



Original Research Article

## **A Study on Effect of Onlay Mesh Repair of Ventral Abdominal Wall Hernias in Women in Our Rural Setup**

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### **ABSTRACT**

**INTRODUCTION:-** Hernia is defined as protrusion of a viscus or part of a viscus through a normal or abnormal opening in the walls of its containing cavity. External abdominal hernia is the commonest form. This study aims to shed light on Abdominal wall hernias in women and its management by Onlay mesh repair.

**AIMS AND OBJECTIVES:-** To study cases of abdominal wall hernias in our setup and their management by onlay mesh repair

**METHODS:-** All female patients with different types of abdominal wall hernias eg. Umbilical hernia, Para-umbilical hernias, Incisional hernias, Epigastric hernia, etc. excluding the inguinal hernias and patients below 5 yrs of age were included into the study. They were admitted and operated for the same by Onlay mesh repair and its results observed. Follow up was kept for 6 to 18 months post discharge.

**RESULTS:-** Out of the total 74 patients included in the study, 16.22% patients developed complications following Onlay mesh repair, of which 2.7% cases had seroma formation. These were the 2 cases with huge incisional hernias and advanced age. These were treated by aspiration and daily dressings with support by abdominal binder. 13.52% cases developed minor superficial surgical wound infection which was treated on basis of antibiotic sensitivity with daily dressings.

**CONCLUSIONS:-** Open onlay mesh repair is an efficient method of treatment in spite of laproscopic hernioplasty being one of the preferred methods of treatment of abdominal wall hernias, in rural setup where it is not affordable by the patient.

**Key words:** Ventral abdominal hernia, Women, Onlay mesh repair.

### **INTRODUCTION**

Hernia is a protrusion of a viscus or part of a viscus through a normal / abnormal opening in the walls of its containing cavity.

[1] The external Abdominal Hernia is the commonest form. The most frequent types are Inguinal, Femoral, Umbilical,

Paraumbilical, Epigastric and Incisional Hernia.

Abdominal wall hernias are a familiar surgical problem. Millions of patients are affected every year. Whether symptomatic or asymptomatic, hernias commonly cause pain or are aesthetically distressing to the patients. These concerns,

coupled with the risk of incarceration, are the most common reasons patients seek surgical repair of hernias. Advances in the basic clinical sciences have allowed a better understanding of pathophysiology of hernia formation. It is known that a hernia will continue to enlarge over time if not treated. Presence of ventral hernia is itself, an indication for repair when no substantial co morbid conditions exist.

The field of hernia repair has evolved as a result of surgical innovations and has been significantly benefited from technological improvements. Tension free repair is one of the key concepts that have revolutionized hernia surgery. The use of mesh has resulted in a decrease in recurrence rates in hernia.

More recently, laparoscopic approaches for incisional hernias have extended the options for hernia repair. Laparoscopic repair demands significant expertise to achieve outcomes comparable with those of open repairs. Although Hernia is more common in men , women are also is susceptible to hernia. There is very little published information relating specifically to hernia in women. The following discussion aims to shed light on the different types of Ventral abdominal wall hernias in women, mode of presentation, treatment and outcome by Onlay mesh repair.

## **MATERIALS AND METHODS**

This is a prospective study based on the cases of ventral abdominal wall hernia, Observed at Annasaheb Chudaman Patil Memorial Medical College(ACPMMC) and Hospital, Jawahar Medical Foundation, Dhule during the period of June 2011 to September 2013.

Our study group consisted of female cases of ventral abdominal wall hernias that presented in our O.P.D. The inpatients chosen in this study were all women above

15 years. They presented with various types of external Abdominal Hernia. Patients admitted for Elective surgery were included in this study. The patients related factor namely age, obesity, multi-parity, cough/COPD, constipation, Hypertension, Diabetes mellitus, past surgical history(Nature, type of surgery, duration between surgery and time of presentation etc.) and any other relevant history were recorded.

Routine investigations viz. Hematology, Urine examination, Chest X-RAY, ECG, Ultrasound abdomen and pelvis for all patients and other special investigations were done for associated diseases where ever required.

