Original Article

# Evaluation of Simple Non Absorbable Mesh Versus Composite Partially Absorbable Mesh in Laparoscopic Mesh Hernioplasty in Ventral Hernias

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## Abstract

**Background:** The type of mesh used in laparoscopic and open hernia repairs remains a topic of debate; however, no mesh is considered ideal. The current study compared the two mesh types used in laparoscopic ventral hernia repair. **Material and Methods:** Fifty patients with ventral hernia who underwent laparoscopic repair were randomized into two groups. In Group I (n=25), a composite mesh was used, whereas in Group II (n=25), a polypropylene mesh was used. The intraoperative and postoperative parameters were analysed. Statistical analysis was performed using Microsoft Excel 2021 and SPSS (v. 2021). **Results:** The outcomes were not statistically significant. However, the pain score was higher in group II at 1-month and 3-month follow-up (p=0.023 and 0.01, respectively). But after 6 months of follow-up, both groups were comparable. **Conclusion:** The current study does not find significant differences in the use of both meshes or in their postoperative outcomes.

**Keywords:** Laparoscopy, Hernia, Mesh, Pain.

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## Introduction

The standard of care for incisional and ventral hernias is rapidly shifting to laparoscopic repair. With long-term follow-up, recurrence rates have dropped to less than 10%, and in some series, to less than 2%.[1,2] Randomised studies comparing laparoscopic and open repair of incisional and ventral hernias have demonstrated superior outcomes for laparoscopic surgery in terms of short operating times, recurrence rates, postoperative hospital stays, wound infection rates, and overall sequelae.[3–6]

Laparoscopic repair has a low complication rate. Compared with open repair, laparoscopic procedures are associated with fewer wound infections.[7]

Since the recurrence rates are significantly reduced when prostheses are utilised, their usage has become crucial for the repair of all hernias. Many new meshes have been created to meet this requirement. To manage abdominal wall defects, a wide range of materials and products is available, each with its own advantages and disadvantages. A search for an ideal mesh is still underway. There are various innovative meshes available, depending on their properties, to reduce adhesions and improve outcomes.[8]

We compared and evaluated the use of two different types of meshes, non-absorbable and composite partially absorbable mesh, in ventral hernias and their outcomes.

## Materials and Methods

Fifty patients of either sex with ventral hernias of different aetiologies participated in the current study after giving their informed consent. The institution's ethics committee granted permission to conduct the study, and the methods used complied with the 2013 revision of the 1975 Helsinki Declaration and the ethical guidelines of the relevant institutional committee on human experimentation. Patients were prospectively randomized by draw of lots into two groups- 25 patients in study Group I, in whom a partially absorbable Polypropylene plus Polyglycolic acid composite mesh (weight 60gm/m2 and pore size 2mm) was used and 25 in Group II, in whom a simple non absorbable polypropylene mesh of weight 90gm/m2 and pore size of 1mm was used. The mesh size used was 30×30 cm in both groups and was tailored to the defect size and number.

**The inclusion criteria were:**

- Patients having divarication of recti
- Patient having epigastric hernia (fatty hernia of Linea alba)
- Paraumbilical hernia
- Incisional hernia

**The exclusion criteria were:**

- Densely scarred abdomen

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- Acute abdomen with strangulated or infracted bowel
- Incarcerated hernias
- Multiple operated scars
- Children < 18 yrs of age

**After being moved up from the outpatient section, patients were exposed to:**

- A thorough medical history and examination
- Routine tests for blood, urine
- ECG

Abdominal ultrasonography is used to diagnose concurrent illnesses such as cholelithiasis and ovarian cysts, as well as to rule out ascites and intra-abdominal cancers.

The patient continued to fast overnight, and before surgery, a 1 gm intravenous dose of cefoperazone was administered.

**Operative procedure:** The patient was given general anaesthesia. To avoid unintentional penetration injuries to the stomach and bladder during insufflations, a nasogastric tube and a Foley's catheter were placed for gastric and bladder decompression.

Before treatment began, the defect size was measured with a scale, and the mesh was adjusted accordingly. Sutures were then attached to the diagonally opposite edges of the mesh.

To help with mesh orientation in the abdominal cavity, two types of sutures were used: Ethilon (black, no. 1) and Prolene (blue, 1-0).

Pneumoperitoneum was usually created using a closed method. To create pneumoperitoneum with 10–12 mmHg of carbon dioxide, a Veress needle was placed at the palmar point. Through the first trocar, a zero-degree laparoscope was inserted, and the abdomen was examined. The hernia defect and any related adhesions were identified. To keep all of the defect's edges visible during the procedure, two or three more trocars were put under direct vision at least 5 cm from the hernia defect's lateral edge or as laterally as possible. The bowel was separated from the anterior abdominal wall by an adhesion-lysis procedure. To alter the view and make the dissection easier, the abdominal wall and hernia defect were externally palpated.

Initially, the mesh was mapped based on the hernia defect's size. While study group 2 patients received a standard heavyweight polypropylene monofilament mesh (Trulene, Suture India), study group 1 patients received a partially absorbable composite mesh made of absorbable multifilament Polyglycolic acid and non-absorbable multifilament Polypropylene (Prosorb, Suture India). Propylene (blue) and Ethilon No. 1 (black) sutures were fastened to the mesh's diagonally opposing edges. These sutures served as intraperitoneal markers when the mesh needed to be mended. Fixations are performed transfacially with a port-closure instrument.

Every patient was given an abdominal binder on the 1st postoperative day. Operating duration, mesh size, mesh placement, fixation technique, intraoperative mesh handling, and any challenges encountered throughout the procedure were meticulously recorded. Patients' pain levels, nausea, vomiting, and length of hospital stay were evaluated after surgery. At the first post-operative day, one week, one month, three months, and six months, the patients were evaluated. Complications such as bleeding, prolonged ileus, wound infection, and intra-abdominal collection were recorded.

