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ORIGINAL CONTRIBUTIONS

Single Anastomosis Duodenal-Ileal Bypass with Sleeve Gastrectomy/One Anastomosis Duodenal Switch (SADI-S/OADS) IFSO Position Statement

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Abstract
The International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) has played an integral role in educating both the metabolic surgical and the medical community at large about the role of innovative and new surgical and or endoscopic interventions in treating adiposity-based chronic diseases. The single anastomosis duodenal-ileal bypass with sleeve gastrectomy (SADI-S) is also called the one anastomosis duodenal switch (OADS). This is a relatively new procedure that has been proposed as an alternative to the currently accepted duodenal switch (DS) procedure. The IFSO commissioned a task force (Appendix 1) to determine if SADI-S/OADS is an effective and safe procedure and if it should be considered a surgical option for the treatment of adiposity and adiposity-based chronic diseases. The following position statement is issued by the IFSO SADI-S/OADS task force and approved by the IFSO Executive Board. This statement is based on current clinical knowledge, expert opinion and published peer-reviewed scientific evidence. It will be reviewed in 2 years.

Keywords Position statement · IFSO · OADS · SADI

Preamble

The International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) has played an integral role in educating both the metabolic surgical and the medical community at large about the role of innovative and new surgical and or endoscopic interventions in treating adiposity-based chronic diseases.

The single anastomosis duodenal-ileal bypass with sleeve gastrectomy (SADI-S) is also called the one anastomosis duodenal switch (OADS). This is a relatively new procedure that has been proposed as an alternative to the currently accepted duodenal switch (DS) procedure. The IFSO commissioned a task force (Appendix 1) to determine if SADI-S/OADS is an effective and safe procedure and if it should be considered a surgical option for the treatment of adiposity and adiposity-based chronic diseases.

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The following position statement is issued by the IFSO SADI-S/OADS task force and approved by the IFSO Executive Board. This statement is based on current clinical knowledge, expert opinion and published peer-reviewed scientific evidence. It will be reviewed in 2 years.

Background

The concept of duodenal switch was proposed in 1987 by DeMeester et al. as an alternative to RYGB for the treatment of bile reflux [1]. Traverso and Longmire reported the advantages of pylorus preservation in a complex procedure such as the pancreaticoduodenectomy [2]. This technique was then adapted to bariatric surgery in 1989 by Hess and Marceau [3, 4], creating the biliopancreatic diversion procedure (BPD).

Like the BPD, the DS has been demonstrated in long-term studies to provide significantly greater weight loss than other bariatric procedures with concurrent sustained improvement in metabolic health [5]. However, the side effects of DS relating to malabsorption of fat-soluble vitamins, micronutrients

and protein as well as steatorrhea have limited the broad acceptability of this procedure. These side effects also mean that careful patient education and expert aftercare is required [6]. In the most recent IFSO global survey of bariatric surgical procedures, BPD and DS accounted for 1.1% of all procedures performed worldwide [7].

SADI-S/OADS was proposed in 2007 by Sanchez-Pernaute, Torres et al. as a modification of DS, anastomosing the duodenum directly to an omega loop of ileum 200 cm proximal to the ileo-caecal valve, eliminating the need for the Roux-en-Y jejunal-ileal anastomosis [8]. Theoretical benefits over DS included reduction of the operative risk by eliminating one anastomosis with potentially similar weight loss and health benefits (Fig. 1).

Comparison of DS to SADI-S/OADS

Since the Sanchez-Pernaute and Torres' paper, other similar one anastomosis duodenal switch procedures have been reported in the literature: SIPS (stomach intestinal pyloric sparing surgery) [9], single anastomosis duodenal-jejunal bypass with sleeve gastrectomy (SADJB-SG) [10], loop duodeno-jejunal bypass with sleeve gastrectomy (LDJB-SG) [11], single anastomosis duodenal switch, distal loop duodeno-ileostomy (DIOS) and proximal duodeno-jejunotomy (DJOS) [12].

