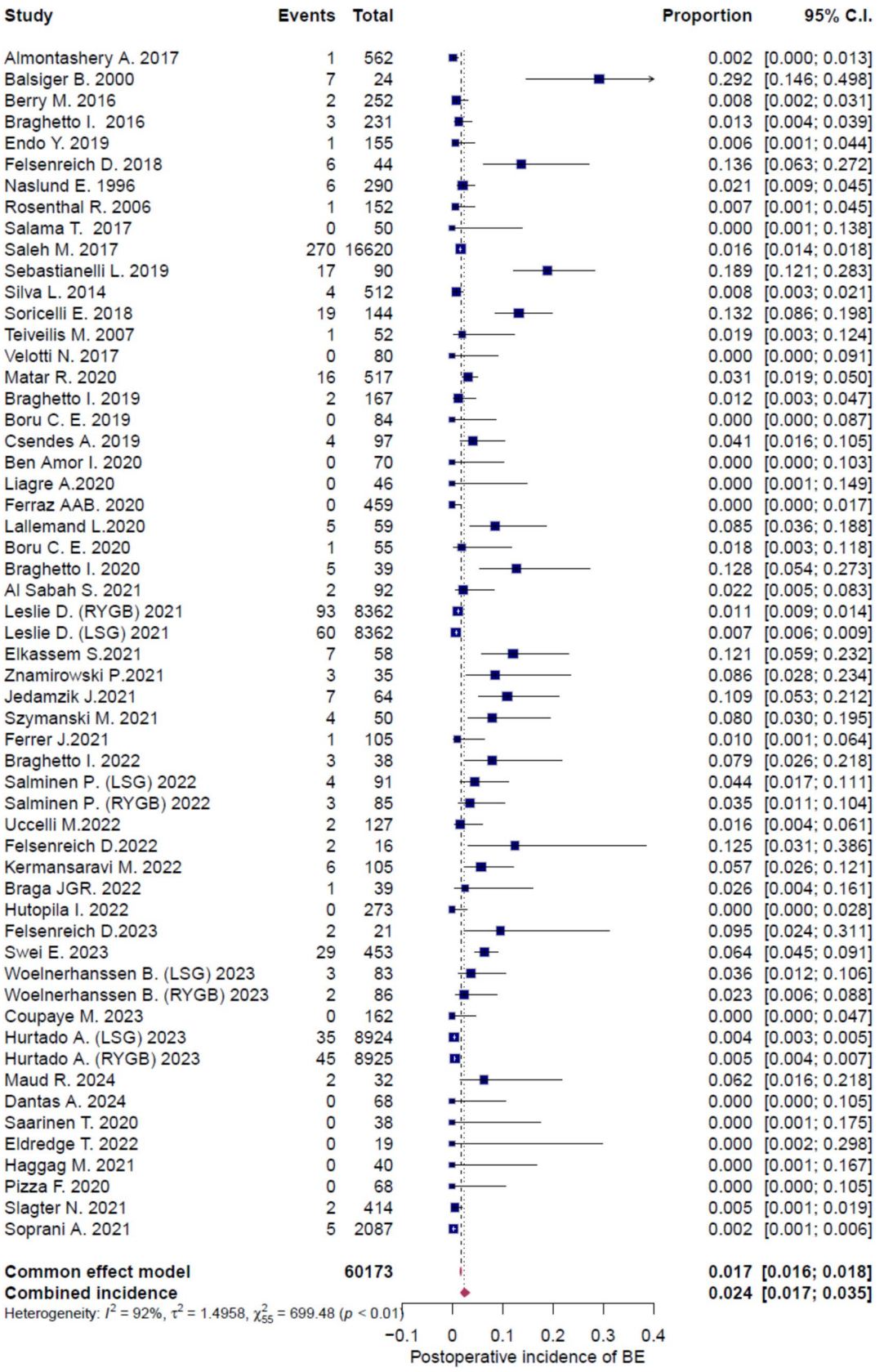


Fig. 3 Incidence of BE after MBS

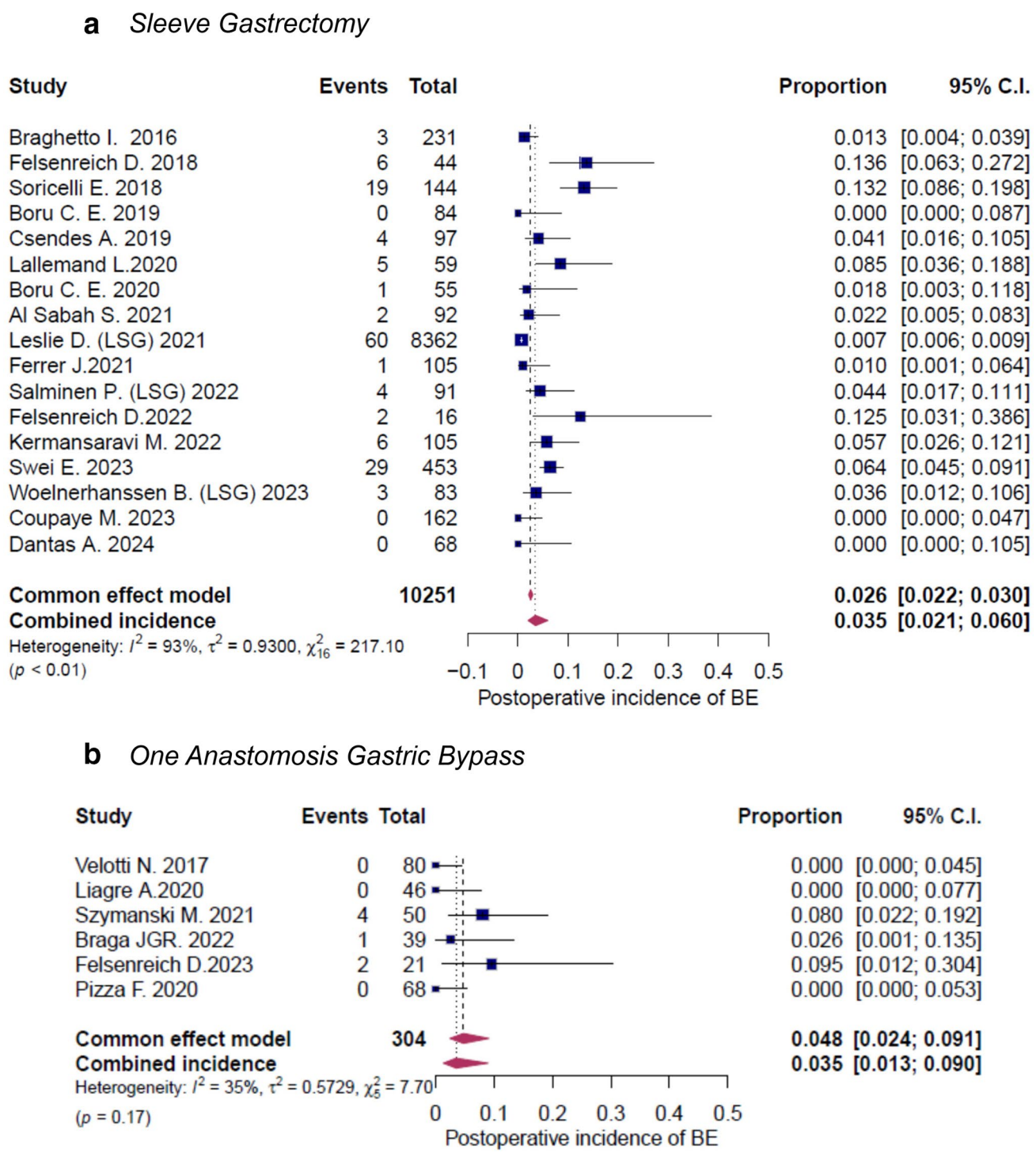


Fig. 4 BE after MBS including only studies with patients who had undergone preoperative screening Endoscopy and had follow-up UGIE at a minimum of 2 years post-procedure. **a** Sleeve gastrectomy. **b** One anastomosis gastric bypass. **c** Roux-en-Y gastric bypass

studies), the overall pooled ES was 33% (95% CI 26–40%, $I2 = 98.7\%$). Symptomatic patients had abnormal findings in 29% (95% CI 16–44%, $I2 = 99.41\%$.) of investigations. In contrast, abnormal findings were identified in 36% (95% CI 20–53%, $I2 = 99.5\%$) of asymptomatic patients.

