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## Original Research Article

# Reducing operative morbidity among female patients combining laparoscopic hysterectomy and laparoscopic ventral hernia mesh repair procedures: a single centre 14 years experiences

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## ABSTRACT

**Background:** During laparoscopic ventral hernia repair (LVHR) mesh is used and so this procedure is not combined with any other major surgery, due to the risk of mesh infection. We did laparoscopic hysterectomy (LH) with LVHR in our study group and found it to be safe procedure with excellent patient recovery and satisfaction rates. Aims and objectives of the study was to assess the short- and long-term clinical outcomes of doing LH and LVHR simultaneously. The primary objectives were to evaluate the intraoperative and post-operative complications, mesh infection rates, hernia recurrence rates and patient satisfaction rates for at least 4 years.

**Methods:** This prospective study was conducted at Aarogya Hospital and test tube centre from 1st January 2007 to 31st December 2016 and follow up completed by 31st December 2020. Total 100 women were included, willing for LH and LVHR simultaneously irrespective of the size of uterus and hernia defect size up to 7cms.

**Results:** Maximum number of patients 65% were in the age group of 45-55 years. 70% patients had previous surgeries commonest being LSCS in 46% cases. Hernia defect size was between 3-5 cm in length and width in 70% cases, requiring dual mesh fixation in 68% cases of size 15x15cms. Our recurrence rate for hernia was nil, 98% cases were highly satisfied with the surgical outcomes by the end of 4 years follow-up.

**Conclusions:** We emphasize that LH can be easily done with LVHR in combination reducing operative morbidity.

**Keywords:** Dual mesh (Proceed, Symbotex), Incisional hernia, Laparoscopic hysterectomy, Laparoscopic ventral hernia repair, Umbilical hernia

## INTRODUCTION

Caesarean section (CS) is the most frequently performed procedure on women all over the world. Ventral hernias continue to be one of the most prevalent complications after abdominal surgery, pose significant medical issues and are associated with an economic burden and adverse quality of life.<sup>1,2</sup> Hysterectomy is the second most frequently performed procedure on women with an incidence of 6 % among married woman between the age of 30 -49 years.<sup>3</sup> CS rates are on rising trend and thereby

the incidence of incisional hernias. In the last decade the wide used of laparoscopy for hysterectomy and ventral hernia repairs has led to shortened hospital stays, decreased pain, faster recovery times, decreased wound morbidity and lower hernia recurrence rates. During laparoscopic ventral hernia repair (LVHR) mesh is used and so this procedure is not combined with any other major surgery, due to the risk of mesh infection. The most important concern of mesh infection is preventable by means of selection of mesh material, maintain sterility of prosthesis and operating setup, proper disinfection and

sterilization of scopes and adequate antibiotic coverage. We did laparoscopic hysterectomy (LH) with LVHR in our study group and found it to be safe procedure with excellent patient recovery and satisfaction rates. Aims and objectives of the study was to assess the short- and long-term clinical outcomes of doing LH and LVHR simultaneously. The primary objectives were to evaluate the intraoperative and post-operative complications, mesh infection rates, hernia recurrence rates and patient satisfaction rates for at least 4 years. Secondary objectives were assessment of surgical technique, types of mesh fixation technique, operative time, length of hospital stay, pain assessment, quality of life improvement, menopausal symptoms and requirement of hormone replacement therapy.

## METHODS

This prospective study was conducted at Aarogya Hospital and test tube centre from 1st January 2007 to 31st December 2016 and follow up completed by 31st December 2020. The study protocol was approved by institutional review board and ethics committee. Informed written consent was obtained from all patients before opting for the surgical procedure. Total 100 women were included.

### *Inclusion criteria*

All indicated cases willing for LH and LVHR simultaneously irrespective of the size of uterus and hernia defect size up to 7cms were included in the study.

### *Exclusion criteria*

Any investigation like ultrasonography, CT scan, MRI or D and C reports were suspicious of uterine, ovarian or cervical malignancy. Any uterine specimen which would require electromechanical morcellation, chronic pelvic inflammatory diseases, tubo-ovarian abscess, grade IV endometriosis. Hernia defect size >7cms. American society of Anaesthesiologists (ASA) grade IV patients. Strangulated hernias, emergency surgeries, recurrence of hernia cases either with suture repair or mesh placement in the index surgery, associated problems like acute appendicitis, cholecystitis, ileitis, colitis, suspected abdominal tuberculosis, patients not willing for long term follow up, patient on immunosuppressants, corticosteroids, history of smoking or tobacco chewing, chronic obstructive pulmonary disease, morbid obesity were excluded from the study.

