

# Retrospective Study for the Outcomes of Single Incision Laparoscopic Sleeve Gastrectomy for Treatment of Morbid Obesity

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**Background:** LSG became very popular among all the community. Traditionally, it is performed through 3-5 incisions. SILSG is done through one incision, improving the aesthetic outcome. SILSG has some advantages over the conventional LSG which are less abdominal pain, less admission in hospital, and rapid return to work.

**Aim:** In this study we are going to assess the safety and feasibility of SILSG in a group of patients and report the outcomes and complications.

**Materials and Methods:** We collected the data of 50 consecutive patients with morbid obesity who underwent SILSG in our department from May 2017 till August 2018. The inclusion criteria were a body mass index (BMI)  $\geq 40$  or  $\geq 35$  kg/m<sup>2</sup> associated with co-morbidities. The exclusion criteria were patients with a BMI  $>60$  kg/m<sup>2</sup>, previous upper abdominal surgeries, large abdominal hernias, or large hiatus hernia.

**Results:** 50 patients were included in our study. Their median age was 41 years, and 78% were females. The median BMI was 44.5 kg/m<sup>2</sup>. The median operating time was 72 minutes (range 56–145). There was no intraoperative complications. Six patients (12%) required 1 or 2 additional trocars. Only 6% had early complications. There was no cases of wound infection or incisional hernia. There was no conversion to open surgery or conventional LSG. There was no mortality. The mean reduction in excess weight was 68%. All patients were satisfied with their wound.

**Conclusion:** SILSG is a safe and feasible technique if performed by an expert surgeon. It has low complication rates and no reported mortality. Randomized studies are still needed after improvement of the associated learning curve, to assess the long-term results.

**Key words:** LSG, SILSG, single incision sleeve gastrectomy, bariatric surgery, single port.

## Introduction

Morbid obesity became an epidemic in developed and developing countries worldwide.<sup>1</sup> Variable bariatric procedures have been used to achieve persistent weight loss and resolution of comorbidities resulting in a survival advantage.<sup>2</sup>

Since it became a primary and definite operation for morbidly obese patients, laparoscopic sleeve gastrectomy (LSG) became very popular among surgeons, and many obese patients prefer it.<sup>3</sup> Surgeons are always trying to improve the cosmetic results and this resulted in the appearance of new minimally invasive techniques.

The continuous development of single incision laparoscopic surgery (SILS) and its usage in many operations resulted in the appearance of single-incision laparoscopic sleeve gastrectomy (SILSG), and many case series were reported.<sup>4</sup> Traditionally LSG is performed by 3-5 incisions. SILSG is done through one incision, improving the aesthetic outcome. SILSG has some advantages over the conventional LSG which are less abdominal pain, less admission in hospital, and rapid return to work. Some surgeons criticize SILSG for being a complex procedure as there is difficulty to obtain optimal angulation which may result in difficult dissection. Also exposure may not be sufficient as a result of

excess subcutaneous and intra-abdominal fat & large left lobe of the liver with absence of retraction. All these points may lead to inadequate resection and poor results.<sup>5</sup>

In this study we are going to assess the safety and feasibility of SILSG in a group of patients and report the outcomes and complications.

## Materials and methods

From May 2017 to August 2018, 50 consecutive morbidly obese patients underwent SILSG in our department. The inclusion criteria were a body mass index (BMI)  $\geq 40$  or  $\geq 35$  kg/m<sup>2</sup> associated with co-morbidities. The exclusion criteria were patients with a BMI  $>60$  kg/m<sup>2</sup>, previous upper abdominal surgeries, large abdominal hernias, or large hiatus hernia.

