

Research Article

Short term outcomes of single anastomosis sleeve jejunal bypass for the treatment of morbidly obese patients



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Abstract

Background: Single anastomosis sleeve jejunal (SASJ) bypass is a recently developed bariatric technique. This procedure aims to keep passing to the duodenum to reduce the associated nutritional deficiency and to allow endoscopic treatment of choledocholithiasis. This study aimed to evaluate the efficacy of the SASJ bypass in the treatment of morbidly obese patients. **Methods:** 50 morbidly obese patients underwent SASJ bypass, All patients were followed up at 1, and 6 months. We evaluated BMI, post-operative complications, and obesity-related comorbidities. **Results:** The mean age of enlisted cases was 35.2 years, and the mean BMI was 49.8kg/m². Of the patients, 37(74%) had type two DM, and 16(32%) were hypertensive. 10 (20%) cases had osteoarthritis, 12(24%) cases had obstructive sleep apnea, and 4(8%) cases had GERD. Intraluminal bleeding occurred in two cases (4%). and three patients developed biliary gastritis (6%). One patient (2%) developed DVT. The percentage of EWL was 58.2% after 6 months Normalization of blood glucose level occurred within 6 months after surgery in 86.4 % of diabetic patients. Hypertension improved in all hypertensive patients. **Conclusion:** Laparoscopic SASJ bypass is an effective, safe, and technically easy operation for treating morbid obesity and comorbid conditions with less nutritional deficiencies.

Keywords: Loop bipartition · metabolic surgery · obesity.

Introduction

Obesity is a global preventable health problem associated with a variety of metabolic disorders such as type II diabetes mellitus (T2DM), dyslipidemia, hypertension (HTN), and obstructive sleep apnea^[1]

Metabolic surgery is more effective than conservative measures in the management of morbid obesity^[2]. Globally, vertical sleeve gastrectomy (VSG), Roux-en-Y gastric bypass (RYGB), and mini-gastric bypass (MGB) are the most common approved bariatric operations^[3].

One newly developed weight loss procedure, the single sleeve ileal anastomosis bypass (SASI), has been developed as a modification to Santoro's operation (sleeve gastrectomy with

transit bipartition SG + TB)^[4]. Since no duodenal division or manual anastomosis is required, the procedure allows easy endoscopic access to the duodenum^[1].

Mahdy et al., noted that SASI has the following advantages over other bariatric procedures: SASI has a shorter operative time compared to other procedures; 2) easy access to the duodenum and biliary tree endoscopically; 3) SASI does not divide the duodenum, thus eliminating the possibility of duodenal stump leakage, a serious complication with an incidence range between; 4) the tension on the anastomosis lower than other techniques; 5) there are no blind loops, excluded segments, or foreign bodies; 6) SASI is completely reversible^[5]. The SASJ bypass is a modified SASI with a shorter biliopancreatic limb length.

SASJ bypass is therefore efficient and safe to prevent long-term nutritional complications^[6].

Our study aimed to evaluate the efficacy of SASJ bypass as a treatment for morbid obesity and comorbid conditions.

Patients and Methods

A total number of 50 morbidly obese were included in this study from November 2021 till August 2022. Obesity was diagnosed on basis of Mass Index (BMI).

All patients were consented to be included in the study after explaining the operation and its possible complications.

Inclusion criteria:

- 1- Age between 18-60 years old.
- 2- BMI > 35 with comorbidities or BMI > 40 with or without comorbidities.
- 3- Diabetics, with type 2 DM.

Exclusion criteria:

1. Previous laparoscopic metabolic surgery
2. Patients with huge anterior abdominal wall hernias.
3. Cirrhotic patients.
4. Pregnant or lactating females.
5. Unfit Patients for anesthesia.
6. Patients with any contraindications to laparoscopic surgery.

