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Research Article

Post Laparoscopic Single Anastomosis Duodeno-ileal bypass-Sleeve GastrectomyDiarrhea versusPost Laparoscopic Sleeve Gastrectomy Diarrhea

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Abstract: BackgroundIn a trial to modify the effective BPD-DS operation - the same way Rutledge modified RYGB by doing one loop end-to-side anastomosis – and to preserve its principles, the single anastomosis duodeno-ileal bypass with sleeve gastrectomy (SADI-S) was first described in 2007 by Sánchez-Pernaute and Torres as they performed Sleeve gastrectomy followed by 1-loop duodenoileostomy, with 250 cm between anastomosis and ileocecal valve. Anastomosis performed in ante colic and is peristaltic manner. Diarrhea after bariatric surgery, mainly those with malabsorptive elements including Roux-Y Gastric Bypass and Biliopancreatic Diversion, is not uncommon and an essential determinant of quality of life and micro- and macronutrient deficiencies. Bariatric procedures is the only sustainably successful method to address BMI and its comorbidities, particularly gaining more and more importance in the specific treatment of diabetic patients Purpose to assess diarrhea after the two procedures, Patients and Methods: The interventions were led at Beni-suef University Hospital between January 2018 and December2019, after the patients fitted both the inclusions and exclusions criteria. This study consisted of 36 patients which were randomized into 2 groups. Group (A): 18 patients assigned for Single Anastomosis Duodeno-ileal bypass – Sleeve Gastrectomy [SADI-S].Group (B): 18 patients assigned for Sleeve Gastrectomy.Conclusion: SADI-S/OADS is associated with more diarrhea than LSG.

Keywords: BPD-DS, SADI-S, Gastrectomy, Bariatric Surgery.

INTRODUCTION

There is a strong evident between obesity and diarrhea (Ho, W., & Spiegel, B. M. 2008). The incidence of diarrhea in the obese population is around 8% (Petereit, R.*et al*., 2014), Double of that in lean people. A possible cause might be a increased intake of poorly absorbed sugars (Aro, P. *et al*., 2005). Indeed, digestive symptoms in general, including diarrhea, are frequent among high BMI patients, both before and after bariatric procedures (Bouchoucha, M. *et al*., 2015).

There is a change of bowel habits after every bariatric surgery, even though the severity of symptoms differs between the individual techniques. Up to 75% of patients suffer from change of bowel habits and faecal transit time after RYGB (Petereit, R. *et al*., 2014). Diarrhea is a common symptom after RYGB (Ocón, J. B. *et al*., 2005), and usual after BPD[6]. Length of the common channel, *i.e*., the amount of absorptive surface, seems to have a role, given the higher frequency of diarrhea in long limb/distal RYGB patients than after short limb/proximal RYGB procedures (Fysekidis, M. *et al*., 2012), in BPD compared to RYGB (Sileri, P. *et al*., 2012), and in BPD patients with shorter common channels (Wasserberg, N. *et al*., 2008).

SADI-S compared with DS cancel the Roux-en-Y gastric bypass by fashioning an omega loop, and because of the intact pylorus , bile diversion is not needed as the natural barrier remains in place. Pylorus provides control of solid stool emptying, reducing the chances of dumping syndrome and assisting in the maintenance of a physiologically based rate of gastric emptying (Mitzman, B. *et al*., 2016).

SADI-S benefits over DS included reduction of the operative risk by eliminating one anastomosis with potentially similar weight loss and health benefits (Brown, W. A. *et al*., 2018). Effect SIBO after bariatric procedures are unclear. The nutrients escaping digestion

in the small bowel due to SIBO might yield elevated levels of short- and medium-chain fatty acids through metabolization in the large bowel, implying a higher caloric uptake (Schwiertz, A. *et al*., 2010; Jeppesen, P. B., & Mortensen, P. B. 1999). However, data on expected resulting reduced weight loss is conflicting (Andalib, I. *et al*., 2015). The changed anatomy with by- passing small bowel segments severely inflicts diagnostic measures; aspiration and culture might be impossible despite advanced endoscopic techniques, and breath testing underlies the same restrictions (Choung, R. S. *et al*., 2011).

Patients and methods

- **Group (A)**: 18 patients assigned for Single Anastomosis Duodeno-ileal bypass – Sleeve Gastrectomy [SADI-S].
- **Group (B):** 18 patients assigned for Sleeve Gastrectomy.

❖ Study Sample:

The study consisted of 36 patients which were randomized into 2 groups. Patients were enrolled in the study after giving written informed consent.

- **Group (A)**: 18 patients assigned for Single Anastomosis Duodeno-ileal bypass – Sleeve Gastrectomy [SADI-S].
- **Group (B):** 18 patients assigned for Sleeve Gastrectomy.

⁎ Inclusion criteria:

1. Patients who had BMIs of 40 Kg/m^2 or more, or between 35 Kg/m^2 and 40 Kg/m^2 with obesity related comorbidities that could be improved if they lose weight.
2. Age (18-65) years old.
3. Patients were generally fit for anesthesia and surgery.