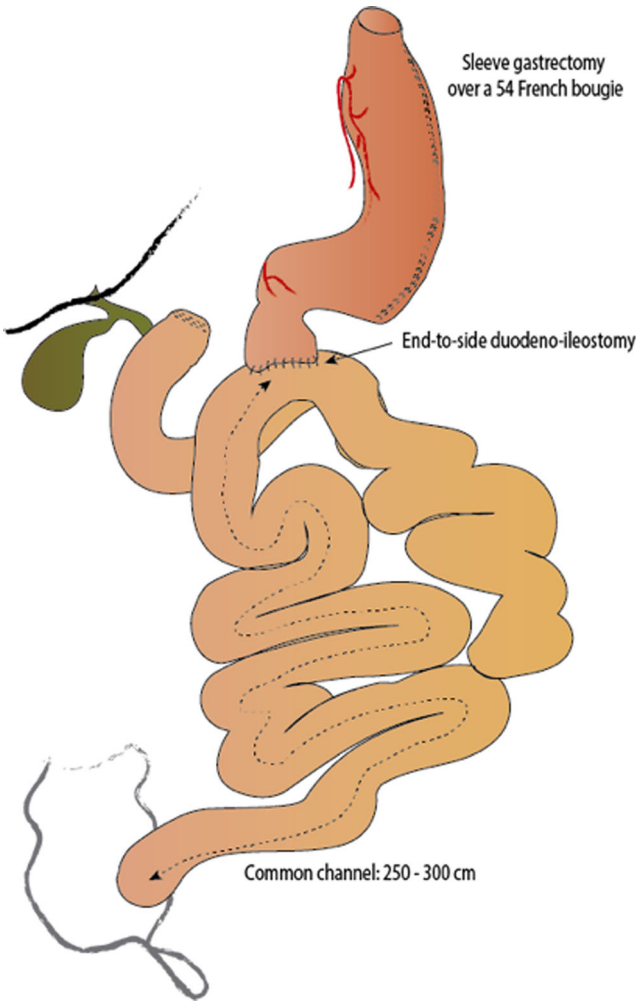

Fig. 1 Diagramme of a typical SADI-S/OADS

There has been an increasing interest in these procedures, particularly in the context of revisional bariatric surgery. The task force undertook a systematic review to summarise the current evidence on these procedures with the aim of providing the most up-to-date information to guide practice.

Methods

Literature Search

We performed a comprehensive literature search to identify studies reporting any experience or outcomes with the SADI-S/OADS. The search was done in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement. We searched MEDLINE (1946 to June 2017), EMBASE (1974 to June 2017), PubMed (until June 2017) and the Cochrane Library (until June 2017). Search terms were broad, to encompass all single anastomosis pylorus-preserving procedures (SAPPP). These include terms specifying the bariatric procedure (*duodenal switch*, *biliopancreatic bypass*, *duodenoileal bypass*, *duodenojejunal bypass*, *bariatric surgery*) and single anastomosis (*single anastomosis*, *loop anastomosis*, *one anastomosis*, *omega loop*, *mini*). A full list of search terms is presented in Appendix 2 (Table 2). Manual searching of reference lists from reviews, as well as references from selected primary studies, was performed to identify any additional studies.

Inclusion Criteria

Studies were selected based on any data or reported experiences with single anastomoses pylorus-preserving procedures. All study designs, study sizes and follow-up time frames were accepted. Abstracts were included, but separated from full manuscript publications.

Data Extraction

Information extracted from eligible studies included basic study data (year, country, design, study size), demographic data, surgical technique, follow-up, weight loss, evolution of co-morbidities and complications.

Results

Literature Search

Using the search strategy described, we identified 3771 studies. After 573 duplicates were removed, we screened titles and abstracts for 3198 records. Sixty-five eligible articles were identified, of which 43 were conference abstracts. Hence, 22 full-length publications were identified for inclusion [9–30] (Fig. 2).

