

# Concomitant bariatric and ventral/incisional hernia surgery in morbidly obese patients

Asnat Raziel · Nasser Sakran · Amir Szold · David Goitein

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## Abstract

**Introduction** Ventral hernias are not uncommon in the bariatric population. Their management is technically demanding and remains controversial. Hernia complications can be lethal after bariatric surgery (BS). We herein report our experience with concomitant BS and ventral hernia repair (VHR).

**Methods** We performed a retrospective analysis of a prospectively maintained database queried for combined procedures. Hernias were repaired after complete reduction (when the defect was not empty) using a dual mesh fixed to the abdominal wall with absorbable tackers. Data collected included demographics, anthropometrics, co-morbidities, peri-operative course, and intermediate weight loss and co-morbidity status.

**Results** Between 2007 and 2012, a total of 54 patients (34 females, mean body mass index  $44.2 \text{ kg/m}^2$ ) underwent concomitant BS and VHR. The vast majority of procedures

were laparoscopic sleeve gastrectomies ( $N = 48$ ; 89 %). Others included laparoscopic Roux-en-y gastric bypass (RYGB), open RYGB, and laparoscopic gastric banding (two each). Six patients had complications (11 %): three leaks, two abdominal wall hematomas, and one pulmonary embolism. Hernia recurrence was noted in one patient (1.8 %). Average excess weight loss post-surgery was  $49.9 \pm 10.3$  and  $57.7 \pm 9.2$  % at 6 and 12 months, respectively. The total number of pre-operative co-morbidities was 110. At 12-month follow-up, 50 % ( $N = 56$ ) were completely resolved and 38 % ( $N = 42$ ) were improved.

**Conclusion** Concomitant BS and VHR is feasible and safe, obviating the need for two separate procedures while not hampering the outcome of either. Complication rates for the combined surgery do not seem to be adversely affected.

**Keywords** Bariatric surgery · Sleeve gastrectomy · Roux-en-Y gastric bypass · Ventral hernia

A. Raziel · N. Sakran · A. Szold · D. Goitein  
Israeli Center for Bariatric Surgery (ICBS), Assia Medical Group, Assuta Medical Center, Tel Aviv, Israel

N. Sakran  
Department of Surgery A, Emek Medical Center, Afula, Israel

N. Sakran  
Faculty of Medicine, Technion-Israel Institute of Technology, Haifa, Israel

D. Goitein (✉)  
Department of Surgery C, Chaim Sheba Medical Center, 2 Sheba Rd., 52621 Tel Hashomer, Israel  
e-mail: david.goitein@sheba.health.gov.il

D. Goitein  
Sackler School of Medicine, Tel Aviv University, Tel Aviv, Israel

The risk of incisional hernia development (in open surgery) increases from 13 to 39 % for patients with body mass index (BMI) under and over  $25 \text{ kg/m}^2$ , respectively [1]. Patients are often counseled to lose weight before surgery. Open ventral hernia repair (VHR) is fraught with many postoperative wound complications related to incision length and extensive tissue dissection, as well as a high incidence of recurrence (38–59 %) [2]. Ventral hernias are not uncommon in the bariatric population, and were encountered in 8 % of patients undergoing gastric bypass [3]. Elevated intra-abdominal pressure is associated with an increased incidence of ventral hernias, and is also correlated with systemic hypertension seen in the morbidly

obese [4]. The risk is further emphasized in patients with obesity hypoventilation syndrome or sleep apnea.

Open bariatric surgery (BS) has had a high incidence of incisional hernia (up to 20 % in open gastric bypass patients, with a higher incidence in those presenting with a previous incisional hernia) [5, 6]. Owens et al. [7] conducted a large review of 2,644 patients undergoing laparoscopic BS and found that this rate has been dramatically reduced to 0.57 %.

