



A PROSPECTIVE COMPARATIVE STUDY BETWEEN ONLAY AND RETRO-RECTUS MESH REPAIR IN VENTRAL HERNIA CASES IN A TERTIARY CARE CENTER

General Surgery

Dr. Hariharan. B Senior Resident, Department of General Surgery, G.R.Medical College, Gwalior.

Dr. Devendra Prajapati Assistant Professor, Department of General Surgery, G.R.Medical College, Gwalior.

Dr. Munindra Pratap Singh Demonstrator, Department of Physiology, G.R.Medical College, Gwalior.

Dr. Prashant Shrivastava* Professor & Head, Department of General Surgery, G.R.Medical College, Gwalior.
*Corresponding Author

ABSTRACT

Ventral hernia, a commonly dealt surgical problem in clinical practice, is defined as an abnormal protrusion of a viscus or a part of the viscus through a defect or weakness in the anterior abdominal wall. Various risk factors such as old age, history of previous surgery, obesity, COPD, diabetes mellitus, smoking & alcoholism lead to the formation of ventral hernias. Mesh hernioplasty has become the gold standard in the management of ventral hernias. There are various procedures in the management of ventral hernias based on the placement of mesh. In this study, we compare the traditional onlay and retro-rectus mesh repair in ventral hernias in terms of postoperative complications, hospital stay & feasibility.

KEYWORDS

Ventral hernias, mesh hernioplasty, onlay, retro-rectus, complications.

INTRODUCTION

Ventral hernias may be defined as an abnormal protrusion of pre-peritoneal content or a viscus or a part of it through a defect in the fascia or musculature of the anterior abdominal wall.⁽¹⁾ They are commonly diagnosed in surgical practice accounting for about 15-20%.^(2,3) Ventral hernias may be classified as primary which includes umbilical/paraumbilical, epigastric, lumbar, Spigelian, and secondary / incisional related to previous surgery and trauma.

Based on National operative statistics, incisional hernias are the most common among ventral hernias with incidence accounting for about 15%-20%, while epigastric & para-umbilical/umbilical account for about 10%.

The first case of ventral hernia (para-umbilical hernia) was identified in 100 A.D by Celsus and the repair of ventral hernia case was done by Stoser in 1894.

Various risk factors leading to ventral hernias are multiparity, obesity, old age, prostatism, emphysema, sleep apnea & COPD, whereas malnutrition, defective wound healing, surgical site infections, and technical errors contribute majorly to the formation of incisional hernia.^(1,4)

This study was aimed to compare onlay and retro-rectus mesh repair in ventral hernias in terms of postoperative complications, hospital stay and feasibility. This helps in framing practical guidelines and their application in the management of ventral hernias and in controlling postoperative complications.

AIMS AND OBJECTIVES

To compare the onlay and retro-rectus mesh repair in ventral hernias in terms of complications and hospital stay.

MATERIAL AND METHODS

Type Of Study:

This prospective, comparative study was conducted in the Department of General Surgery at J.A Group of Hospitals, Gwalior (M.P.) from January 2020 to June 2021 after obtaining well informed and written consent from the patients who were diagnosed to have ventral hernias and were planned for surgery. The sample size of this study was 60 with half of them underwent onlay procedure while the rest underwent the retro-rectus method. Patients were assigned group by means of randomization.

Inclusion Criteria

Patients aged between 18-60 years diagnosed to have ventral hernia clinically & ultrasonographically with defect size <10cm were

included in this study.

Exclusion Criteria:

Age <18 years, complicated ventral hernias such as strangulation, obstruction & other high-risk patients who were on anti-coagulant therapy, prior chemo-radiation history, etc. were excluded from this study.

METHODOLOGY

Data was collected via detailed questionnaires and clinical examination from the patients who were admitted to surgical wards of J.A. Group of Hospitals, Gwalior, and requiring surgery for ventral hernias. All necessary investigations were performed and the required data was compiled.

OBSERVATION AND RESULTS

Table 1) Age And Sex Distribution In Study Group

Age/ Sex	18-30	31-45	46-60	Total	Mean Age	Standard Deviation
Male	02 (3.33%)	09 (15%)	11 (18.34%)	22 (36.67%)	44	2.83
Female	01 (1.67%)	17 (28.33%)	20 (33.33%)	38 (63.33%)		
Total	03 (5%)	26 (43.33%)	31 (51.67%)	60 (100%)		

In this study, the incidence of ventral hernia was higher among older age (> 46 years) and in females. The mean age of the study population was 44 and the standard deviation was 2.83.