Outcomes from SADI-D/OADS

There are currently 17 case series and 5 case reports on SADI-D/OADS which are summarised in Table 1. There is insufficient data within the case reports to inform practice, and these will not be considered for the purpose of this position paper.

The SADI-D/OADS has been reported in both the primary and the secondary setting.

Primary

There are 14 case series that include primary patients (detail in Table 1). In total, there are 1045 patients reported upon; however, this is an over estimation due to shared patients between the reports from Sanchez-Pernaute and Torres [24–27]. Most series report short-term weight loss at 12 or 24 months with variable means of reporting weight loss being used. Mean total body weight loss (TBWL) is reported as ranging from 37 to 38.9% at 12 months, 41 to 48% at 18 months and 34 to 39% at 2 years. Mean excess weight loss (EWL) is reported as ranging from 61.6 to 95% at 12 months. The longest time point currently reported for follow-up is at 5 years. In this report, the TBWL achieved was 38% (24 patients, 66.7% follow-up) [25]. Changes in T2DM diagnosis and treatment were reported in 5 case series including primary patients. There was a significant improvement in both HBA1c and requirement for hypoglycaemic agents.

Secondary

There are 5 case series that include revisional patients (detail in Table 1). In total, there are 58 patients included in these reports. The weight loss achieved appears to be similar to primary patients, but the lack of consistent reporting and small numbers make meaningful comparison impossible. The effect on T2DM appears similar to the primary procedures.

Early complications were uncommon in all series with anastomotic leaks, bleeding and nausea being the predominant issues. Late complications were nutritional with several reports of hypoalbuminemia and iron deficiency. GERD was also reported as was dumping syndrome and flatulence. Long-term need for re-operation has not been reported although revisional procedures have been described [27].