Despite the frequent incidence, the management of ventral hernias in BS patients remains controversial and is technically difficult to perform [8]. However, hernia complications, particularly small bowel obstruction, associated with gastric remnant perforation, disruption of the gastrojejunostomy, Roux limb ischemia, and aspiration can be particularly lethal after laparoscopic gastric bypass [9]. The options for management of the bariatric patient with a ventral hernia include (i) perform the planned BS and defer the hernia repair to a later time, hopefully after significant weight loss; (ii) repair the hernia first and postpone the BS until recovery, usually an acceptably short time, so that recurrence is unlikely; and (iii) concomitant BS with VHR.

We herein report our experience with 54 patients who underwent concomitant BS and VHR.

## Materials and methods

A detailed database of our bariatric service is prospectively maintained. After obtaining institutional review board approval, we queried this database for patients who underwent concomitant BS and VHR. Data collected included demographics, anthropometrics, co-morbidities, peri-operative course, and intermediate weight loss and co-morbidity status.

Symptomatic hernias, empty hernia defects, and those with contents that had to be reduced to complete the BS were repaired in the same surgery. Hernias were repaired using a dual mesh: visceral material: polyvinylidene fluoride (PVDF) monofilament, parietal material: polypropylene (PP) monofilament (DynaMesh, Aachen, Germany) after reduction of the hernia contents, when present. The mesh was not pre-soaked in antibiotic solution prior to introduction into the peritoneal cavity. It was fixed to the abdominal wall using absorbable tackers (Covidien, Mansfield, OH, USA).

## Results

Between January 2007 and December 2012, a total of 54 patients (34 females) underwent simultaneous BS and VHR. Demographic data are presented in Table 1.

Most patients ( $N = 48$ ; 88.9 %) underwent laparoscopic sleeve gastrectomy. Laparoscopic Roux-en-y gastric bypass (LRYGB), open RYGB, and laparoscopic adjustable gastric banding were performed in two patients each. Hernias repaired included 31 umbilical and 25 incisional, all without previous repair attempts (Table 2). Six patients (11 %) had complications: three leaks, two abdominal wall hematomas, and one pulmonary embolism. We did not encounter mesh infection. One patient had a recurrent hernia. This patient had a small, 3-cm umbilical hernia without content. His medical history includes chronic renal

**Table 1** Patient characteristics

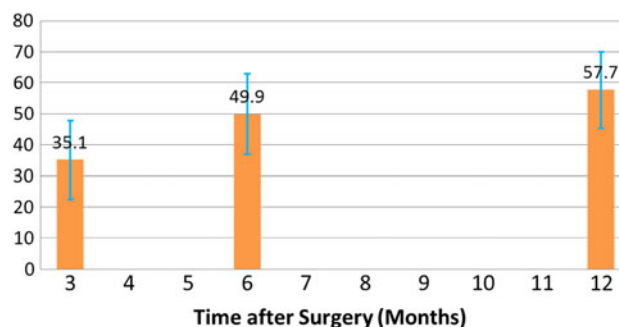
Patients ( $N$ )	54
Mean age, years (range)	53 (31–74)
Female:male	34:20
Mean weight, kg ( $\pm$ SD)	124.6 $\pm$ 16.6
Mean BMI, kg/m <sup>2</sup> ( $\pm$ SD)	44.2 $\pm$ 4.5

*BMI* body mass index, *SD* standard deviation

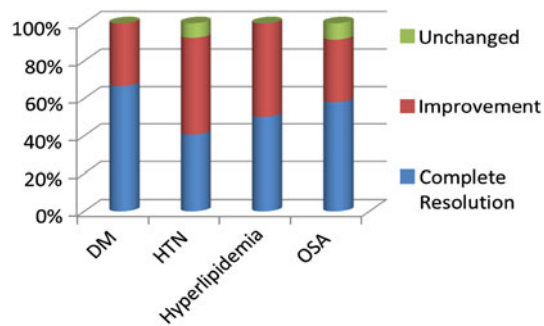
**Table 2** Operative data

Type of hernia	
Ventral	23
Umbilical	29
Ventral and umbilical	2
Type of BS	
LSG	48
LRYGB	2
ORYGB	2
LAGB	2
Additional procedures	
BS revision (SRVG, LAGB, both)	9 (7,1,1)
Cholecystectomy	5
Hiatal hernia repair	3