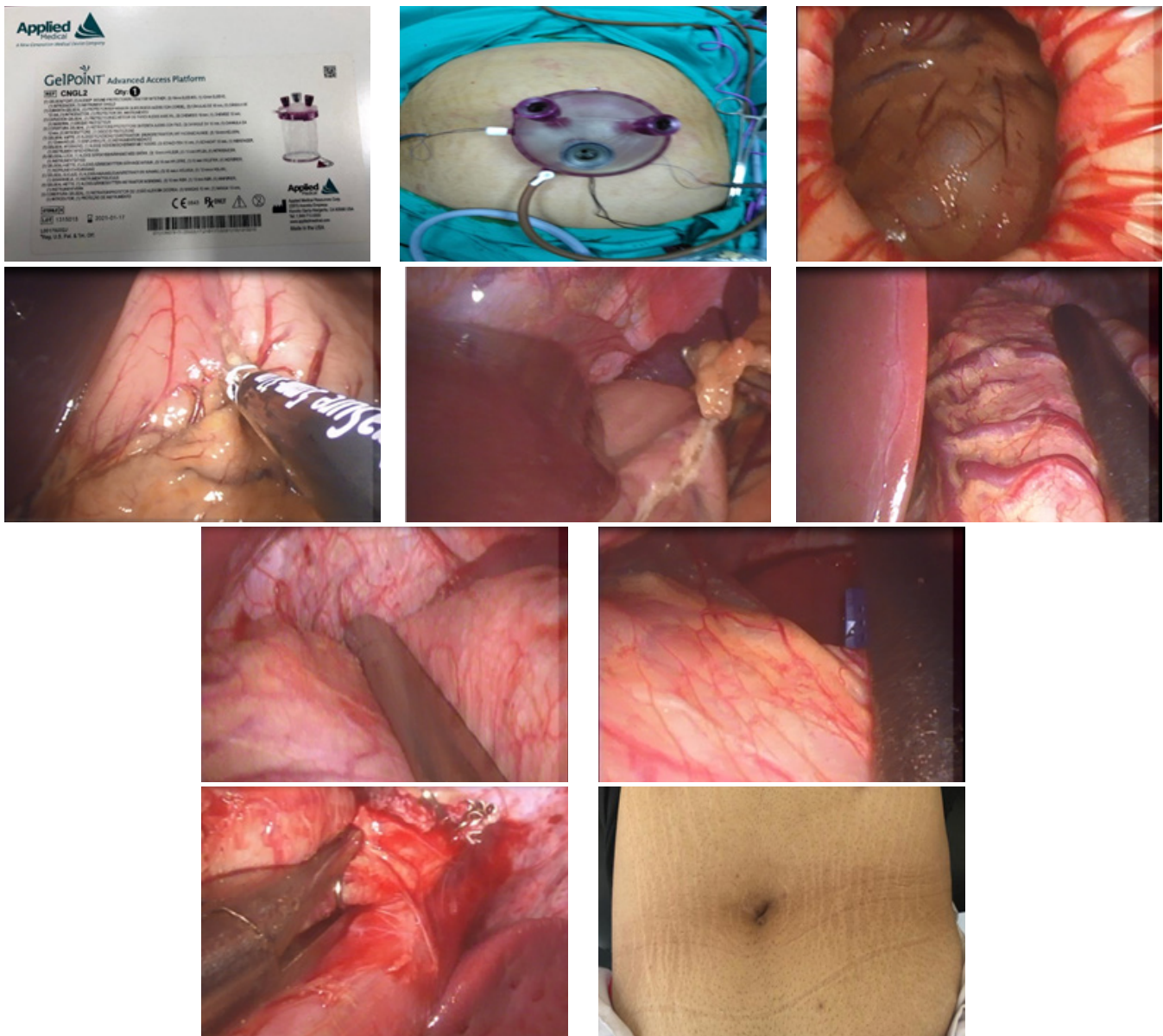
The preoperative preparation were routine laboratory investigations, pelvi-abdominal U/S, UGI endoscopy, echocardiogram and chest X-ray. We discussed the operative details with all patients and the signed a detailed consent before the operation.