Another reason to consider a baseline pre-MBS UGIE is the frequency of GERD symptoms after MBS, and the unpredictable correlation with new pathology after MBS. Whilst the SLEEVEPASS RCT found all patients with de novo BE had symptoms of GERD that were either the

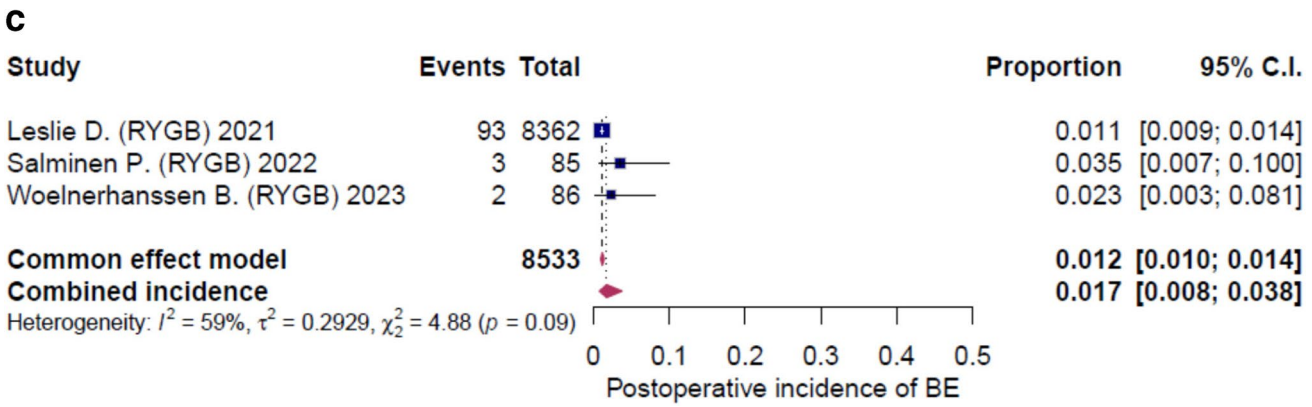


Fig. 4 (continued)

same or worse than pre-MBS, de novo esophagitis was less predictably associated with changes in pre- and post-MBS GERD symptoms, particularly for RYGB rather than SG patients [8]. A baseline UGIE may enable a better assessment of need for ongoing UGIE follow-up in addition to having an effect on the procedure choice.

Recommendation 1 – As symptoms are not an accurate predictor of pre-MBS pathology and/or susceptibility to post-MBS GERD, upper gastrointestinal endoscopy should be strongly considered prior to MBS

The post-operative incidence of BE after MBS was estimated at 2.4% (95% CI 1.66–3.45; $I^2 = 92.1\%$). Excluding a single study that reported the rate of BE after SG as 29.17%, the highest rate of BE was seen after SG 2.86 (95% CI 1.7–4.75%, *n* studies = 27), followed by OAGB 2.07% (95% CI 0.92–4.58%, *n* studies = 14) and RYGB 1.9% (95% CI 0.66–5.37%, *n* studies = 6).

When inclusion criteria were Limited to studies that included patients who had undergone a pre-operative screening Endoscopy and then follow-up Endoscopy that was performed at least 2-years following the MBS procedure, the pooled post operative incidence of de novo BE following SG was 3.53% (95% CI 2.05–5.99%, *n* studies = 17; 10,251 patients), 3.5% following OAGB (95% CI 1.3–9.0%, *n* studies = 6; 304 patients) and 1.7% following RYGB (95% CI 0.8–3.8%; *n* studies = 3; 8533 patients).

In the only RCT to report de novo BE, SLEEVEPASS, rates were similar for SG (four of 91 patients (4%)) but higher for RYGB (three of 85 (4%)) at 10-year follow up [8]. The lack of other high-level longer term studies documenting de novo Barretts, as well as the heterogeneity of the available data, are important Limitations of this current Position Statement given the timeframe to develop Barretts is likely longer than 2 years.

People living with GERD have a 5–12% risk of harboring BE [29, 30]. In the SLEEVEPASS RCT, people with de novo BE after LSG or RYGB all had GERD symptoms that were either the same as preoperatively, or worse than preoperatively. No patients were asymptomatic [8]. The updated guidelines from the American College of Gastroenterologists [21] and American Society for Gastrointestinal Endoscopy [31] recommend no surveillance endoscopy for people with GERD unless there are "alert" symptoms such as dysphagia, odynophagia, weight loss, anemia or gastrointestinal bleeding.

Given the rates of de novo BE found after an MBS procedure are lower than those seen in people living with GERD, and there is a signal to suggest that patients who develop BE after MBS will usually have GERD symptoms, it would seem reasonable to also only suggest UGIE after MBS for those with "alert" symptoms, particularly if they have had a pre-MBS UGIE.

Recommendation 2 –Upper gastrointestinal gastroscopy must be performed after MBS if patients develop alert symptoms such as dysphagia, odynophagia, weight loss, anemia or gastrointestinal bleeding

Recommendation 3 – People with incident or refractory GERD after MBS should undergo an upper gastrointestinal endoscopy

The rates of both regression and progression of known BE present prior to MBS remain poorly defined. Given there is no evidence that MBS accelerates BE progression to dysplasia and EAC, even after SG, it is recommended that the usual surveillance pathways as recommended by other professional societies be followed (Table 1) [21–25, 31].