*BS* bariatric surgery, *LAGB* laparoscopic adjustable gastric banding, *LRYGB* laparoscopic Roux-en-Y gastric bypass, *LSG* laparoscopic sleeve gastrectomy, *ORYGB* open Roux-en-Y gastric bypass, *SRVG* silastic ring vertical gastroplasty



**Fig. 1** Percent excess weight loss after surgery



**Fig. 2** Co-morbidity status 12 months after concomitant BS and VHR. *DM* diabetes mellitus, *HTN* hypertension, *OSA* obstructive sleep apnea

failure and renal transplantation, chronically receiving immunomodulation. In a routine follow-up visit, a recurrent, asymptomatic umbilical hernia was detected 3 months postoperatively. The patient declined intervention for hernia repair.

As expected, BS resulted in significant weight loss and remission or improvement of obesity related co-morbidities.

Average excess weight loss post-surgery was  $49.9 \pm 10.3$  and  $57.7 \pm 9.2$  % at 6 and 12 months, respectively (Fig. 1).

The total number of co-morbidities was 110, including diabetes, hypertension, hyperlipidemia, and sleep apnea. At 12-month follow-up, 56 (50 %) were completely resolved (i.e. normal values without medication) and 42 (38 %) were improved (i.e. reduction in number or dosage of pre-operatively ingested medication) (Fig. 2).

Both weight loss and co-morbidity improvement are similar to that seen in our BS patients who did not undergo VHR (data not shown).

## Discussion

Ventral hernias are not infrequently encountered in patients scheduled for BS. These can either be known hernias or those found during surgery. Datta et al. [3] reported an 8 % incidence of unsuspected ventral hernias in patients undergoing LRYGB.

The management of ventral hernias in the bariatric population is still under debate, as is the method for hernia repair. As stated, there are several options.

The argument for postponing the hernia repair until after BS and sufficient weight loss has occurred lies in the tendency for poorer results for VHR in the obese population. Raftopoulos and co-workers describe their experience with VHR in the obese ( $BMI >35 \text{ kg/m}^2$ ), reporting a 25.9 % complication rate and 18.5 % recurrence rate (in a relatively short follow-up time of 15 months). In their cohort, almost half (48 %) underwent concomitant VHR and LRYGB.

These rates are troubling and speak for postponing the repair to a more favorable time. Another concern is the risk for mesh contamination in a clean-contaminated procedure if foreign material is used. It is fair to mention that there is no consensus regarding this, and there are many reports of mesh utilization in clean-contaminated fields [10].

Newcomb et al. [11] reported on their experience in dealing with complex, recurrent incisional hernias and suggested BS (specifically RYGB) as a facilitating procedure prior to hernia repair, with good results. It should be noted that in their experience, all three concomitant RYGB and VHR recurred.

A recent review article suggests that concomitant BS and VHR should be employed if hernia reduction was performed or in hernias with a small neck [12]. A case report of a patient with an umbilical hernia that was found during LRYGB, reduced, and left in place, who later presented with incarceration and ultimately died of sepsis from aspiration during induction [13], further supports the choice for concomitant surgery. Eid et al. [9] encountered a very high rate of small bowel obstruction from incarceration when the hernia was left in place and thus concluded that deferral of definitive repair should be avoided.

It is our practice to repair ventral hernias at the time of BS in cases of symptomatic hernias, empty hernia defects, and those with contents that have to be reduced to complete the procedure. The choice of mesh material was dictated by availability in our hospital. Other options may work just as well. We find that concomitant BS and VHR is safe, beneficial for the patient, and does not interfere with the outcome of the original BS. The rate of complications for the combination surgery is similar to that of BS.

**Disclosures** Drs. Asnat Raziel, Nasser Sakran, Amir Szold, and David Goitein have no conflict of interest or financial ties to disclose.

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