❖ Exclusion criteria:

1. Previous gastric or duodenal surgery.
2. Endocrine disorders excluding diabetes mellitus.
3. Psychiatric illness.
4. Recent diagnosis of malignancy.
5. Heavy smokers and alcoholics.

RESULTS

Postoperative diarrhea was defined as more than three bowel motions of loose stool per day. Percentage of SADI-S who has a number of more than three times of loose stools per day is 61.1 % (n=11) at 6 months and 12 months after surgery. There is a statistically significant difference with Sleeve group as only two patients (11.1%) suffered from postoperative diarrhea after 6 months and three patients (16.7%) at 12 months.

Table 1. Number of bowel motions in of both groups.

Number of bowel motions Postoperative		Type of operation SADI-S group		LSG group		Test of Significance	P value
		No.	%	No.	%		
6 months	**Abnoral**	11	61.1%	2	11.1%	Chi square (χ^2) test $\chi2(1, N= 36) = 9.75$	0.002
	Normal	7	38.9%	16	88.9%		
12 months	**Abnoral**	11	61.1%	3	16.7%	Chi square (χ^2) test $\chi2(1, N= 36) = 7.48$	0.006

DISCUSSION

Even though one would accept the role of the microbiome regarding occurrence and/or decrease of diarrhea after bariatric procedures, this has not yet been elucidated. Anaerobes , normally increased after SG, was found to be substantially decreased in patients with idiopathic chronic diarrhea (Swidsinski, A. *et al*., 2008). These results were confirmed by another group reporting an enrichment of anaerobes, among other phyla, in controls when compared to diarrhea cases, irrespective of whether they were or not Clostridium difficile-associated (Schubert, A. M. *et al*., 2014). These results cast a possible evident between the normally observed post-bariatric shift of anaerobes within the microbiota composition and diarrhea into doubt. Further studies addressing this question are warranted.

There are only a few clues of SADI-S as a primary- or second-step operation after SG in the literature (Odstrcil, E. A. *et al*., 2010; Hammer, H. F., & Hammer, J. 2012). The intervention constitutes a simplification of the conventional duodenal switch. It is easier and quicker to perform and associated with less morbidity and mortality. Being a malabsorptive procedures it has a weight loss about 70% and a high rate of metabolic improvement. Due to the malabsorption the described complications and secondary effects, are predominantly diarrhea and hypoalbuminemia. However the intervention is described to be safe and effective , the risk of preserving pylorus and creating a high pressure system remain a challenging disadvantage: GERD can deteriorates or occur de-novo(Odstrcil, E. A. *et al*., 2010; Hammer, H. F., & Hammer, J. 2012).

The mean number of bowel motions was 5 times ± 3.35 at 6 months after surgery in OADS/SADI-

S .this number slightly improved at one year to be 4.12 times ± 2.5. Percentage of OADS/SADI-S who has a number of more than three times of loose stools per day is 61.1 % (n=11) at 6 months and 12 months after surgery. There is a statistically significant difference with LSG group as only two patients (11.8%) suffered from postoperative diarrhea.

The high prevalence of postoperative diarrhea in OADS/SADI-S patients affected the quality of their lives causing 27.8% of them to be unsatisfied about the operation. Postoperative diarrhea was persistent in spite of changing the quality of food and its diary content. One patient, a 32-year old woman, is suffering from postoperative diarrhea with occasional attacks of functional fecal incontinence especially in the morning. Metronidazole was empirically prescribed for all suffering patients. Only one patient has responded well and the diarrhea stopped after metronidazole administration for 10 days suggesting that SIBO to be the culprit.

Shoar et al.,2018 in their review of 587 OADS/SADI-S patients, reported similarly that postoperative diarrhea was the most common complication (1.2%) (Shoar, S. *et al*., 2018).Also, *Sanchez-Pernaute et al.,2010* reported the number of bowel movements depended on the amount of ingested fat. the mean number bowel motions was 2.5 with 30% of the patients (n=15) have three or more bowel movements per day. One case (2%) complained of severe diarrhea and consequent hypoalbuminemia which has improved after metronidazole administration (Sánchez-Pernaute, A. *et al*., 2010)[=.(However, ***Vilallonga etal.,2017*** considered diarrhea an indication for revision as they reported five cases of OADS/ SADI-S who needed revisional surgery. The fifth patient suffered from severe diarrhea (6–7 daily bowel movements). She recovered from the intractable diarrheal attacks after revisional surgery but gained weight (Vilallonga, R. *et al*., 2017).

On the other hand, ***Lin et al., 2019*** reported that 1.2% of patient who underwent LSG suffered from diarrhea (Lin, S. *et al*., 2019)**.**

Cottom et al., 2017 showed that diarrhea/steatorrhea in SADIS patients occur as a result of a miscounted alimentary loop, resembling the length of a common limb in the traditional BPDDS. Subsequently, the diarrhea was resolved after lengthening of the loop to a 450 cm common channel (Cottam, A. *et al*., 2017).

No patient has been submitted to a reversal operation, and though follow-up is still short, most of the revisions of malabsorptive surgery for malnutrition are performed between the first and the second postoperative year. So, longer follow up will be considered.

Conclusion : SADI-S/OADS is associated with more diarrhea than LSG .

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