Pre-operative assessment:

An interdisciplinary bariatric team included a bariatric surgeon, endocrinologist, nurse, dietitian, and general physician evaluated the patient preoperatively. Each patient's history was taken in detail. Complete clinical

examination, including measurement of body weight, height, and BMI was done. A complete set of laboratory tests, including a complete blood count, coagulation profile, HbA1C, renal function tests, liver function tests, lipid profiles, and thyroid function tests, as well as imaging, such as abdominal ultrasound and chest x-rays, were conducted. Patients with upper GIT symptoms underwent upper endoscopy.

Surgical technique:

The patient was placed in French position. The patient was placed in a forced anti-Trendelenburg position. The technique started with the devascularization of the greater curvature of the stomach (figure 1). The dissection then continued proximally toward the gastroesophageal junction. The dissection then continued distally till 3-4 cm from the pylorus. Any Posterior attachments between the stomach and pancreas were dissected. A 38-French calibration tube (bougie) was used to guide a proper sleeve, starting 6 cm proximal to the pylorus (figure 2) with a stapler charged with a 60 mm green cartridge for the antrum and 60 mm yellow and blue cartridges for the body and fundus. The first jejunal loop was identified and 200 cm was measured from the duodenojejunal junction downwards, then a stapled isoperistaltic side-to-side anastomosis between the antrum of the stomach and jejunum was done. (figure 3). The staple defect was closed with running single layer sutures. The transected stomach was then removed. Methylene blue test was done to assess the presence of leakage.

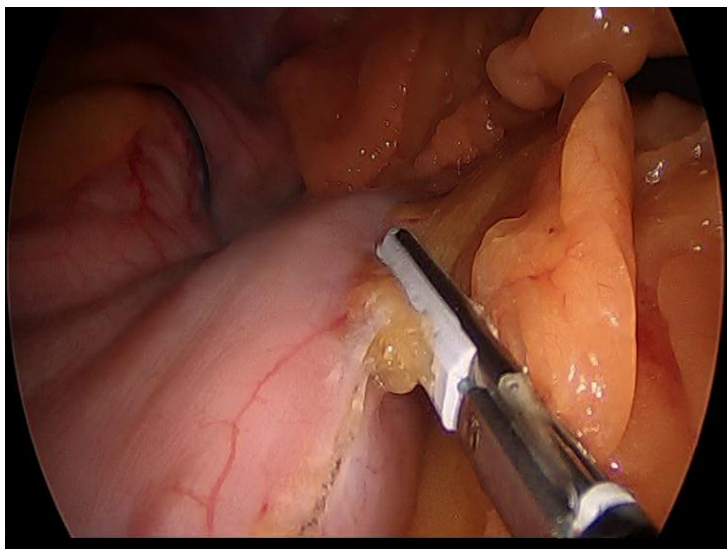


Figure 1: devascularization of the greater curvature of the stomach.

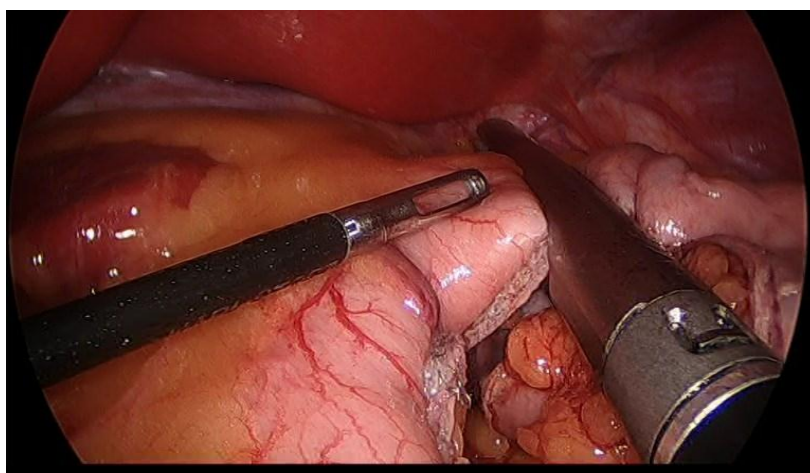


Figure 2: the creation of a gastric sleeve 6 cm from the pylorus.