## Operative technique

Patients were put in supine position and brought into anti-Trendelenburg position with extended arms, opened legs. A 2.5 cm incision was done

through the umbilicus using an open technique. We passed prolene sutures through the edges of the rectus sheath to facilitate the closure of the defect. The access port (Gelpoint® Tri-Port, Applied medical, USA) was then inserted. We used a 10-mm 30° scope and straight laparoscopic instruments in all patients. We started dissection of the gastrocolic ligament 2 cm proximal to the pyloric ring using the 5-mm blunt tip Ligasure™ (Covidien, France). The Ligasure™ was preferred over the Harmonic scalpel™ as the particulate matter that obstructs the vision is much less. The dissection continues upwards till the angle of Hiss. Any posterior gastric adhesions were cut. A 36F bougie was introduced into the stomach and placed along the lesser curve. The stapler used must be articulating; either Endo-GIA with blue or purple cartridge (Covidien) or Echelon Flex with gold and blue cartridge (Ethicon, France). We started stapling 2-4 cm proximal to the pyloric ring using a green cartridge. Stapling

was continued along the bougie using articulation whenever needed (**Figure 1**). Hemostasis of the staple line was performed using hemo-clips, sutures or bio-surgical materials as fibrillar® and surgicel®. We fixed the sleeved stomach to the omentum or pancreatic fascia to avoid twisting or migration. Leak test by injection of methylene blue through the bougie was routinely done. No drains were left. The resected stomach was extracted from the single port incision, and the sheath was properly closed with the formerly placed prolene sutures to avoid incisional hernia. Subcuticular suturing with absorbable material was done. Neither urinary catheter nor nasogastric tube was left. In only 6 patients we needed an extra trocar; in 4 of them we introduced an additional 3mm needle below the xiphoid process as a liver retractor, and in the other 2 patients an additional 5mm trocar was introduced in the left anterior axillary line for retraction of omentum.



**Fig 1: Operative steps. (A) Single port set label. (B) The single port after introduction. (C) Entry of the camera through the port. (D), (E) Dissection of the greater omentum. (F), (G), (H) Stapling of the stomach. (I) Hemostasis using clip. (J) Wound after closure.**

## Postoperative management and follow-up

Discharge of all cases were on the 1<sup>st</sup> postoperative day. Patients were allowed to start clear fluids intake for 2 weeks then semisolid diet for another 2 weeks. We allowed the patients to gradually start solid food after the first month. Anticoagulation was prescribed for 2 weeks postoperative together with a proton pump inhibitor for 2 months. Multivitamins were prescribed starting from 1st postoperative week.

Patients were followed up for 1 year. The patients attended the outpatient clinic after 2 weeks and then at 1, 3, 6 and 12 months. Investigations for comorbidities were done at 3 and 12 months. Follow up was directed mainly to EWL%, resolution of comorbidities, trocar site hernia and cosmetic result.

## Results

We had fifty consecutive patients in the study (**Table 1**). The average age was 41 years (21–58 years), and 39 (78%) were females. The average BMI was 44.5 kg/m<sup>2</sup> (range 38–50). The co-morbidities were DM in 15 (30%), hypertension in 12 (24), hyperlipidemia 5 (10%) and sleep apnea in 4 (8%).

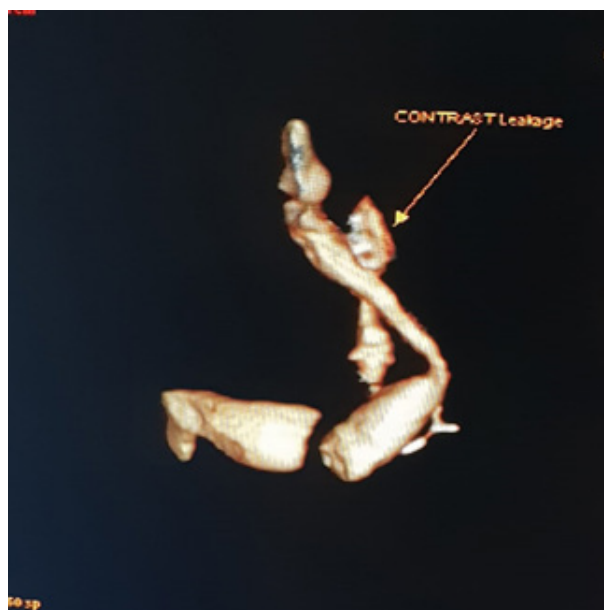
**Table 1: Demographic features of the patients**