A complete preoperative evaluation was done prior to surgical intervention. Coexisting conditions like severe anaemia, chronic cough, hypertension and diabetes mellitus were controlled. Haemoglobin status, colposcopy, cervical cytology endometrial biopsy and CT scan reports were evaluated thoroughly prophylactic single dose antibiotic was given to all cases 30 minutes prior to surgery and continued till 4th postoperative day. All cases were

done under general anaesthesia and in lithotomy position. Carbon dioxide pneumoperitoneum was created up to 12 mm of mercury using veress needle introduced through Palmer's point. 10 mm port was made and 10 mm telescope introduced through Palmers point. Two accessory 5 mm ports were made just below xiphisternum and on left lumbar wall in anterior axillary line under direct visualization for LVHR. Adhesions to the anterior abdominal wall surrounding the hernia were lysed and reduction of hernial contents was done, leaving hernia sac in situ.

LH was done with standard 4 ports using 5mm telescope supraumbilically and three accessory 5mm ports. Ligasure vessel sealer system was used for LH. No sutures or clips were used for LH leaving no foreign material on coagulated stumps. Specimen was removed vaginally. Vault was closed vaginally with vicryl no-1 on needle. This reduced operating time and sutures became extraperitoneal. After completion of LH, the position of the patient was made supine. LH ports (all 5mm) closed with monocryl sutures. Abdominal wall was now again painted and draped. Initial 10 mm and 5 mm accessory ports for LVHR kept in situ Surgeons rescrubbed.

After completion of the dissection the hernia defect was measured and an appropriately sized prosthetic mesh was chosen to overlap all margins of the defect by at least 3-5 cms. Dual mesh (Proceed, Symbotex) of appropriate size was then opened. A minimum of 4 prolene sutures were placed on mesh (proceed). The mesh was then introduced through the 10 mm port. The hernial defect was closed with either prolene or PDS no -1 using suture passer. After proper positioning of the mesh, a suture passer was used to pull the trans fascial sutures through separate incisions and tied with the knots buried in subcutaneous tissues (In Symbotex mesh sutures are prepositioned). The circumference of the mesh was then tacked to posterior fascia in double crown method using titanium non absorbable spiral tacks (protack).

At the completion of mesh placement, the bowel was examined for possible iatrogenic injury. The omentum and vault were observed for haemostasis. Omentum was spread between mesh and bowels. Then the pneumoperitoneum was released. The skin incisions were closed with absorbable sutures. 10mm port was closed with port closure needle using vicryl no. 2-0 suture. No drains were kept. Compression dressing was done over hernia site and abdominal binder was given to all patients to prevent seroma formation.

### *Follow up*

Patients were seen in OPD at regular intervals of one week, one month 3 months, six month and then yearly follow up for 4 years. At each visit, a full examination and ultrasonography was done to see signs of recurrence and mesh displacement. Patients were asked to fill questioner on patient satisfaction, pain, menopausal symptoms like hot flushes, anxiety, urinary and defecatory problems and

quality of life improvement. Patients having menopausal symptoms were given hormone replacement therapy with either tibolone or conjugated equine oestrogens. Calcium 1000mg daily orally was given to all patients. Data from each visit were documented in the hospital's electronic medical record. If patient was unable to visit hospital then telephone calls were made and follow up recorded.

The Hospital Management System (HMS) version 2.0 software was used for record maintenance and statistical analysis. Categorical variables are presented as frequencies and percentage of the recorded entries. Pain was assessed at intervals during the study using a visual analogue scale (VAS) with score of 0-10, (0= no pain, 10=unbearable pain,) 0-4 mild pain, 5-7 moderate pain, 8-

10 severe pain. Single dose analgesic was given to all patients after 8 hours of surgery (Diclofenac). Further analgesics were added as per patient's pain assessment and pain relief.

## RESULTS

Maximum number of patients 65% were in the age group of 45-55 years. 20% were overweight and 20% were obese. 96% patients were multiparous. 70% patients had previous surgeries commonest being LSCS in 46% cases. Midline vertical incisions lead to incisional hernia in 96% cases. Chronic hypertension was seen in 40% cases (Table 1).