Table 2) Distribution Of Complications In The Study Group Based On Age

Age	Post Op Pain	Seroma	Wound Infection	Flap necrosis	Paralytic Ileus	Recurrence after 6 months
18-30	01 (1.67%)	00 (0%)	00 (0%)	00 (0%)	00 (0%)	00 (0%)
31-45	05 (8.33%)	03 (5%)	03 (5%)	03 (5%)	00 (0%)	00 (0%)
46-60	09 (15%)	07 (11.67%)	04 (6.67%)	03 (5%)	02 (3.34%)	02 (3.34%)
Total	15 (25%)	10 (16.67%)	07 (11.67%)	06 (10%)	02 (3.34%)	02 (3.34%)

From the above table, it is evident that the incidence of complications such as post-operative pain, seroma, wound infections, paralytic ileus, and recurrence were higher among old age (above 45 years of age), while the incidence of flap necrosis was equal among middle and old age patients.

Table 3) Distribution Of Complications Based On Sex

Sex	Post Op Pain	Seroma	Wound Infection	Flap Necrosis	Paralytic Ileus	Recurrence after 6 months
Male	08 (13.33%)	02 (3.34%)	02 (3.34%)	02 (3.33%)	00 (0%)	02 (3.34%)
Female	07 (11.67%)	08 (13.33%)	05 (8.33%)	04 (6.67%)	02 (3.34%)	00 (0%)
Total	15 (25%)	10 (16.67%)	07 (11.67%)	06 (10%)	02 (3.34%)	02 (3.34%)
p value	0.122	0.230	0.636	0.858	-	-

From the above data, it is evident that the incidence of seroma, wound infections, and flap necrosis were higher among females, while males (n=2) had a recurrence of hernia after 6 months.

Table 4) Distribution Of Complications Based On Procedure

Pro-cedure	Post Op Pain	Seroma	Wound Infection	Flap Necrosis	Paralytic ileus	Recurrence after 6 months
Onlay	11 (18.33%)	08 (13.33%)	06 (10%)	05 (8.33%)	01 (1.67%)	02 (3.34%)
Retro-rectus	04 (6.67%)	02 (3.34%)	01 (1.67%)	01 (1.67%)	01 (1.67%)	00 (0%)
Total	15 (25%)	10 (16.67%)	07 (11.67%)	06 (10%)	02 (3.34%)	02 (3.34%)
p value	0.037	0.037	0.044	0.085	0.313	0.150

The above table indicates the higher incidence of complications in traditional onlay procedure compared to retro-rectus procedure & with incidence of post-operative pain, seroma & wound infections being statistically significant.

Table 5) Hospital Stay

Type of Surgery	Mean duration of hospital stay (days)	Standard Deviation
Onlay	6.083	1.015
Retro-rectus	5.133	0.88

The above table shows that the mean duration of hospital stay following retro-rectus procedure was shorter (5.133 days), while those who underwent traditional onlay procedure had slightly longer hospital stays (6.083 days).

DISCUSSION

Various techniques were developed in treating ventral hernias starting from primary repair of ventral hernia to the use of prosthetic material for providing additional support to the repair. The main aims of these techniques are the closure of the defect and/or provide additional support to musculo-fascial tissues in order to prevent the recurrence.

In the current scenario, mesh hernioplasty is the ideal technique for various ventral hernias which can be done by both open and laparoscopic methods based on feasibility. However, the ideal location for the mesh placement remains controversial even today.

Seroma Formation

The occurrence of seroma among the patients who underwent onlay procedure was 13.33% while retro-rectus procedure accounted for 3.34% (p-value = 0.037) and it was statistically significant. Similar results were observed in studies conducted by Renu et al⁽⁵⁾, Joseph Mathew et al⁽⁶⁾ & Aly Saber et al⁽⁷⁾. And in this study, the female had more predilection for seroma formation accounting for about 13.33%

Comparison With Other Studies

	Kharde et al(13) (2021)		Aly Saber et al (7) (2016)		Gleysteen et al(8) (2009)		Joseph Mathew et al(6) (2017)		Renu et al(5) (2018)		Present study	
	Onlay	Retro-rectus	Onlay	Retro-rectus	Onlay	Retro-rectus	Onlay	Retro-rectus	Onlay	Retro-rectus	Onlay	Retro-rectus
Seroma	4%	3%	6%	2%	10%	16.67%	13.4%	2.22%	12%	0%	13.33%	3.34%
Wound infection	1%	0%	8%	4%	12%	4%	13.4%	4.4%	8%	0%	10%	1.67%
Flap necrosis	-	-	-	-	-	-	-	-	-	-	8.33%	1.67%

while males accounted for 3.34%. This might be due to high body fat percentage in females than males which is in accordance with a study by Joseph Mathew et al which revealed the occurrence of seroma in about 13.4% of females, while only 2.22% of males had seroma.⁽⁶⁾

The occurrence of seroma is higher among the patients who underwent onlay procedure due to extensive subcutaneous tissue dissection for the placement of mesh which leads to tissue devitalization whereas in the retro-rectus group, the seroma formation is less as there is minimal skin and subcutaneous tissue dissection. Patients with seroma were managed conservatively in this study.