	Number	Percentage or Range
Age (median-range)	41	21-58
Gender(Male: Female)	11:39	22:78
BMI (mean-range)	47.5	38-58
Comorbidities		
DM	15	30
Hypertension	12	24
Hyperlipidemia	5	10
Sleep apnea	4	8

The average time for the operations was 72 minutes (range 56–145). There was no significant blood loss, and no blood transfusion was needed. No intra-operative complications occurred. There was no conversion to open surgery in any patient. Six patients (12%) required addition of 1 or 2 trocars (all of them were among the first 20 patients). In 4 of them we introduced an additional 3mm needle below the xiphoid process as a liver retractor, and in the other 2 patients (BMI 55 & 58) an additional 5mm trocar was introduced in the left anterior axillary line for retraction of omentum. The median number of staples used was 5 (range 4–7). The resected stomach was extracted intact through the incision, with no need to extend the incision.

As regards the post-operative analgesics, all patients had 25mcg fentanyl patch on their chest wall before surgery and for 3 days postoperative. They also receive single dose of morphine derivative immediately after recovery from anesthesia. No other doses were required except for NSAIDs every 12 hours.

As regards postoperative complications, only 3 patients had early complications. The first was postoperative bleeding diagnosed by tachycardia and drop in hemoglobin level by 2 gm/dl; managed conservatively with transfusion of 2 units of packed RBCs. The second was postoperative surgical bed collection (hematoma) managed by U/S guided aspiration and pig tail insertion. The third one was leakage in the upper third of the stomach diagnosed by 3D virtual gastroscopy (**Figure 2**). The patient was managed by simultaneous laparoscopic peritoneal lavage and endoscopic mega-stent insertion. There was no cases of wound infection or incisional hernia. The average hospital stay was 1.5 days. No cases were converted to open surgery or conventional LSG.



**Fig 2: 3D virtual gastroscopy showing leakage of the dye just below the gastro-esophageal junction.**

## Follow-up

The pre-operative comorbidities including diabetes, hypertension, hyperlipidemia and sleep apnea showed resolution by 60%, 67%, 80% and 75%, respectively. There was no mortality. The average decline in excess weight was 68%. The patients were satisfied with their wound.

## Discussion

Many studies have confirmed the feasibility of SILSG. The mean operating time in our study was 72 minutes, very close to the conventional LSG. Dimitrios et al. reported that average operative

time was from 45 to 151 minutes. Lakdawala et al.<sup>6</sup> reported a shorter operative time after excluding patients with upper abdominal surgeries or a BMI  $\geq 60$  kg/m<sup>2</sup>. In our study, it was 72 minutes but with improvement of the learning curve, there was marked decrease in the operative time which becomes 60 minutes in the last 10 cases.

The SILSG has a critical learning curve, and so making the procedure more technically demanding. There is no triangulation between the instruments as all are introduced through the same port, so there may be a clash between each other and together with the laparoscope.<sup>7</sup> The surgeon must be adapted to that crossing. There must be good coordination between the camera man and the surgeon.<sup>8</sup>

Specific instruments should be used to make SILSG safer and technically easier. Double curved graspers & the flexible laparoscope system make the procedure easier and avoids the swordplay between instruments. As there is no triangulation, it should be replaced by antero-posterior movements and rotation in one axis. All movements should be gentle and of limited amplitude to avoid port extraction and so inadequate pneumo-peritoneum. SILSG may be done using traditional straight laparoscopic instruments, as done in our study.<sup>9</sup>

Saber et al.<sup>7</sup> stated that SILSG had less post-operative pain, less need for analgesia, and a shorter hospital stay than conventional LSG. The decrease in postoperative pain is due to it is only a single wound, minimizing the trauma to the abdominal wall and minimizing the leverage effect on the abdomen. Lakdawala et al. presented that 24% of the conventional LSG patients had taken analgesics after discharge, while no patient in the SILSG had ( $P < .0001$ ). In our study, all patients had 25mcg fentanyl patch on their chest wall before surgery and for 3 days postoperative, single dose of morphine derivative immediately after recovery from anesthesia and NSAIDs every 12 hours.