**Table 1: Patient profile.**

Variables	Number	Percentage
<b>Age (in years)</b>		
35-45	24	24
45-55	65	65
55-65	08	08
65-75	03	03
<b>BMI (Kg/mt<sup>2</sup>)</b>		
20-25	60	60
25-30	20	20
30-35	12	12
35-40	08	08
>40	Nil	Nil
<b>Parity</b>		
1	04	04
2	65	65
3	15	15
>4	16	16
<b>History of previous surgeries (70 cases)</b>		
<b>LSCS</b>		
One	05	05
Two	33	33
Three	08	08
Tubectomy	02	02
<b>Laparotomy</b>		
Ectopic pregnancy	03	03
Intestinal perforation	04	04
Intestinal obstruction	05	05
Appendectomy	03	03
Ovarian cystectomy	05	05
Laparoscopic port site hernia	02	02
<b>Type of incision</b>		
Midline vertical	96	96
Pfannenstiel	02	02
<b>Associated medical disorders-62</b>		
Hypertension	40	40
Diabetes mellitus	15	15
Bronchial Asthma	03	03
Sickle cell anaemia	02	02
On anticoagulants	02	02

Continued.

Variables	Number	Percentage
<b>American society of Anesthetologists (ASA) classification</b>		
Class I	55	55
Class II	43	43
Class III	02	02
Class IV / V	Nil	Nil

**Table 2: Chief presenting complaints and LH details (n=100).**

Chief complaints	Number	Percentage
Menorrhagia	80	80
Abdominal swelling	100	100
Chronic abdomen pain	85	85
Severe dysmenorrhea	35	35
Difficulty in urination and defecation	10	10
Hernia reducible by taxis	18	18
Dragging sensation	35	35
<b>Indications for hysterectomy</b>		
Fibroid uterus	62	62
DUB	26	26
Adenomyosis	12	12
<b>Relevant ultrasonographic findings</b>		
<b>Uterine volume (in cu.cm)</b>		
50-100	26	26
100-150	24	24
150-200	20	20
200-250	15	15
>250	15	15
<b>Ovarian status</b>		
Bilateral normal ovaries	75	75
Bilateral atrophic ovaries	15	15
Unilateral simple ovarian cyst >5cm	08	08
<b>Types of LH</b>		
LH with bilateral salpingectomy	100	100
LH with bilateral oophorectomy	15	15
LH with unilateral oophorectomy	08	08

**Table 3: Types of ventral hernia, hernia defect size and types of mesh used.**

N=100	Number	Percentage
Primary	30	30
Incisional	70	70
Post laparotomy	68	68
Post laparoscopy	02	02
<b>Location of primary hernias</b>		
Umbilical / Supraumbilical	25	25
Epigastric	05	05
<b>Location for incisional hernia</b>		
Epigastric	04	04
Periumbilical	02	02
Sub umbilical	60	60
Suprapubic	04	04
<b>Hernia defect size</b>		
<b>Length</b>		
<3 cm	20	20
3-5 cm	70	70

Continued.

N=100	Number	Percentage
5-7 cm	10	10
<b>Width</b>		
<3 cm	20	20
3-5 cm	70	70
5-7 cm	10	10
<b>Types of mesh used</b>		
<b>Dual mesh</b>		
(Proceed, Symbotex)	98	98
Polypropylene Mesh	02	02

**Table 4: Intraoperative details.**

Surgical times (in minutes)		Average	Range
Laparoscopic hysterectomy		55	45-65
Laparoscopic adhesiolysis		15	10-20
Laparoscopic hernioplasty		40	30-50
Total operating time		110	90-140
Type and size of mesh			
Type	Size	Number	Percentage
Dual mesh (size in cms)	12x15	20	20
(Proceed, Symbotex)	15x15	68	68
	20x15	10	10
Polypropylene mesh	15x15	02	02
Mean blood loss (in ml)		Number	Percentage
20-30		80	80
30-40		10	10
40-50		10	10
Complications during surgeries		Nil	Nil
Haemorrhage, ureteric, bowel or bladder injury		Nil	Nil
Conversion to Laparotomy		Nil	Nil
Anaesthesia complications		Nil	Nil

Menorrhagia was the commonest menstrual complaint in 80% cases and hysterectomy was done for fibroid uterus in 62% cases. 100% cases found hernia because of appearance of abdominal swelling (Table 2).

Primary ventral hernias were umbilical or supraumbilical in 25% cases. Hernia defect size was between 3-5 cm in length and width in 70% cases (Table 3) requiring dual mesh fixation in 68% cases of size 15x15cms (Table 4).