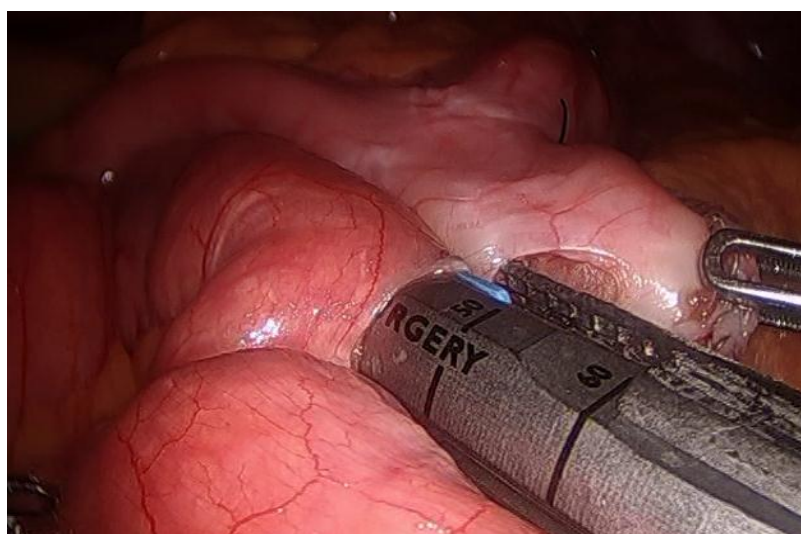


Figure 3: isoperistaltic side to side sleeve-jejunal anastomosis .

Post-operative care:

Patients were transferred to internal ward. Proton pump inhibitor was administrated routinely in all patients. and oral fluids intake was started 6 hours after surgery. Early ambulation was advised from the first postoperative day. The patients were discharged 2 to 3 days postoperatively according to postoperative course.

Study outcomes:

The primary outcomes of our study were as follows^[7]: the percentage of TWL = [(preoperative weight – follow up weight)/ preoperative weight] × 100; the percentage of EWL = [(preoperative weight – follow up weight)/ preoperative excess weight] × 100.

In T2DM, full remission is defined as a fasting plasma glucose level below 100 mg/dL or a HbA1C level less than 6% without the use of oral hypoglycemic drugs or insulin. A partial improvement in T2DM was defined as a reduction of at least 25% of the fasting plasma glucose level and at least 1% in the hemoglobin A1c level with the use of hypoglycemic medications.

Secondary outcomes were the effect of the operation on other comorbidities, post-operative complications^[7].

Postoperative complications included leakage, port site infection, port site hernia, bleeding, biliary reflux and nutritional deficiencies.

Follow-up

We followed up the included patients in the outpatient clinic 2 weeks postoperatively and then every month for 6 months. The patients were evaluated for body weight and improvement of comorbidities including DM, hypertension ,GERD and obstructive sleep apnea. For 2 weeks, all patients were allowed a liquid diet, then a soft diet the following week. then, patients were put on a high-protein and low-calorie diet. The patients were prescribed multivitamin supplements including Centrum once daily, calcitron once daily, Ferritron once daily, Betolvex injection twice daily, and Devarol 200000 IU monthly. After the first postoperative week, patients were advised to start some physical activity. All patients had a full blood investigation every 3 months.

Statistical analysis

Statistical analysis was done using IBM SPSS version 25. Numerical data was expressed as mean and standard deviation or median and range as appropriate. Qualitative data was expressed as frequency and percentage. A p-value < 0.05 will be considered significant.

Results**Preoperative data**

50 cases were included in our study. Regarding their demographics, the mean age of the studied cases was 35.2 (range, 19-60 years). There were 36 females included in our study. The mean preoperative BMI was 49.8 kg/m². Regarding the comorbidities, 37(74%) patients had diabetes mellitus, 16(32%) cases were hypertensive, 10(20%) cases had osteoarthritis, 12(24%) cases had obstructive sleep apnea, and 4(8%) cases had GERD (see table 1).

The effect of SASJ on weight loss and comorbidities:

The mean preoperative patient weight was 140 kg. Follow-up patient weight decreased by a significantly to 126.2, and 98.6 kg at 1 month, 6-months respectively (p <0.0001) (see table 2).