Lakdawala et al. published a prospective study and compared outcomes of SILSG versus conventional LSG in 600 patients with 2 years follow up.<sup>10</sup> This study stated that there were less postoperative pain, less need for analgesia and great patient satisfaction as regards the cosmetic outcome in the SILSG. Only 2 patients had wound infection and 3 (1%) patients had port-site hernia in the SILSG group. In our study there were no cases of wound infection or incisional hernia. There were 2 (<1%) cases of leakage in the SILSG group and 1 case in the conventional LSG group. In our study leakage was 2%. There was no cases converted to open surgery or conventional laparoscopy and no extra ports was added. In our study there were no cases

of conversion but we had 6 cases (12%) where we added 1 or 2 additional trocars.

The most challenging step in SILSG is retracting the liver. It should be adequate to provide good vision of the operative field and to minimize the complications. It is usually difficult to continue the procedure in cases with huge left liver lobe, which hinders good vision and proper dissection.<sup>11</sup>

Many ways of liver retraction are used as sutures, percutaneous retractors, or by holding upwards the stomach itself.<sup>13</sup> Saber et al.<sup>7</sup> stated that a low-calorie diet 2-4 weeks before surgery will reduce the size of the left lobe of the liver, making its retraction easier. They also initially used a suture covered by a part of a rubber catheter as a liver retractor to avoid its laceration. Gillard et al. published a study in 2016<sup>9</sup> and stated that in their first cases they introduced a 5-mm liver retractor through an additional port. Huang et al.<sup>14</sup> used monofilament sutures on straight needles with a pledget. But this procedure is time consuming and may cause liver injury. Lakdawala et al.<sup>10</sup> used of a 3 mm mini-laparoscopic instrument inserted in the epigastrium to retract the liver, with no apparent scar. Gentileschi et al.<sup>15</sup> retracted the liver with the laparoscope itself. Rogula et al.<sup>16</sup> stated that whenever needed, a 5 mm epigastric incision was made to apply Nathanson retractor without a port. Maluenda et al.<sup>17</sup> retracted the liver by a Veress needle. Gomberawalla et al.<sup>18</sup> made a 2.5mm epigastric skin incision to introduce a liver retractor, whereas Galvani et al.<sup>19</sup> used a bulldog and a hook to make a retractor.

Pushing the stomach vertically upwards with the surgeon's left hand should maintain adequate retraction. Introduction of additional trocars in multi-port laparoscopic surgeries is not a failure of laparoscopy, so introduction of additional trocars in SILSG should not be considered a failed single-port procedure.

Port-site hernia is an important issue after SILS. After bariatric surgeries, patients enter a catabolic phase and so wound healing may be delayed. Therefore, closure of the trocar site should be performed with great attention. Patients are not allowed to lift heavy objects or make any activities that contract abdominal wall muscles for the first 2 months. Gillard et al.<sup>9</sup> observed a 3.7% rate of port-site hernia after performing a CT scan at 1 year. Pourcher et al.<sup>5</sup> reported 0% rate of incisional hernia. Other studies reported a port-site hernia rate of 1% and 1.2% [10,20] in SILSG, but didn't perform a systematic CT scan. In our study there was no cases of incisional hernia.

One of the benefits of SILSG is improved cosmesis. Aesthetic result is a major concern especially

among young females. Also this benefit results in a psychological satisfaction that improves quality of life and postoperative compliance.<sup>9</sup>

The most frequently used single-port devices were LESS Triport/Quadport (Olympus, Japan), Covidien SILS Port and Gelport/Gelpoint (Applied Medical).<sup>12</sup> In our study we used Gelpoint triport in all cases.

Dimitrios et al. stated that the average hospital stay was from 1.4 to 6 days for the LSG group and from 1.7 to 5 days for the SILSG group.<sup>12</sup> In our study it was 1.5 days.