As Clinical diagnosis was made, patients with medical illness were appropriately treated to attain near normal parameters before surgery. All patients were treated with Onlay Mesh Repair. At the induction of anaesthesia prophylactic dose of antibiotic (3<sup>rd</sup> generation cephalosporin) was given. In Mesh Repair, Polypropelene mesh was used with at least 4cm of mesh overlapping the edges of the fascial defect and secured with Polypropelene no. 1 interrupted / continuous suture over the fascia. Suction drain was used for all patients and removed after 48 to 72 hrs or when drain decreased.

Particular attention was given to study various aspects of Ventral abdominal hernias like:

- 1) Distribution of ventral hernias with respect to age of presentation.
- 2) Types of hernias.
- 3) Etiological /Predisposing factors for development of ventral hernias.
- 4) Common presentations.
- 5) Period between the previous surgery and development of Incisional hernia.
- 6) Exact location and size of the defect.
- 7) Management by Onlay Mesh Repair.

8) Complications in the peri-operative period.

9) Follow up done 1, 6, 12, 18 months after surgery.

## RESULTS AND OBSERVATIONS

This study was conducted in the period from June 2011 to September 2013.

Total no. of admissions in ACPMMC in this period = 8130.

Total no. of surgical admissions in ACPMMC = 2305.

Total no. of Hernia cases admitted and operated in this period = 328.

Total no. of Ventral abdominal wall hernias operated in this period = 106.

Total no. of male cases with ventral hernias = 24.

Total no. of female cases with Ventral abdominal hernias = 82.

Total no. of female cases operated by Onlay mesh repair = 74.

(Actual no. of cases included in our study)

Out of the 8 cases not operated:

2 were not fit due advanced cardio-vascular problems.

6 cases were having defects < 4 cm in size hence only Primary suturing repair was done.

Ventral abdominal hernias constituted - 32.3% of all the varieties of hernias in this study.

Male : Female ratio for ventral hernias in our study = 1 : 3.4.

Table – 2. Distribution of various types of ventral hernias.

Sr no.	Type of hernia	No. of cases	Percentage
1)	Incisional	53	71.6
2)	Umbilical	3	4.05
3)	Para-Umbilical	13	17.60
4)	Epigastric	5	6.75
5)	Spigelian	0	0
TOTAL		74	100

Table – 1. Common presenting complains of ventral hernias

Symptoms	No. of cases	%
Swelling only	50	67.5
Swelling & Pain	17	23
Pain only	7	9.5

Table –3. Age distribution of cases of ventral hernias in our study.

Age in years	No. of cases	Percentage
15 – 25	2	2.7
26 – 35	11	14.86
36 – 45	21	28.38
46 – 55	26	35.14
56 – 65	12	16.22
> 65	2	2.7
Total	74	100.0

Table – 4. Common predisposing factors for development of ventral hernias.

Risk Factors	No. of cases	Percentage
Past surgery	53	71.6
Obesity	40	54
Constipation	15	20.27
Chronic cough	8	10.81
Multiparity	24	32.43
Hypertension	13	17.56
Diabetes mellitus	5	6.76

Table – 5. Types of surgeries causing Ventral hernias

Past surgery	No. of cases	Percentage
Abdominal Hysterectomy	13	24.52
LSCS	17	32
Laprotomy for perforation peritonitis	12	22.64
Open tubal ligation	6	11.32
Cholecystectomy	2	3.77
Appendectomy	1	1.88
Incisional hernia repair	2	3.77
Total	53	100.0

Table – 6. Types of incisions resulting in incisional hernias.

Type of incision	No. of patients	Percentage
Upper midline	10	18.87
Lower midline	25	47.17
Upper paramedian	2	3.77
Lower paramedian	3	5.66
Tubectomy(TL)	6	11.32
Pfannenstiel	4	7.55
Kocker's	2	3.77
Grid iron(GI)	1	1.88

Table – 7. Duration for the onset of Incisional hernia after previous surgery (DOAPS).