As for the percentage of EWL and % TWL it was 58.2% and 29.1 respectively at the 6-month follow-up.

At a 6-month follow-up visit, 32 cases had diabetes in full remission (86.4%). While improvement was achieved in four cases (10.8%). failure was encountered in one case (2.7%). Additionally, hypertension was improved in all hypertensive patients (as shown in table 4). In addition, hyperlipidemia and obstructive sleep apnea were improved in all patients. GERD improved in two of four patients who had preoperative GERD.

Complications

Regarding post-operative complications, there was no leakage in any of our patients .one patient (2%) developed DVT, two cases (4%) developed port site infection, one case (2%) developed biliary vomiting, 1 case (2%) developed port site hernia, 2 cases (4%) developed intraluminal bleeding (see table 5).

Table 1: Preoperative characteristics of patients

Variable		Descriptive statistics (n=50)
Age	Range	(19-64)
	Mean ± SD	35.2±11.1
Sex	Male	14(28%)
	Female	36(72%)
Comorbidity	DM	37(74%)
	HTN	16(32%)
	OA	10(20%)
	OSA	12(24%)
	Hyperlipidemia	18(36%)
	GERD	4(8%)
Preoperative weight (kg)	Range	(95-198)
	Mean ± SD	140±25.7
Height (cm)	Range	(152-188)
	Mean ± SD	167.8±10.6
Preoperative BMI	Range	(37.1-79.3)
	Mean ± SD	49.8±8.3

Table 2 : body weight follow-up in the current study

		Preoperative	Postoperative 1m	Postoperative 6m	P value
		N=50	N=50	N=50	
Body weight	Range	(95-198)	(88-179)	(76-135)	<0.001*
	Mean ± SD	140±25.7	126.2±23.7	98.6±14.8	
<i>P value between each two time</i>					
<i>Preoperative</i>			<0.001*	<0.001*	
<i>Postoperative 1m</i>				<0.001*	
<i>Postoperative 6m</i>					

Table 3: follow up excess weight loss and total body weight loss

		Postoperative 6m	P value
		N=50	
Excess weight loss	Range	(35.6-77.3)	<0.001*
	Mean ± SD	58.2±11	
Total body weight loss	Range	(18.9-38.9)	<0.001*
	Mean ± SD	29.1±4.9	

Table 4 : the effect of SAS-J on DM

Effect on Diabetes Mellitus	Number (%)
DM complete remission	32(86.4%)
DM partial remission	4 (10.8%)
Failure	1(2.7%)

Table 5: The effect of SASJ on other comorbidities

	Preoperative number.	6-month Post operative.	Percentage of improvement	P value
HTN	16	0	100 %	<0.001
OSA	11	0	100%	<0.001
Hyperlipidemia	18	0	100%	<0.001
GERD	4	2	50%	<0.001

Table 6: post-operative complications

<i>Variable</i>	Descriptive statistics (n=50)
DVT	1(2%)
port site infection	2(4%)
biliary vomiting	1(2%)
port site hernia	1(2%)
Intraluminal bleeding	2(4%)

Discussion

The ideal bariatric operation must be safe with minimal complications, easy to perform with low learning curve and effective in weight reduction and resolution of associated comorbidities^[1].

The sleeve gastrectomy is now the most popular validated weight loss surgery in several bariatric centers. However, laparoscopic sleeve gastrectomy is less effective in superobese patients, has a higher incidence of postoperative esophageal reflux, and is associated with long-term weight regain^[8].

LRYGB is an effective operation regarding weight loss and remission of comorbidities, but it is technically challenging and has significant perioperative complications. MGB is more simple than RYGB and has very good long-term results but is associated with nutritional deficiencies^[9].