Dimitrios et al. compared LSG versus SILSG and stated that the conversion rate was 0% in the LSG group and 0-5% in the SILSG.<sup>12</sup> In our study there was no conversion.

EWL% is the best measure to assess the outcomes of SILSG. Lakdawala et al. compared LSG and SILSG and stated that the EWL% was comparable in the 2 groups. At 2 years, EWL% was 65.4±29.6 and 69.1±26.3 in SILSG and LSG patients, respectively. In our study EWL% was 68% at 1 year.<sup>10</sup>

As regards postoperative complications, Delgado et al.<sup>21</sup> reported 2 cases of intraperitoneal bleeding that required re-laparoscopy. Mittermair et al.<sup>22</sup> reported 1 case of intraperitoneal bleeding that required single incision laparoscopy and clipping of the bleeder, and 1 case of leakage that required laparotomy and oversewing. Pourcher et al.<sup>5</sup> reported a 3.3% complication rate; 1 case of leakage and 1 case of reversible cubital paresthesia. Stefanopoulos et al.<sup>13</sup> reported a 3% postoperative complication rate with intraperitoneal haemorrhage being the most common complication. Gaillard et al.<sup>9</sup> reported 24 cases of relaparoscopy due to haemoperitoneum and 19 cases of relaparoscopy combined with endoscopy due to leakage. In our study the rate of complications was 6% with 1 case of leakage that needed combined laparoscopic and endoscopic management.

Nowadays, in the era of cost-effectiveness, attention has been drawn in the cost of SILSG. Estimating the cost of SILSG and comparing it to the conventional LSG is very important to evaluate the new technique. Most studies referred to the safety of SILSG without taking the cost into account. With improvement of the learning curve, the operative time becomes shorter and so reducing the costs. Enhanced recovery and minimal postoperative analgesia after SILSG shortens the hospital stay and so lowers the cost.<sup>4</sup>

### Conclusion

SILSG is a safe and feasible technique if performed by an expert surgeon. Inclusion criteria that allow

patients to undergo SILSG should be clearly stated. Technique standardization and a safe method for liver retraction will make SILSG more feasible. Most studies done referred that it has shorter hospital stay and less postoperative pain but didn't give enough statistical evidence, although it was thought that it was only done for its cosmetic result. The bariatric federations should decide if SILSG is an alternative for selected patients or if it optimum to all patients. Randomized studies are still needed after improvement of the associated learning curve, to assess the long-term results as regards EWL%, resolution of comorbidities, incisional hernia rate, pain reduction, cosmetic satisfaction and cost-effectiveness.

### Conflict of Interest

The authors state that they have no conflict of interest.

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# Polypropylene Mesh Repair of Ventral Abdominal Hernias: Subcutaneous Drain Versus Binder with Aspiration: A Comparative Study of 60 Patients

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**Background:** Abdominal wall (Ventral) hernias are common in Egypt and worldwide. For many decades their repair represents a challenge for surgeons particularly if complex with potential recurrence. Postoperative complications include seroma formation, wound hematoma & infection, temporary decrease of bowel motility, bowel injury, urinary bladder injury, urine retention, pain, heart & breathing problems and may be death.

**Patients and methods:** This prospective study involved 60 patients presenting for surgical repair of their hernias at the Surgery Department (Cairo University Hospitals) from July 2016 through July 2017. After the approval of the Ethical Committee, they were divided into 2 equal groups A&B each is 30 patients having non complicated ventral hernias. Exclusion criteria were large hernias with a defect more than 12 cms, hernias with skin loss, presence of infection, diabetes mellitus, liver or kidney diseases and also those receiving steroids, chemotherapy or immunotherapy. All hernias were repaired primarily with the use of onlay polypropylene mesh. For Group A patients a subcutaneous drain was inserted while for group B ones they were left without drain but followed by a tight abdominal binder and if seroma forms it was treated by repeated percutaneous aspiration using a wide bore needle. Comparison criteria were the presence or absence of significant seroma, hematoma, wound infection, postoperative pain and lastly the degree of patient satisfaction.