Wound Infection

As per literature, higher rates of wound infection occurred after the onlay procedure as it involved extensive soft tissue dissection and also because of the superficial placement of the mesh over the anterior rectus sheath, while the same following the retro-rectus procedure was less compared to the on-lay. Wound infection was noted in 10% of patients who underwent on-lay repair, while among the patients who had retro-rectus repair, the incidence was 1.67% (p value-0.037) and was statistically significant. Similar results were obtained in a comparative study conducted by Joseph Mathew et al⁽⁶⁾, Renu et al⁽⁵⁾ & also in a study by Gleysteen et al⁽⁸⁾.

Post-operative Pain:

At present, the data regarding post-operative pain outcomes are contradictory. Out of 60 patients, 18.33% of patients who underwent onlay procedure experienced significant post-operative pain, while 6.67% of those who underwent retro-rectus procedure experienced post-operative pain (p value-0.037) and it is statistically significant. A comparative study by Thangamani et al from Tamilnadu reported that about 84% of the patients who underwent onlay procedure experienced significant postoperative pain while only 12% of the patients following retro-rectus repair experienced significant pain⁽⁹⁾. And similarly a study by Rajsiddharth et al from Telangana showed results in concordance with this study.⁽¹⁰⁾

Flap Necrosis

Flap necrosis is more common following an on-lay procedure due to extensive tissue dissection leading to disruption of perforating vessels thereby reducing the vascular supply to the overlying skin. Flap necrosis occurred in 8.33% of patients who underwent the on-lay procedure, whereas 1.67% of patients had the same following the retro-rectus procedure (p value-0.085) which was insignificant. Similar results were seen in a study conducted by Ali Hussein Al-Tai.⁽¹¹⁾ Patients with flap necrosis were managed by administration of IV antibiotics along with serial debridement of necrosed margins which facilitates healing by secondary intention.

Recurrence Following 6 Months:

The recurrence of hernia can be explained by the fact that the pressure required to displace the position of mesh in case of on-lay is less compared to the mesh in retro-rectus position (Pascal's Law). Out of 60 patients in this study, 3.34% of the patients who underwent on-lay procedures had recurrence after 6 months of follow up while no patient had a recurrence following retro-rectus. (p-value-0.150), while studies conducted by Gleysteen et al⁽⁸⁾, Aly Saber et al⁽⁷⁾, and Joseph Mathew et al⁽⁶⁾ also revealed similar results.

Mean Duration Of Hospital Stay

The mean duration of hospital stay post-retro-rectus procedure was shorter (5.133 days) while post-onlay procedure was slightly longer (6.083 days) which might be due to increased incidence of various complications such as seroma, wound infection, and flap necrosis following onlay procedure. Similar results were obtained by Joseph Mathew et al⁽⁶⁾ & Ibrahim et al⁽¹²⁾ which is in accordance with this study.

Post-operative pain	-	-	-	-	-	-	3.5%	3.1%	-	-	18.33%	6.67%
Recurrence after 6 months	1%	1%	8%	3%	14%	4%	12%	1%	-	-	3.34%	0%

In recent times prevention of ventral hernia has gained importance and this can be achieved by controlling modifiable patient risks factors such as obesity, COPD, and diabetes mellitus. Various patient-related factors such as old age, co-morbidities, prior surgical history and also procedure-related factors should be considered before choosing the ideal method in order to achieve the desired result. In fact, onlay mesh repair is the ideal procedure in elderly patients with hostile abdomen who had a history of multiple surgeries. Moreover, in these cases, onlay procedure is technically easy with a shorter operative time and also avoids direct contact with the bowel which is advantageous in elderly and critically ill patients.

But in younger patients with a history of multiple surgeries and patients with a large ventral hernia, abdominal wall reconstruction by Rives-Stoppa and retro-rectus mesh repair can be a good alternative. Hence 'one-size fits all' concept for patients with a ventral hernia may not be sufficient to achieve the desired result.

CONCLUSION

- The incidence of various complications such as seroma formation, wound infection, postoperative pain, flap necrosis, paralytic ileus, and recurrence of hernia after 6 months was higher among the old age group.
- The incidence of complications was higher among the traditional onlay procedure compared to the retro-rectus procedure with post-operative pain, seroma & wound infections being statistically significant.
- The mean duration of hospital stay following retro-rectus procedure was shorter (5.133 days), while those who underwent traditional onlay procedure had slightly longer hospital stay (6.083 days).
- Concept of 'one-size fits all' for patients with ventral hernia may not be sufficient to achieve desired result.
- Various patient related factors such as old age, co-morbidities, prior surgical history and also procedure related factors should be considered before choosing ideal method in order to achieve the desired result.

Conflict Of Interest: None

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Ethical Approval: This Study was approved by Institutional Ethics Committee, G.R.Medical College, Gwalior.

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