Due to their altered anatomy, traditional transoral ERCP cannot be performed with RYGB, MGB, and SADI. For accessing the biliary tree, a variety of techniques have been described, including laparoscopic transcystic common bile duct exploration (LTCE), balloon enteroscopy assisted ERCP, percutaneous transhepatic cholangiography, laparoscopic transgastric

ERCP (LTERCP), laparoscopic choledochoduodenoscopy and EUS-guided transhepatic ERCP. Techniques such as these are technically challenging, have high risk of complication, and have a high failure rate^[10].

Obesity and rapid weight reduction are risk factors for gall stone disease as approximately one third of patients may develop gallstones after bariatric surgery^[11].

The SASI bypass is a modification of the sleeve gastrectomy by adding a single anastomosis between the gastric antrum and the ileum. While sleeve gastrectomy has become the most popular metabolic technique in most centers owing to its good results^[12], several disadvantages of sleeve gastrectomy have been reported like being less effective in super obese patients, a high incidence of postoperative GERD, and weight regain on long-term follow-up^[13].

SASJ bypass is a modified SASI bypass with shorter biliopancreatic limbs. Therefore, the SASJ bypass is efficient and safe to prevent long-term nutritional deficiencies^[6]. In this study, the % EWL after 6 months of follow up was approximately 58.2%. Regarding % EWL, in other studies, Sewefy and Saleh

reported that the included cases achieved 85% EWL at one-year follow up^[15].

Mansey and his colleagues reported that the SASJ procedure achieved a % EWL of 92.13% after 12 months^[16].

Furthermore, Khalaf and Hamed observed that the percentage of EWL had mean values of 58.7 and 86.9%, while the percentage of TWL had mean values of 29.5 and 44.2% at 6- and 12-month follow-up visits respectively^[11].

Elrefai et al., showed that SASJ achieved 77.61% EWL after 12 months^[17].

74% of the patients had type two diabetes. 32 cases (86.4%) had full remission, while improvement was achieved in 4 cases (10.8%). failure was observed in one case (2.7%).

This was consistent with Sayadishahraki et al., revealed that all of the patients who underwent Single Anastomosis Sleeve Jejunal Bypass, showed remission of diabetes mellitus during the 6 months follow up and stopped hypoglycemic drugs and insulin therapy^[18].

According to Sewefy et al., complete remission of DM occurred within two months after SAS-J bypass in all diabetic patients^[15].

In our study, SASJ bypass showed improvements in other obesity-associated comorbidities. All hypertensive patients improved after 6 months.

In another study, and after two-year of follow up, hypertension was remitted in 89% patients^[15].

Additionally, Khalaf et al., reported resolution of hypertension in 23.2% of patients, while improvement occurred in the remaining cases^[11].

According to Mansey et al., Out of the 7 cases with obesity and hypertension, 5 cases showed resolution while the remaining 2 cases showed improvement during the one-year follow-up^[16].

The remission rate for patients with hyperlipidemia reached 100%, in comparison with 65%, 42%, 62.3%, and 96% for SASI, sleeve gastrectomy, RYGB, and MGB. This study showed 100% improvement in sleep apnea syndrome versus 59%, 45.8%, 44.2%, and 90% for SASI, sleeve, RYGB, and MGB. GERD improved in half of the patients

compared to 92%, 25%, 60.4%, and 92% for SASI, sleeve, RYGB, and MGB, respectively^[19, 20].

The majority of morbidities after SASJ bypass were minor. The most frequent complication after the SASI bypass was biliary gastritis. One case developed biliary gastritis and managed by PPIs and antiemetics without need for surgical intervention. There is a high incidence of bile reflux in patients with a single anastomosis between the gastric pouch and the intestine. It also occurs after the one-anastomosis gastric bypass procedure and it has even been observed after RYGB^[21]. Our collected data confirmed the safety of the SASJ operation regarding the early post-operative course, since no patients with gastric leakage were reported.

Recent study also found no leakage following SASJ, which is consistent with our findings^[15] and this agreed with our data. However, Khalil et al., reported that leakage occurred in 2 patients after SASJ^[22].

Conclusion

Laparoscopic SASJ bypass is an effective, safe, and technically easy operation for treating morbid obesity and associated comorbid conditions with least nutritional deficiency.

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Conflict of interest: None.

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