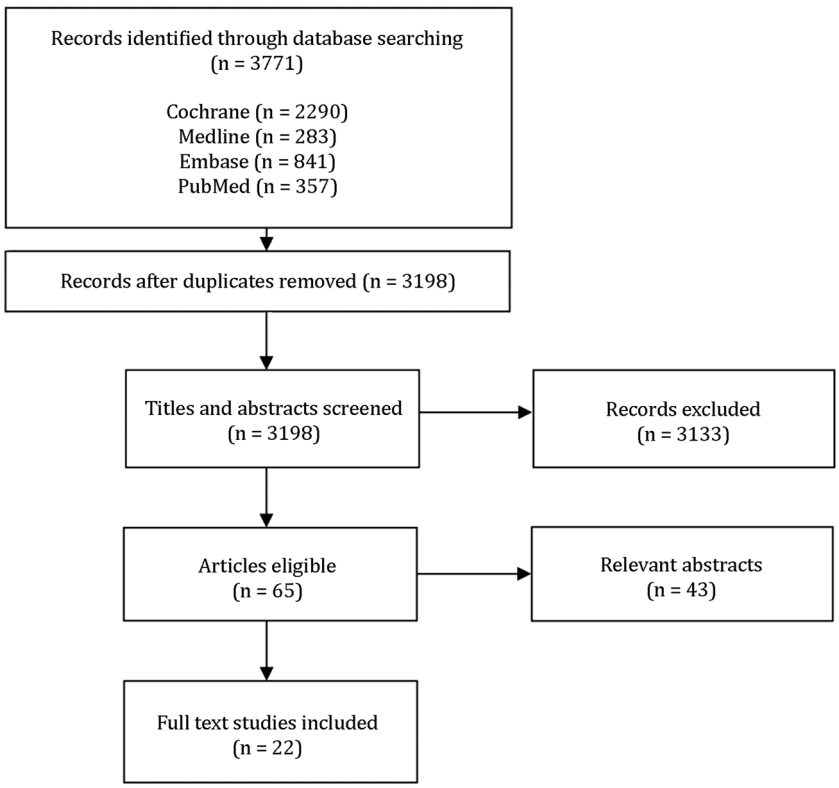

Fig. 2 PRISMA flowchart

Table 1 Study data

Study data	Procedure	*n*=	Primary or revision	Maximum time point and %follow-up	Male gender	Start BMI (kg/m^2)	Weight loss achieved	T2DM resolution	Early complications *requiring re-operation	Long-term complications *requiring re-operation
Mitzman, 2016 (USA)	Stomach intestinal pylorus sparing (SIPS) surgery Retrospective cohort (single arm)	123 (proxi-mal)	Primary	12 months 64/102 patients (62.7%)	36.6% (45)	49.4 ± 9.2	TBWL 38.6 ± 0.7 (1 year)	NR	1 bleeding prepyloric ulcer* (converted to RYGB) 2 constipation, 2 diarrhoea, 4 intraabdominal haematoma, with 1 infection 1 gastric sleeve stricture 1 dysphagia	Not reported
Nelson, 2016 (USA)	Single anastomosis duodeno-ileal bypass with sleeve gastrectomy (SADI-S) Cohort study (single arm)	69	Primary	12 months 24/69 patients (34.8%)	30.4% (21)	58.4 ± 8.3 (range 42.3–91.8)	TBWL 37.3% EWL 61.6%	9/18 patients with diabetes at baseline (50%)	1 duodeno-ileal obstruction with perforation of small bowel* 1 sleeve leak* 1 duodenal stump leak* 3 low oral intake, 1 post-operative bleed, 1 atelectasis 3 30-day readmission (tachycardia, DVT, viral gastroenteritis)	Not reported
Surve, 2017 (USA)	Stomach intestinal pylorus sparing (SIPS) surgery Retrospective cohort (single arm)	120	Primary	24 months (27 patients) 73 patients (of possible 95) at 1 year 52/69 at 2 years 27/38 at 3 years	35.0% (42)	49.5 ± 9.4	TBWL 34.2% (32.3–36.0) at 24 months	Abnormal BSL 64/118 to 13/81 Abnormal HbA1c 61/109 to 7/72	1 acute blood loss anaemia 1 intraabdominal haematoma*	1 diarrhoea, 2 constipation, 1 malnutrition, 2 hiatus hernia 4 sleeve stricture 2 retrograde filling of afferent limb 1 common channel lengthening
Cottam, 2016a (USA)	Loop duodenal switch Matched cohort study (LDS vs GBP)	54 (distal)	Primary	18 months %follow-up NR	29.6%	47.6 ± 8.8	TBWL 41% (39.3–42.7)	NR	1 nausea 1 abdominal wall spasm	1 sleeve stricture 1 dilated fundus* 1 GERD, 1 diarrhoea, 1 miscounted small bowel*
Grueneberger, 2014 (Germany)	Duodeno-jejunostomy or duodeno-ileostomy	16 (7 DJOS, 9 DIOS)	Primary and secondary.	6 months %follow-up NR	25% (3 DIOS,	DIOS 40.6 (33.2–55.9),	EWL 46.5% (DJOS),		1 trocar perforation	1 revision operation 10 significant reflux

Table 1 (continued)