55% cases had moderate pain post operatively and 80% cases were discharged within 48 hours. Mild seroma formation occurred in 50% cases (Table 5).

Our recurrence rate for hernia was nil, 98% cases were highly satisfied with the surgical outcomes by the end of 4 years follow-up. Menopausal symptoms requiring hormone replacement therapy occurred in 35% cases (Table 6).

**Table 5: Postoperative details (n=100).**

Abdominal pain	2 <sup>nd</sup> POD	7 <sup>th</sup> POD
Mild	10	85
Moderate	55	15
Severe	35	Nil
Pyrexia	Nil	Nil
Post-operative ileus	02	Nil
Nausea and vomiting	25	Nil
Mild vaginal bleeding and discharge	Nil	25
Rexplorations	Nil	Nil
Pneumonitis	Nil	Nil
Venous thrombosis	Nil	Nil
Length of hospital stay	Number	Percentage
Up to 2days	80	80
2-4 days	20	20
SEROMA formation	Number	Percentage
Mild	50	50
Moderate	10	10
Severe	Nil	Nil
Port site infection	02	02
Readmission	Nil	Nil

**Table 6: Follow up details.**

	6 month		1 year		4 year	
Pain in abdomen	Number	%	Number	%	Number	%
No pain	Nil	Nil	60	60	Nil	Nil
Mild pain	60	60	38	38	Nil	Nil
Moderate pain	35	35	02	02	Nil	Nil
Severe pain	05	05	Nil	Nil	Nil	Nil

Continued.

	6 month		1 year		4 year	
Mesh displacement	Nil	Nil	Nil	Nil	Nil	Nil
Mesh infection	Nil	Nil	Nil	Nil	Nil	Nil
Chronic port site infection	Nil	Nil	Nil	Nil	Nil	Nil
Recurrence of hernia	Nil	Nil	Nil	Nil	Nil	Nil
<b>Patient satisfaction</b>						
Excellent	55	55	65	65	98	98
Good	19	19	18	18	02	02
Medium	20	20	15	15	Nil	Nil
Dissatisfactory	06	06	02	02	Nil	Nil
			<b>Number</b>	<b>Percentage</b>		
<b>Menopausal symptoms</b>			35	35		
Hormone replacement therapy			35	35		
Tibolone for 6 months			10	10		
Conjugated equine oestrogens for 3 months			25	25		

## DISCUSSION

From January 2001 to December 2006, we were practising LH and LVHR in patients requiring both surgeries separately. Our experience made us realize that these two surgeries can be done in combination alleviating the need of multiple surgeries. Our learning curve for LH and other laparoscopic procedure had reached a satisfactory level in these years.<sup>4-6</sup> LH is a safe procedure.<sup>7</sup> Combining two major surgeries may apparently lead to excessive pain, prolonged hospital stays, increased nausea, vomiting, paralytic ileus due to prolonged anaesthesia and increased risk of mesh infection. LVHR required average time of 40 minutes and hospital stay of 2 days which is comparable to Gillion et al who had average time of 43.4 minutes and 2.5-day hospital stay.<sup>8</sup> Despite 2 surgeries our patients had only mild pain by 7th post-operative day Lipere et al also reported significant pain reduction by 8th postoperative day.<sup>9</sup> We had mild seroma formation in 50 % cases which resolved with compression dressing only. Chelala et al eliminated the dead space by routine closure of the defect, thus reducing the seroma formation to 2.56% with low risk of infection <1%.<sup>10</sup> The development of a seroma is multifactorial and is likely related to the introduction of a foreign body eliciting an inflammatory response, as well as leaving the hernia sac intact.

The use of synthetic mesh for the repair of hernias has reduced recurrence rates significantly. But the use of synthetic mesh can be complicated by infection. The methods of sterilization and disinfection of laparoscopic instruments and mycobacterial infection constitute important causes for wound infection. The mesh infection rates range from 0.7 to 2 % in LVHR. Our mesh infection rate was nil. We have used high level disinfection for fiberoptic cords and telescopes. Remaining all instruments were autoclaved. Mesh and tackers were never reused. We emphasize that we need to follow principles of surgery such as strict asepsis, meticulous haemostasis, delicate tissue handling and obliteration of dead spaces at hernia sites. Use of antibiotic impregnated drapes, preoperative and perioperative systemic antibiotic, topical application

of antimicrobials and application of antibiotic releasing substances such as gentamycin releasing collagen tampons over the mesh have been used with variable success.<sup>11</sup>