Duration for the onset of Incisional hernia after previous surgery (DOAPS)	No. of cases	%
< 6 months	19	35.84
6 months to 1 yr	17	32.08
1 – 5 yrs	11	20.75
5 – 10 yrs	4	7.55
> 10 yrs	2	3.77
Total	53	100

Table – 9. Complications of Onlay mesh repair in our study.

Complication	No. of cases	%
Seroma	2	2.7
Minor surgical site infection	10	13.52
Dehiscence	0	0
Mesh infection	0	0
Accidental enterotomy	0	0
Nil	62	83.78
Total	74	100.0

Table – 8. Distribution of defect size within the various types of hernias.

Type of hernia → Defect size Maximum diam. ↓	Incisional hernia No. (%)	Paraumbilical hernia No. (%)	Umbilical hernia No. (%)	Epigastric hernia No. (%)	TOTAL No. (%)
4cm – 6cm	10 (18.87)	10 (76.92)	3 (100)	3 (60)	26(35.13)
>6cm–10cm	30 (56.60)	3 (23.08)	0	2 (40)	35(47.3)
>10cm-15cm	11 (20.76)	0	0	0	11(14.87)
>15cm	2 (3.77)	0	0	0	2(2.7)
TOTAL	53	13	3	5	74

Table- 10. Duration of hospital stay.

Duration of hospital stay	No. of cases	%
3 – 4 days	40	54.05
5 – 6 days	32	43.24
7 – 10 days	3	2.7
TOTAL	74	100

Patients that had a hospital stay of 3-4 days included all the ParaUmbilical hernias, all the umbilical hernias, all the epigastric hernias, the 10 cases of incisional hernias that had small size defects(4-6cm) and 9 cases of incisional hernia with medium sized defects(>6-10cm).

All these case were discharged on 3<sup>rd</sup>/4<sup>th</sup> day with suction drain in situ and called for follow up after 48 - 72 hrs for drain removal. The 3 cases with huge incisional hernias required a stay of 7 – 10 days due development of complications.

There were no post-operative deaths / any major cardiovascular or pulmonary complication. Vacuum drainage was employed in all cases, but 2 cases which had huge incisional hernia developed seroma due need of excessive dissection and were treated by percutaneous aspiration and daily dressing. 10 cases developed minor surgical site infection, were treated as per culture and

sensitivity reports with suitable antibiotics and regular dressings.

Mean duration of hospital stay was 4.6 days (range 3 – 10 days) shortest being those which required less dissection while longest in cases with huge incisional hernias, those who were medically unfit initially for surgery and those who developed post-operative complications.

Follow up of patients was done at 1, 6, 12, 18 months interval. Of all the patients followed up none developed recurrence during the study period.



Figure 1. A patient with umbilical hernia.



Figure 2. Umbilical hernia - Onlay mesh repair.



Figure .3. Epigastric hernial sac on exposure.



Figure .4. Onlay mesh repair of Epigastric hernia.



Figure .5. Huge lower midline incisional hernial sac.



Figure 6. Onlay mesh repair of the above huge incisional hernia.

## DISCUSSION

- Ventral hernias are a familiar surgical problem.
- Ventral hernias include Incisional and Primary defects in abdominal fascia, which can cause Umbilical, Paraumbilical, Epigastric and Spigelian hernias. [1]
- Ventral abdominal hernias constituted - 32.3% of all the varieties of hernias in this study.

### Male : Female ratio

Male : Female ratio for ventral hernias in our study= 1 : 3.4.

Regnard et al, [2] in their study on incisional hernia found that the sex ratio was 1:5.

The female preponderance in the occurrence of incisional hernia is probably due to laxity of abdominal wall due to repeated pregnancy and

associated obesity which usually is associated with a higher incidence of post-operative infection.

### Relative distribution of the different varieties of ventral hernias in our study

Most common type of ventral abdominal wall hernia in women are Incisional hernias( 53 cases – 71.6 % ), 2<sup>nd</sup> commonest being Para-Umbilical hernias(13 cases – 17.6 % ), 3<sup>rd</sup> commonest Epigastric hernias ( 5 cases – 6.75 % ) and least common being purely Umbilical hernias ( 3 cases – 4.05 % ) in our study. We did'nt get

any case of Spigelian hernia in our period of study.