Recommendation 4 – Patients undergoing MBS with known BE should remain on a surveillance program as recommended by the relevant national professional society or body

The paucity of information on the progression and regression of BE after SG, OAGB and RYGB makes it difficult to provide strong recommendations on the relative appropriateness of different MBS procedures for people

living with both obesity and BE. We suggest that a personalised approach be taken, with the potential risks and benefits of each MBS procedure being outlined to a person with BE considering MBS to enable shared decision-making on the most acceptable MBS procedure type.

Recommendation 5 – Patients living with GERD and/or BE should be fully informed about the relative risks of the various MBS procedures to enable shared-decision making

Recommendation 6 – For patients with known BE, bypass procedures may be preferred

Recommendation 7 – More research, including registry studies, needs to be undertaken to better delineate the impact of MBS on known BE

Conclusion

This IFSO Position Statement provides guidance for clinicians on UGIE before and after MBS as well as how BE may impact surgical decision making and follow-up. The need for more high-level data is noted, with existing data having significant Limitations due to the heterogeneity of the data and short follow up times in the majority of studies. For this reason, this Position Statement should be reviewed with updated literature in 3 years' time.

Acknowledgements The authors acknowledge the contribution of Professor Ricardo Cohen and the IFSO Scientific Committee in reviewing and revising this paper.

Author contribution All authors were involved with study planning. OMF, YJ and JA did the systematic reviews and systematic analyses. All authors contributed to the development of the seven recommendations. WAB wrote the first draft and all authors reviewed the manuscript.

Data Availability No datasets were generated or analysed during the current study.

Declarations

Ethics Approval Not relevant to this type of paper.

Competing interests WB reports: Grants from Johnson and Johnson, Medtronic, GORE, Applied Medical, Novo Nordisk, NHMRC, Myerton and the Australian Commonwealth Government. Personal fees from Johnson and Johnson, GORE, Novo Nordisk, Pfizer, Medtronic, Lily and Merck Sharpe and Dohme for lectures and advisory boards. OMF reports: no relevant disclosures YJ reports: no relevant disclosures JA reports: no relevant disclosures CS reports: no relevant disclosures RM reports: no relevant disclosures CP reports: Personal fees from J&J, Medtronics, Boston Scientific for educational lectures JBD reports: Personal fees from Health ED, Novo Nordisk, Lily, Nestle Health Science and Reshape Lifesciences, for lectures, advisory boards and/or consultancies. PS reports: Lecture fees from Novo Nordisk, BD, and Johnson & Johnson. Data safety monitoring committee for GT Metabolic. Research grants Sigrid Jusélius Foundation, Academy of Finland, and European Research Council.

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Authors and Affiliations

Wendy A. Brown[1,2] · Oliver M. Fisher[3,4] · Yazmin Johari[1,2] · Jessica Au[1,2] · Christine Stier[5] · Rachel Moore[6] · Chetan Parmar[7,8] · John B. Dixon[9] · Paulina Salminen[10,11]

✉ Wendy A. Brown
Wendy.Brown@monash.edu

Oliver M. Fisher
ofisher83@gmail.com

Yazmin Johari
yazmin.johari@gmail.com

Jessica Au
j.au@alfred.org.au

Christine Stier
christinestier@googlemail.com

Rachel Moore
rachel.moore@mooremetabolics.com

Chetan Parmar
drcparmar@gmail.com

John B. Dixon
profjohndixon@gmail.com

Paulina Salminen
Paulina.Salminen@tyks.fi

[1] Department of Surgery, School of Translational Medicine, Monash University, Melbourne, Australia

[2] OesophagoGastric and Bariatric Unit, Alfred Health, Melbourne, Australia

[3] Upper GI Surgery Unit, St George Hospital, Sydney, Australia

[4] Discipline of Surgery, University of New South Wales, Sydney, Australia

[5] Department of Surgery, Interdisciplinary Endoscopy, University Medical Center Mannheim, Heidelberg University, Mannheim, Germany

[6] Private Practitioner, Denver, CO, USA

[7] University College London, London, United Kingdom

[8] Whittington Hospital NHS Trust, London, United Kingdom

[9] Iverson Health Innovation Research Institute, Swinburne University of Technology, Melbourne, Australia

[10] Division of Digestive Surgery and Urology, Turku University Hospital, Turku, Finland

[11] Department of Surgery, University of Turku, Turku, Finland