The recurrence of hernia is an important issue. We have completed 4 years follow up for 100% cases with recurrence in none of the cases. We have operated 70% cases with defect size 3-5cms with overlap of mesh for 3-5cms. Nardi et al found a 7% hernia recurrence at 5 years follow up.<sup>12</sup> The factors related to the patient and the surgical technique that may influence the onset of early or late recurrence are a defect size >5 cm, an overlap of the mesh < 5 cm, a BMI of 30 kg/m<sup>2</sup> or superior and the presence of significant comorbidities (ASA score 3) Leblance et al analysed 95 articles and found that the risk for recurrence of hernia decreased with increasing area of mesh overlap (<3 cm incidence rate 0.086, 3-5cm incidence rate 0.046 and >5 cm incidence rate 0.014).<sup>13</sup>

We had applied mesh in all cases even for small hernias (1-3cm), Kaufman et al suggested that even for small hernias (1-4cm) mesh repair should be the operation of choice.<sup>14</sup> Choice of mesh can influence outcomes.<sup>15</sup> From 2014 onwards we have been using symbotex composite mesh. Symbotex composite mesh is dual sided comprising of a microporous monofilament, hydrophilic textile in three-dimensional construction that allows for reinforced strength, memory shape and significant tissue in growth. A bioabsorbable collagen film on the visceral side minimizes tissue attachments. We had done defect closure in all cases. Danish nationwide cohort study showed a reduced risk of reoperation for recurrence if defect closure was performed in addition to mesh fixation during laparoscopic incisional hernia repair.<sup>16</sup>

We had combined LH and LVHR. While assessing patient satisfaction, we had put questions emphasising on menopausal symptoms, abdominal pain, vaginal discharge, sexual activity, capacity to do routine work and improvement in overall quality of life. Patient reported outcomes are 85% sensitive and 81% specific to detect recurrence. Patients reporting no bulge and no pain had 0%



chance of recurrence.<sup>17,18</sup> This is probably the only study combining LH with LVHR and adequate follow up of all cases for 4 years.

### Limitations

Incisional hernia is an iatrogenic abdominal wall defect that occurs at the site of previous incision. Various factors have been identified to be responsible for the failure, including obesity, wound infection, suture material used for the closure of fascial defect, early wound infection and dehiscence. But we could not find detailed data on the factors that lead to hernia formation as no medical records were available with the patients. If these factors could have been found in our cohort, this study would have contributed on preventive aspects of hernia formation. Until techniques for the prevention of hernias are established, repair of these defects will remain an important topic of discussion.

This study has not analysed the cost benefit analysis of combining two major surgeries which should be definitely beneficial in terms of operative morbidity and reduction in disability days. The mean total cost for LVHR in France in 2011 was estimated to be 6451 Euros ranging from 4731 euros for unemployed patients to 10107 Euros for employed patients whose indirect costs (5375 Euros) were slightly higher than the direct costs.<sup>2</sup>

In our centre we are doing laparoscopic surgeries either LH or LVHR for last 20 years. Open surgeries are being done only in malignant cases or very large hernias requiring abdominal wall reconstruction. So, we are unable to give a comparable data between open and laparoscopic procedures for hysterectomy and ventral hernia repairs. Patient with incisional hernia and requirement of hysterectomy benefit substantially from surgery concerning quality of life independent of surgical technique. An event free recovery frequently occurred after laparoscopic surgery.<sup>19</sup>

LVHR is still an evolving surgery. In LVHR using a bridging technique, an overlap of at least 5 cm is not all that is required to prevent hernia recurrence. The ratio of mesh area to defect area (M/D ratio) is another important factor for recurrence.<sup>20</sup> A ratio of 13 appears as the threshold under which that technique cannot be recommended and abdominal wall reconstruction may be required. We have not analysed M/D ratio in our study.

### CONCLUSION

With advancements in minimal access surgery, combined laparoscopic procedures are now being performed for treating coexisting abdominal pathologies at the same surgery. We emphasize that LH can be easily done with LVHR. Since incisional hernias commonly occur after LSCS and for gynaecological problems, females always visit gynaecologist where we need to keep in mind that if patient needs hysterectomy and hernia repair, we can

suggest these surgeries in combination reducing operative morbidity.

As long as the basic surgical principles, indications for combined procedures, meticulous exclusion criteria, strict asepsis are adhered to, minimal access surgery is feasible and appears to have several advantages in simultaneous management of two different coexisting pathologies with significant reduction in operative morbidity and hospital stay.

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