Age of presentation

In our study Ventral abdominal hernias mostly presented in age group of 26 – 65 yrs of age(94.6 %), out of which the age group of 36 – 55 yrs comprise 63.52 % of cases in our study suggesting that more than half the cases of ventral abdominal wall hernias fall in the late reproductive and premenopausal period.

Mean age of presentation = 46 yrs.

Carlson et al [3] found that many patients with incisional hernia were between 25 and 90 years with mean age of 60.3 yrs. Incisional hernia occurred at an early age in this study as compared to westerners, probably because of early marriage and multiple pregnancies in Indian women, which leave the abdominal wall weak.

Modes of presentation

Most common presenting complain of ventral abdominal hernias is swelling / visible bulge over the abdomen(67.5 % i.e. 50 patients),

Santora TA and Roslyn JJ [4] have stated that incisional hernia manifest as bulge in the abdominal wall closure.

Cassar K and Munro A [5] defined incisional hernia as a bulge visible and palpable when the patient is standing and often requiring support or repair.

The first sign of an incisional herna is an asymptomatic bulge noticed by the patient,

bulge can be noticed directly over the incision or in an adjacent area locally related to the incision - Millikan KW. [6]

A bulge in the vicinity of a healed scar as said by Robert J Baker. [7]

Patients experience pain and vague discomfort if omentum or even preperitoneal fat herniates through a small defect - Robert J Baker. [7]

Associated risk factors and illness

Most common risk factor for development of ventral abdominal hernias is History of previous major abdominal surgery( 53 cases – 71.6 % ), followed by obesity (40 cases – 54 % ) and multiparity ( 24 cases – 17.76 % ).

Obesity has been cited as a risk factor for development of incisional hernias - Millikan KW. [6] Rios et al [8] had in his study 19.9% cases with diabetes ( 6.76% in our study) and 9.3% cases were obese (54% in our study).

Past history of surgery

Past history of an abdominal surgery is the most common risk factor(71.6%) for development of ventral abdominal hernias simply because Incisional hernias are the most common type of ventral abdominal hernias. This is due the high frequency of pelvic surgeries performed in females.

Most common surgeries in past predisposing for development of ventral abdominal hernias are 1) Emergency LSCS and 2) Abdominal hysterectomy.

Table 11. Types of surgeries causing incisional hernias(Tulaskar N [9]).

Type of Previous surgery	No. of Cases		(%)	
	Tulaskar N (n-64)	Our study (n-53)	Tulaskar N	Our study
LSCS	25	17	39.06	32
Abdominal hysterectomy	14	13	21.8	24.52
Tubal ligation	7	6	10.9	11.32
Exploratory laparotomy	10	12	15.6	22.64
Incisional hernia	4	2	6.25	3.77
Cholecystectomy	2	2	3.12	3.77
Appendicectomy	0	1	0	1.88
Pyelolithotomy	2	0	3.12	0

With respect to the type of surgeries involved in etiology of incisional hernias findings of our study is almost similar to findings of study by Tulaskar N as seen by the above table .

Table 12. Incisional hernia through various incisions.

Sr no.	Type of incisions	No. of patients	Percentage
1)	Infraumbilical	77	36
2)	Supraumbilical	35	16
3)	Supra+Infra umbilical	32	15
4)	Paraumbilical	32	15
5)	Subcostal	13	6
6)	Pratransrectal	12	5.5
7)	Lumbotomies	5	2
8)	Others	10	4.5

Most common type of incision predisposing to development of incisional hernia is Lower midline incision (47.17 %).

Carlson [3] found a 10.5% ventral hernia rate in 4129 lower midline incisions, compared

with a 7.5% rate for transverse incisions and a 2.5% rate for paramedian incisions.

Rios A and colleagues [8] have given the percentages of various incisions through which hernia have occurred as shown in the table below.

Even in the study conducted by Rois and colleagues, Lower midline incisions (Infraumbilical) are the most common site for development of incisional hernia as in our study (Rois and colleagues [8] – 36 %, Our study – 47.17 %).