Study data	Procedure	*n*=	Primary or revision	Maximum time point and %follow-up	Male gender	Start BMI (kg/m^2)	Weight loss achieved	T2DM resolution	Early complications *requiring re-operation	Long-term complications *requiring re-operation
	with sleeve gastrectomy (DJOS and DIOS) Cohort study		5 revision DIOS (2 IGB, 1 LAGB, 2 RYGB), 4 revision DJOS (4 LAGB)		1 DJOS)	DJOS 41.6 (35.7–47.9)	49.6% (DIOS)	HbA1c decrease 6.8 to 5.7% (DIOS), 8.0 to 5.9 (DJOS). DIOS 8/9 diabetic, with 1/9 diabetic at end (87.5% remission)		14 PPI treatment 8 diarrhoea 1 dumping syndrome 10 flatulence
Huang, 2013 (Taiwan)	Loop duodeno-jejunal bypass with sleeve gastrectomy (LDJB-SG) Cohort study (single arm)	22 (proximal)	Primary	6 months %follow-up 100%	40%	28.4 ± 4.03 (range 21.8–38.3)	End BMI 23.4 ± 3.4	11 (50%)	1 gastric stricture*	N/A
Huang, 2016 (Taiwan)	LDJB-SG (Patient crossover with Huang 2013) Matched cohort study (RYGB vs LDJB-SG)	30 (proximal)	Primary	12 months %follow-up 100%	40% (12)	28.2 ± 3.6	End BMI 22.4 ± 2.5 (− 5.8 ± 2.4)	16 (53.3%)	1 bleed 1 gastric stricture* 1 wound infection	1 ventral hernia* 4 reflux 13 erosive esophagitis
Lee, 2015 (Taiwan)	Duodenal-jejunal bypass with sleeve gastrectomy (DJB-SG) Matched cohort study (DJB-SG vs SG alone)	89 (proximal)	Primary	12 months %follow-up 29.2% (26)	36.0% (32)	35.1 ± 5.9	EWL 87.2 ± 14.9% BMI 23.9 ± 2.2	27/29 (93.1%) Mean decrease in HbA1c 2.8%	4 bleeding (*1 re-operation) 2 marginal ulcer, 1 ARDS, 2 wound infection, 1 vomiting, 1 dehydration, 1 atelectesis	1 stricture*
Lee, 2014 (Taiwan)	Single anastomosis duodeno-jejunal bypass with sleeve gastrectomy (SADJB-SG) Cohort study (SADJB-SG vs MGB vs RYGB)	50 (proximal)	Primary	12 months %follow-up 68% (34)	19 (38%)	38.4 ± 6.0	TBWL 32.7% BMI 25.9 ± 4.6 kg/m^2	HbA1c 9.2 ± 2.1 to 6.1 ± 0.9% BSL 150.9 ± 68.5 to 109.2 ± 39.3 mg/dl	1 wound infection, 1 gastric stasis, 1 prolonged intubation	
Morales, 2012 (Chile)	SADI-S Cohort study (single arm)	100 (distal)	Primary	Not specified. No long-term follow-up described	19%	37.05	NR	NR	3 sleeve leaks (*2 re-operation) 3 duodenal stump leaks (*1 re-operation) 1 bleed*, 2 intestinal injuries, 1 portal vein thrombosis, 1 sleeve stenosis*,	

Table 1 (continued)