**Results:** Forty one of the 60 patients were females (68.3%) and their age ranged from 27 to 70 years with a mean of 49.2 ( $\pm 11.6$ ). The incidence of seroma formation, hematoma and wound infection in Group A was 46.7%, 16.7% and 26.7% respectively, while in Group B they were 13.3%, 16.7% and 16.7% respectively. Patient satisfaction was 86.7% and 90% in Group A and B respectively.

**Conclusion:** In abdominal ventral mesh hernioplasty, combined abdominal binder and percutaneous aspiration for selected cases is superior to wound drainage in preventing seroma & hematoma formation and subsequent wound infection. It also lessens postoperative pain, shortens hospital stay and improves patient satisfaction.

**Key words:** Ventral hernia, Percutaneous aspiration, Abdominal binder, Subcutaneous drain.

## Introduction

Ventral hernias occur in 28% of patients who have undergone abdominal surgeries in the course of their lives. Still no fixed guidelines for their surgical management, making recurrence rates between 24 and 43%.<sup>1,2</sup> The use of synthetic materials like permanent meshes during repair has resulted in substantial decrease of recurrence rate by about 30% (1% compared to 7% in non mesh repair).<sup>3,4</sup> The only limitation for mesh repair is the relatively higher incidence of complications particularly seroma & hematoma formation, adhesions, wound infection and mesh migration.<sup>5</sup> Seroma formation is the most bothersome to both the surgeon and patient particularly if the hernia is large or complex. Injury to lymphatics and blood vessels or creation of dead spaces particularly during flap dissection are the commonest causes of seroma formation and also liponecrosis. This paves the way to subsequent wound dehiscence. Fortunately, seroma formation is self limiting and easily resolves with the insertion of a subcutaneous drain or repeated aspiration if

happens.<sup>6-8</sup>

The present study was conducted to review and compare between insertion of wound drain and the use of abdominal binder and percutaneous aspiration after open repair of ventral hernias and its effect on postoperative outcome.

## Patients and methods

### Patients

The inclusion criterion was the presence of a hernia having a defect size between 2 and 12 cms. in its maximal dimension. Exclusion criteria included: large hernias with a defect more than 12 cms., hernias with skin loss, the presence of infection, diabetes mellitus, liver or kidney diseases and also those receiving steroids, chemotherapy or immunotherapy.

### Methods

Proper history taking including age, sex, smoking habits or alcohol intake. Past history included

the presence or absence of co-morbidities like hypertension, heart problems etc. Proper physical examination to confirm the diagnosis of ventral hernia, assess the size of the defect and exclude the presence of any local complication (e.g. obstruction, strangulation etc.). All patients were subjected to routine preoperative laboratory investigations (blood count, coagulation profile, liver and kidney function tests). Abdominal ultrasound was done in all patients to confirm the diagnosis and to exclude the possibility of undermining intra-abdominal cause and to exclude the presence of any other unexpected condition that needs management in the same setting. Electrocardiography and Chest X-ray were sometimes needed to assess the cardio-pulmonary condition, followed by correction of any fluid and electrolytes imbalance, and the administration of intravenous Cephalosporin 1 gm /12 hours one day before surgery. Written informed consent was obtained from all patients. Operation was made under general endotracheal anesthesia in 46 patients and spinal anesthesia in 14 patients depending on the general condition of the patient and the decision of the anesthetist.

### Operative technique

Vertical or transverse incision overlying the hernia was done with meticulous dissection of the sac until its proper neck is clearly identified. The aponeurotic fascia was cleared about 5 cms. around the hernia defect. The fundus of the sac was sharply dissected off the skin, opened and contents are dealt with accordingly. Defect size is measured