Tulaskar N and colleagues [9] had got an almost 1.5 times (71.8%) the rate of development of incisional hernia from lower midline incisions as compared to our study result.

Table 13. Type of Incision causing hernia (Tulaskar N and colleagues [9])

Type of Incision	No. of Cases		(%)	
	Tulaskar N (n-64)	Our study (n-53)	Tulaskar N	Our study
Lower Midline	46	25	71.8	47.17
Upper Midline	10	10	15.6	18.87
Pfannensteil incision	2	4	3.1	7.55
Kocher's subcostal	2	2	3.1	3.77
Paramedian	2	5	3.1	9.43
Lumbar incision	2	nil	3.1	Nil

Toms AP [10] and colleagues said that incisional hernias are more following midline incisions through the relatively avascular linea alba and are less common following transverse incisions, especially where muscle splitting approaches are being used.

The preponderance of incisional hernia in females could be due to relatively high frequency of employing lower midline incisions, notoriously prone for herniation, in women for surgeries on pelvic organs.

Majority of patients who undergo gynaecological procedures namely Abdominal hysterectomy (32 %) and LSCS

( 24.52 % ) developed incisional hernia through lower midline incisions.

The frequency of female pelvic surgeries through the subumbilical incision where the linea alba is thinner and less well protected compounded by multiparity is probably the reason why lower abdominal incision are often followed by herniation.

Also, it should be noted that the midline incision remains the most versatile and is frequently used in hemorrhage, trauma and peritonitis. Specific anatomic considerations suggest that vertical midline incisions have more risk of a post-operative incisional hernia.

Patient who had undergone Emergency laparotomy for perforation peritonitis also developed incisional hernia and constituted 22.64 % of cases in our study.

As many as 20% patients who undergo laparotomy develop incisional hernia - Burger JW, Luijendijk RW and colleagues. [11]

#### Time of onset of hernia following previous surgery

Presentation of Incisional hernia after previous operation

Within 6 months of surgery = 43.39%,

Within 6 months to 1 yr after surgery = 24.53%,

Hence most cases i.e. 67.92%, present within 1 yr after surgery.

In a 10 yrs prospective trial involving 537 patients, Mudge M and Hughes LE [12] showed that of the 62 patients that developed incisional hernia, 56 % did so within the 1<sup>st</sup> post-operative year and 35 % after 5 years.

Millikan KW [6] in his study showed that more than half incisional hernias present within first 2 yrs of primary surgery, but significant of them can occur many years after primary surgery.

#### Size of the defect

In our study we had divided the patients into groups on basis of the size of the hernial defect, noted during surgery. 1st group with defect size 4-6 cms constituted 26 cases ( 35.14 % of the total no. of cases in the study) of which 10 cases were of incisional hernias and para-umbilical hernias each, 3 case of epigastric hernias and all the 3 cases of purely umbilical hernias were in this group.

2<sup>nd</sup> group with defect size >6 cm -10 cm were the maximum no. of patients i.e. 35 cases ( 47.3 % of total cases in our study) of which 30 cases were of incisional hernias, 3 cases of para-umbilical hernias and 2 cases of epigastric hernias.

3<sup>rd</sup> group with defect size of >10cm -15 cms had only 11 cases ( 14.86 % of total cases in our study ) all of which were incisional hernias.

4<sup>th</sup> group with defect size >15 cms included 2 cases (2.7% of cases in our study) which were the cases with huge incisional hernias.

All the 3 cases of umbilical hernias had defect size of 4 - 6 cms.

Majority of the Para-umbilical hernias ( 10 out of 13) and Epigastric hernias ( 3 out of 5) had defect size of 4 – 6 cms.

Hence all umbilical hernias, most of the para-umbilical hernias and most of the Epigastric hernias had defect size in the range of 4 – 6 cm .

Most of the Incisional hernias ( 30 out of 53 i.e. 85.72 % of all incisional hernias) had defect size of >6cm – 10 cm, this also make up to 41 % of the total cases in our study.