Study data	Procedure	*n*=	Primary or revision	Maximum time point and %follow-up	Male gender	Start BMI (kg/m^2)	Weight loss achieved	T2DM resolution	Early complications *requiring re-operation	Long-term complications *requiring re-operation
									1 early trocar site hernia* 0 mortality	
Sanchez-Pernaute, 2010 (Spain)	Single anastomosis duodeno-ileal bypass with sleeve gastrectomy (SADI-S) Cohort study (single arm)	50^ (distal) ^shared patients	Primary	3 years %follow-up 98% (49)	36% (18)	44.2 (range 33–67)	EWL 114 ± 9.6% at 2 years, > 100% during the 3rd year	BSL 174.5 (91–292) to 97 (65–101) 90% abnormal BSL to no abnormal BSL. HbA1c 7.6 (5.4–10.5) to 5.4% (4.1–6.5)	1 staple line bleed requiring endoscopic intervention 1 early hernia* 2 sleeve leaks	1 late subphrenic abscess (8 months post-operative) 4 clinical hypoalbuminaemia (1 mortality 3-months post-operatively from respiratory decompensation)
Sanchez-Pernaute, 2013 (Spain)	Single anastomosis duodeno-ileal bypass with sleeve gastrectomy (SADI-S) Cohort study (single arm)	100^ (distal) ^shared patients	Primary (93) and revision (7 after SG)	4 years 75% at 1 year 46% at 2 years 20% at 3 years 4% at 4 years "Follow-up complete for 99% (99)"—pg 732, last paragraph	37% (37)	Primary 44.6 (range 33–67) Revision 48.5 (range 37.6–54.6)	EWL 95% at 12 months	BSL 178.2 (91–408) to 94.7 (1st year) and 79.6 (4th year) HbA1c 7.9 (5.4–13) to 5.3 (1st year) and 5.0 (4th year) 45 of 49 patients (F/U > 1 year) had T2DM remission	2 sleeve leaks 1 duodeno-ileal anastomotic leak 1 gastric haemorrhage requiring endoscopic treatment 1 trocar site hernia*	2 symptomatic hypoalbuminaemia*
Sanchez-Pernaute, 2015a (Spain)	SADI-S Cohort study (single arm)	16^ (distal) ^shared patients	Revision	Mean F/U 21 months (range 2–46 months) 87.5% (14 at 6 months) 62.5% (10 at 1 year) 31% (5 at 2 years)	25% (4)	44 (range 35.5–55.8)	BMI 35 (31.6–37) at 2 years	75% (3/4) remission after SADI-S		1 symptomatic hypoalbuminaemia
Sanchez-Pernaute, 2015b (Spain)	SADI-S Cohort study (single arm)	97^ (distal) ^shared patients	Primary and revision	Various, up to 5 years. Main results reported for 1 year 86/90 (95.6%) at 1 year 74/80 (92.5%) at 2 years 66/70 (94%) at 3 years	46.4% (45)	44.3 (range 33–67)	TBWL 39% (1 year) 39% (2 years) 35% (3 years) 37% (4 years) 38% (5 years)	71.6% (1 year) 77% (2 years) 75.8% (3 years) 63.3% (4 years) 52% (5 years)	1 anastomotic leak 1 hemoperitoneum* 1 incarcerated umbilical hernia*	

Table 1 (continued)

Study data	Procedure	*n*=	Primary or revision	Maximum time point and %follow-up	Male gender	Start BMI (kg/m^2)	Weight loss achieved	T2DM resolution	Early complications *requiring re-operation	Long-term complications *requiring re-operation
				46/53 (86.8%) at 4 years 24/36 (66.7%) at 5 years						
Balibrea, 2017 (Spain)	Single anastomosis duodeno-ileal bypass with sleeve gastrectomy (SADI-S) Cohort study (single arm)	30	Revision (after SG)	24 months 16/30 (53.3%)	26.7% (8)	33.2 ± 5.0	EWL 44.3% ± 35.0	5 patients (of 7 with follow-up)	1 pulmonary atelectasis 1 rectus sheath hematoma (percutaneous embolization) 2 anastomotic leaks*	3 severe hypoalbuminemia* requiring TPN 1 pneumonia 1 acute hepatitis 7 severe iron-deficiency anaemia 3 dumping
Cottam, 2017 (USA)	Stomach intestinal pylorus saving (SIPS) surgery Cohort study (SIPS vs BPD-DS)	61	Primary	24 months 40 at 12 months 19 at 24 months Overall, 19 patients at 24 months (31.1%)	37.7% (23)	50.2 ± 8.6	BMI 29.1 ± 4.7 (24 months) TBWL 38.7% ± 9.3	86% of diabetic patients with HbA1c < 6.0 7 of 36 patients with abnormal HbA1c at 1 year (35 of 54 at baseline)	8 nausea, 3 vomiting, 2 low oxygen saturation, 2 ileus 1 small bowel perforation* 1 sleeve stricture 1 post-operative bleed	1 diarrhoea with malnutrition* 3 abdominal pain, 6 GERD, 4 nausea/vomiting, 1 inadequate weight loss, 2 constipation, 1 gastric stenosis
Cottam, 2016b (USA)	Sleeve gastrectomy with 300-cm loop duodenal switch Retrospective matched cohort (SG vs LDS-SG)	53	Primary	18 months 36 (67.9%)	35.8% (19)	46.2 ± 7.6	TBWL 39.6% (38.5–40.7)	NR	1 nausea 1 post-operative bleed 1 wound infection	4 nausea, 2 constipation, 1 abdominal pain 3 diarrhoea (*1 re-operation) 1 dilated fundus* 2 sleeve strictures requiring endoscopic dilatation
Case reports on OADS										
Huang, 2015 (Taiwan)	LDJB-SG Case reports (×2)	2 (proximal)	Revision	6 months %follow-up 100%	0%	29 and 31 kg/m^2	26 and 28 kg/m^2	NR	None	N/A
Karcz, 2013 (Germany)	Gastric plication (GP) or sleeve gastrectomy (SG) with duodeno-ileal omega switch (DIOS) or duodeno-jejunal omega switch (DJOS) Technical paper	N/A	Primary and revision	N/A	N/A	N/A	N/A	N/A	N/A Videosurgery article, detailing technique of DJOS-GP, DJOS-SG, DIOS-GP and DIOS-SG. Review of literature performed. No outcomes reported	
		1 (proximal)	Revision	N/A	N/A	N/A	N/A	N/A	Internal hernia*	