either preoperatively (admission of fingers or by ultrasound) or intra-operatively using a sterilized tape. Closure of the defect by approximation of the edges (herniorrhaphy) using non-absorbable suture material, either transversally or vertically. Application of polypropylene mesh that extends 5 cms. all around the repair (either sutured by the non absorbable prolene or by mesh tucker). Drainage of the subcutaneous dead space is indicated if the skin is widely undermined. The subcutaneous tissues are approximated and skin closure is performed over a dry field but in a non ischemic technique. Insertion of wound drains (suction or corrugated rubber drains) in Group A patients was performed while for those of Group B members an abdominal binder was worn immediately after surgery and left for 2 weeks with repeated aspiration if seroma or hematoma form. All patients were closely observed for adequate pain control, urine output, blood gases. Clinical examination and investigations were carried out regularly in the follow up period. Third generation cephalosporin antibiotics were continued for 3 days postoperatively extended for 1 week if wound infection is suspected, combined with (trypsin and chemo-trypsin 300 mg each) as an anti-inflammatory agent for 2 weeks. If seroma or hematoma forms in the non-drained B group candidates, aspiration was done using a wide bore needle under aseptic conditions. Postoperative pain, patient satisfaction and return of normal activity were also recorded.

### Results

**Table I: Patients' Characteristics and Findings in both Groups**

Patient's Characteristics	Groups	Seroma Formation	Hematoma formation	Wound Infection	Patient Satisfaction
n = 60					
Sex:	Group A	14	5	8	26
Females: 41 (68.3%)	n = 30	46.7%	16.7%	26.7%	86.7%
Males: 19 (31.7%)	(With Drain)				
Age (in years)	Group B	4	5	5	27
Range: 27-70	n = 30	13.3 %	16.7 %	16.7 %	90 %
Mean: 49.2±11.6	(Binder+ Aspiration)				

### Discussion

To date, the majority of surgeons prefer to insert a subcutaneous drain following ventral hernia repair using synthetic mesh (98%).<sup>9-12</sup> The drain remains for one week or until the yield becomes below 20 mls. /day. In a recent study conducted by Gurusamy et al in 2009 they reported lack of data in literature concerning the superiority of using a subcutaneous

rubber or suction drain over abdominal binder following ventral hernioplasty using a synthetic mesh particularly for the incisional type. In their comparative study they also denied any superiority of using suction drain over the conventional rubber drain inserted in the subcutaneous space in preventing or diminishing seroma formation. Four patients developed seroma formation and wound



infection if rubber drain was used compared to none if a suction drain was used. Though the infection rate was a bit higher in the rubber drain group it was statically insignificant.<sup>9</sup>

In the present series, wound drain (both suction and rubber) did not prevent or even alter the frequency of seroma formation, but resulted in a higher incidence of wound infection (13.3%) and subsequent increase in post operative morbidity and prolongation of the period of hospital stay with cost increase. This is contrary to the routine use of abdominal binder in Group B patients where the infection rate dropped to 8.3%. Many studies reported an appreciable increase in the frequency of seroma formation and subsequent increase of wound infection rate in obese patient doing dermolipectomy in the same setting (38%).<sup>6,13,14, 15</sup> We did not probe this point as obese patients were not included in the study.

The superiority of using abdominal binder accompanied by repeated early aspiration if seroma forms were supported by many studies and confirmed in the present work.<sup>10,11</sup> The aspirations should be repeated at short times if seroma is clinically evident or confirmed by ultrasonography. This can be performed as an outpatient procedure. Delay will allow the seroma to be encapsulated which may affect the esthetic results at the operation site due to contracture and deformity which is of major concern on the side of the patient. The wearing of compression garments during the postoperative period immediately after surgery and use of quilting sutures are efficient alternative measures for prevention of seromas in most cases.

In this study abdominal binder with percutaneous aspiration were superior to wound drains as regards seroma formation, wound infection and postoperative return to normal activity. Small amount of fluid is not a complication, because it is a result of a natural inflammatory process following any surgery, and is mostly absorbed by the body without initiating a problem to the patient. The minimum volume of fluid collection indicating aspiration could not be settled in the present work, but 20 mls. was the cutoff edge for the seroma volume that needs intervention.

### Conclusion

For ventral hernioplasty using synthetic mesh, the use of immediate abdominal binder with occasional aspirations, is superior to a rubber or suction drainage. This lessens or prevents seroma or hematoma formation, It also reduces the incidence of wound infection.

### Conflict of Interest

No conflict of interest to declare.

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