Arroyo et al [13] published a randomized controlled trial on umbilical hernia repair. Although umbilical hernia may differ from incisional hernia etiologically, treatment modalities for ventral hernia repair are similar and results may therefore be compared. In line with our results, Arroyo et al [13] reported that even for small umbilical hernias, mesh repair results in significantly fewer recurrences than suture repair.

#### Hospital stay

Patients that had a hospital stay of 3-4 days included all the ParaUmbilical hernias, all the umbilical hernias, all the epigastric hernias, the 10 cases of incisional hernias that had small size defects(4-6cm) and 9 cases of incisional hernia with medium sized defects(>6-10cm).

All these case were discharged on 3<sup>rd</sup>/4<sup>th</sup> day with suction drain in situ and called for follow up after 48 - 72 hrs for drain removal. The 3 cases with huge incisional hernias required a stay of 7 – 10 days due development of complications



Mean duration of hospital stay was 4.6 days (range 3 – 10 days) shortest being those which required less dissection while longest in cases with huge incisional hernias, those who were medically unfit initially for surgery and those who developed post-operative complications.

**Complications**

All the cases were treated with Onlay mesh repair and vacuum drainage applied to all the cases post-operatively.

In our study 16.22% patients developed complications following Onlay mesh repair, of which 2.7% cases had seroma formation. These were the 2 cases with huge incisional hernias and advanced age. These were treated by aspiration and daily dressings with support by abdominal binder. 13.52% cases developed minor superficial surgical wound infection which was treated on basis of antibiotic sensitivity with daily dressings.

Table 14. Comparison of complications between Lujendijk, Tulaskar N and our study.

Complications	Lujendijk [11]		Tulaskar N [9]		Present study (n=74)	
	No.	%	No.	%	No.	%
Wound infection/SSI	3	5	7	22.58	10	13.52
Seroma	4	6.67	3	9.67	2	2.7
Mesh infection	1	1.67	0	0	0	0
Bleeding/hematoma	1	1.67	1	3.23	0	0
Dehiscence	0	0	1	3.23	0	0
Suture sinus	3	5	0	0	0	0
Enterocutaneous fistula	2	3.33	0	0	0	0
Intestinal obstruction	7	11.67	0	0	0	0
TOTAL	21	35	12	38.71	12	16.22

The complication rates in our study is comparable to those in the above two studies.

**Follow up**

All the cases operated were followed for a period of 6 to 18 months and observed for evidence of recurrence.

None of these cases were found to have recurrence of hernia.

**CONCLUSIONS**

- The different types of hernia encountered in women in our study were Incisional hernia; Paraumbilical hernia, Umbilical hernia and Epigastric hernia.
- Ventral abdominal hernias are 3.4 times more common in women as compared to men.
- The commonest type of hernia in women was incisional hernia following lower abdominal surgery.

Since linea alba is poorly developed below the umbilicus and posterior rectus sheath is deficient below linea semilunaris of Douglas, they are more prone for incisional hernia. The most common previous surgery was an emergency lower segment Caesarian section.

- The incidence of incisional hernia is more common in females especially in obese and multiparous women.
- The incidence of incisional hernia is more common in the age groups 26-65 years, with a mean age of presentation = 46 yrs.
- The majority of incisional hernia occurred within first one year after previous operation.
- The incidence of incisional hernia is more common in midline infra umbilical incision.

- Onlay reinforced primary repair using prolene mesh have given good results and prolene mesh appears to be best tolerated by body tissues.
- The use of closed suction drainage tubes can significantly reduced the post operative wound complications.
- Entero – cutaneous fistula, Mesh Migration, Bowel adhesion are not encountered with onlay mesh repair.
- Minimum recurrence of ventral incisional hernia can be achieved with onlay mesh repair.
- Treatment with onlay mesh repair, using polypropylene mesh is indeed a modality of treatment of ventral abdominal wall hernias with good results, low recurrence, less complications, cheap and hence affordable for rural population .
- To conclude, hernias in women are a significant health hazard. It affects the women of reproductive age group and leads to socio economic burden to the society if not treated promptly.
- In the era of development new novel techniques for ventral hernia repair, Onlay mesh repair still can be used to treat them in rural areas, with good results, where these techniques are not accessible and less afforded by the patients.

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