Table 1 (continued)

Study data	Procedure	*n*=	Primary or revision	Maximum time point and %follow-up	Male gender	Start BMI (kg/m^2)	Weight loss achieved	T2DM resolution	Early complications *requiring re-operation	Long-term complications *requiring re-operation
Summerhays, 2016 (USA)	Loop duodenal switch (LDS) Case report									
Villalonga, 2015 (Spain)	Single anastomosis duodeno-ileal bypass after sleeve gastrectomy (SADI-S) Case series	3	Revision	3–9 months 1 patient with 3 months follow-up 2 patients with 9 months follow-up	100% (3)	34.3–46.5	BMI 28–33 kg/m^2	1 patient with T2DM at baseline had lower insulin requirements at follow-up		
Chiappetta, 2017 (Germany)	Conversion of SADI-S to RYGB Case report	1	Revision	32 months	0	53.4	%TBWL 20.0	NR		Intractable reflux and weight regain

NR, not reported; *IGB*, intragastric balloon; *SG*, sleeve gastrectomy; *RYGB*, Roux-en-Y gastric bypass; *DJB-SG*, duodeno-jejunal bypass with sleeve gastrectomy; *MGB*, mini/omega loop gastric bypass; *BSL*, blood sugar level; *TBWL*, total body weight loss; *T2DM*, type 2 diabetes mellitus

Discussion

There is no medical evidence that shows superiority of standard DS or SADI-S/OADS. There are ongoing clinical trials that may help with this issue. Current evidence suggests that DS and SADI-S/OADI have similar safety profiles, noting that many nutritional issues take years to present and we do not currently have sufficient long-term data on the SADI-S/OADI to comment on this issue.

A comprehensive statement has been issued from the ASMBS in 2016 regarding SADI-S/OADS. In this statement, ASMBS concludes that there is not enough randomised or prospective comparative data to draw any definitive conclusions regarding the safety, efficacy and durability of these procedures compared with the standard DS procedure. So, they considered this procedure "investigational". All the previously reported facts and data would have to be taken into account when scientific societies made some statements regarding novel surgical approaches to bariatric and metabolic surgery [31].

As the obesity treatment modalities continue to advance, certain basic principles such as respect for evidence, ethical commitment, use of accepted methodology for data analysis and inclusion of patients in proper protocols remain a fundamental requirement. IFSO is engaged in developing and implementing new therapeutical options according to these standards.

The need for more RCT's is paramount to our understanding of our interventions; however, the need for guidance for emerging procedures is the responsibility of organisations, such as IFSO. Professional societies must continue to extrapolate the existing data against the needs of the patients we serve and the availability of current technology on a micro and macro level. Though position statements are not without bias, they are meant to be temporal in nature. Continued re-analysis is necessary in order to remain relevant. For this reason, IFSO has adopted the following criteria regarding its position statements:

A: Safety—is the procedure or modification of an existing procedure as safe or safer than existing procedures?

B: Efficacy—is the procedure or modification of an existing procedure as effective or more effective than existing procedure?

C: Long-term consequences—is there potential for unforeseeable long-term considerations? For example, procedures requiring resection or non-reversible anatomic modifications would mandate a higher level of evaluation.

D: Two-year expiration—at which time, the current level of evidence will be re-evaluated and the position statement will be re-affirmed, updated, or modified.

Although there are no RCT's comparing SADI-S/OADS to standard DS, the short-term data available satisfies criteria A: safety and B: efficacy; our concern is the unforeseeable long-term consequences of eliminating the biliary diversion. However, as the post-pyloric duodenum's natural environment is home to high concentrations of bile, this should not be a major issue.

Recommendation of the IFSO SADI-S/OADS Taskforce

Based on the existing data, we recommend the following:

1. SADI-S/OADS should be the standard identifier for this classification of modified DS.
2. There is insufficient data to comment on the long-term safety and efficacy of SADI-S/OADS and patients undergoing this procedure need to be aware of this, and counselled to stay in long-term multidisciplinary care.
3. Surgeons performing this, as well as any other bariatric/metabolic procedure, are encouraged to participate in a national or international registry so that data may be more effectively identified.
4. IFSO supports the SADI-S/OADS as a recognised bariatric/metabolic procedure, but highly encourages RCT's in the near future.

Compliance with Ethical Standards

Conflict of Interest Dr. Brown reports grants from Johnson and Johnson, grants from Medtronic, grants from GORE, personal fees from GORE, grants from Applied Medical, grants from Apollo Endosurgery, grants and personal fees from Novo Nordisc, personal fees from Merck Sharpe and Dohme, outside the submitted work. Dr. Himpens reports personal fees from Ethicon, personal fees from Medtronic, outside the submitted work. Dr. Ooi reports personal fees from the National Health and Medical Research Council, personal fees from Royal Australasian College of Surgeon, outside the submitted work. Dr. Higa has nothing to disclose. Dr. Torres has nothing to disclose.

Ethics Statement Ethical approval is not required for this type of study.

Patient Consent Patient consent is not required for this type of study.

Appendix 1 Members of the IFSO-appointed task force reviewing the literature on SADI-DS/OADS

Kelvin Higa—USA
Geraldine Ooi—Australia
Wendy Brown—Australia
Antonio Torres—Spain
Jacques Himpens—Belgium
Miguel Herrera—Mexico
Wei Jei Lee—Taiwan
Michel Suter—Switzerland
Scott Shikora—USA

Appendix 2

Table 2 List of search terms used

Duodenal switch	Single anastomosis	Pylorus preserving	Overall
Duodeno-jejunostomy	One anastomosis	Pylorus sparing	Single anastomosis pylorus preserving procedure
Duodeno-ileostomy	Billroth II	Pyloric sparing	SAPPP
Duodenoileal bypass	Single loop	Pyloric preserving	single anastomosis duodenal switch
Duodenojejunal bypass	Loop		loop duodeno-jejunal bypass with sleeve gastrectomy
Biliopancreatic diversion, BPD	Stomach Intestinal Pyloric Sparing surgery omega		LDJB-SG
Gastric bypass			single-anastomosis duodeno-jejunal bypass with sleeve gastrectomy
Sleeve gastrectomy			SADJB-SG
Bariatric surgery			mini-duodenal switch
			mini-gastric bypass
			single anastomosis duodeno-ileal bypass with sleeve gastrectomy
			SADI-S
			SADI
			single-anastomosis loop duodenal switch
			LDS
			DJB-SG
			pylorus-preserving loop duodeno-ileostomy with sleeve gastrectomy (DIOS-SG)
			pylorus preserving loop duodeno-jejunostomy with sleeve gastrectomy (DJOS-SG)

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