Microsoft Excel sheet 2021 and SPSS software version 21 were used for statistical analysis. The means of the values were computed. The chi-square test is used to determine the P value. A P value of less than 05 was deemed significant.

## Results

The patients' ages ranged from 19 years to 85 years, with a mean of 48.53 ± 12.2 years. The age distribution was comparable between the two groups, 48.64 ± 10.3 years in Group I versus 48.36 ± 15.93 years in Group II (p=0.942). Most patients in the current study were female (n=31). Female: Male ratio was 1.63:1. In group I, it was 1.5, while in group II, it was 1.7. The difference was not significant (p=0.771). Both groups were comparable with respect to their body mass index (BMI) [Table 1].

The contents of the hernia sac were recorded for each procedure. In patients who had reduced the contents at the time of pneumoperitoneum creation, an empty sac was observed on placing the scope into the abdomen, and the hernias were labeled as having no contents. We found that the majority, i.e., 38 (76%) patients, had only omentum inside the sac- 18 (72%) and 20 (80%) patients in Groups I and II, respectively, 1 (2%) patient also had bowel as hernia contents in the study group 1. It was also seen that 2(4%) patients, one each in the study group, had bowel along with omentum as hernia contents. No contents were seen in 9 (18%) patients- 5 (20%) in study group 1 and 4 (16%) in study group 2. The distribution of the contents of the hernia sac among the two groups was almost similar (p=0.749) [Table 2].

The majority of patients had adhesions (n=41), while the number of defects was single in most of the cases (n=41). The findings were comparable between the two groups [Table 2]. The defect size was 16.63±6.99cm2 $cm^2$ in group I, while it was 15.20±6.32cm2 $cm^2$ in group II. The two groups' operative times do not differ significantly (p=0.08) [Table 2].

In both groups, no patient needed conversion to open.

At various follow-up times, post-operative discomfort was similar in both groups. However, at the one-month and three-month follow-up periods, a considerably lower percentage of patients in group I experience foreign body sensation (p=0.023 & 0.01, respectively) [Table 3].

Ambulation was observed in group I patients more on the first postoperative day (n=13) than in group II (n=11). The difference in ambulation of patients was not significant (p=0.908) [Figure 1] In the current study; the average length of hospital stay was 2.11 days (2.19 days for group I and 2.02 days for group II). The majority of patients (n = 20 in group I and n = 14 in group II) were released on the second post-operative day. The rest of the patients required hospital admission for a maximum of up to 4th days due to pain and infection. The groups were comparable with respect to hospital stay (p=0.764) [Figure 2].

Complications observed were wound infection seen in one patient in group I and two patients in group II (p=0.55). Seroma formation was observed in one patient in each group, while one patient in group II developed a hematoma. Patients were managed conservatively. The groups were comparable in these findings. No recurrence was observed in either group after 6 months of follow-up [Figure 3].

**Table 1: Demographic Profile**

| | Group 1 | Group 2 | Total | P value |
|---|---|---|---|---|
| Male | 10 | 9 | 19 | 0.771 |
| Female | 15 | 16 | 31 | |
| Total | 25 | 25 | 50 | |
| Mean Age (in years) | 48.64 ± 10.3 | 48.36 ± 15.93 | 48.53 ± 12.2 | 0.942 |
| Mean BMI (kg/m2) | 25.84±1.09 | 25.78±1.14 | 25.81±1.10 | 0.667 |

**Table 2: Intraoperative Findings**

| | | Group 1 | Group 2 | Total | P value |
|---|---|---|---|---|---|
| Contents | Intestine | 1 | 0 | 1 | 0.749 |
| | Intestine + Omentum | 1 | 1 | 2 | |
| | Omentum | 18 | 20 | 38 | |
| | None | 5 | 4 | 9 | |
| Adhesions | Yes | 19 | 22 | 41 | 0.269 |
| | No | 6 | 3 | 9 | |
| Number of Defects | Single | 21 | 17 | 38 | 0.326 |
| | Multiple | 4 | 8 | 12 | |
| Mean defect size (cm2) | | 16.63±6.99 | 15.20±6.32 | 15.94±6.63 | 0.436 |
| Mean Operative time (minutes) | | 45.9 ± 4.54 | 42.20±5.00 | 44.06±5.09 | 0.08 |

**Table 3: Post-operative parameters**

| Study Group | Post operative duration | Pain | | | | Foreign body sensation | |
|---|---|---|---|---|---|---|---|
| | | No pain | Mild (1-3) | Moderate (4-6) | Severe (7-10) | Yes | No |
| Group 1 | 1 day | 0 | 1 | 13 | 11 | 25 | 0 |
| | 1 week | 0 | 5 | 16 | 4 | 24 | 1 |
| | 1 month | 14 | 8 | 1 | 2 | 10 | 15 |
| | 3 months | 15 | 7 | 1 | 2 | 1 | 24 |
| | 6 months | 19 | 4 | 1 | 1 | 1 | 24 |
| Group 2 | 1 day | 0 | 0 | 11 | 14 | 25 | 0 |
| | 1 week | 0 | 4 | 11 | 10 | 24 | 1 |
| | 1 month | 12 | 8 | 2 | 3 | 18 | 7 |
| | 3 months | 17 | 6 | 1 | 1 | 8 | 17 |
| | 6 months | 19 | 5 | 1 | 0 | 1 | 24 |
| P value | 1 day | 0.466 | | | | 1.00 | |
| | 1 week | 0.165 | | | | 1.00 | |
| | 1 month | 0.876 | | | | 0.023 | |
| | 3 months | 0.911 | | | | 0.01 | |
| | 6 months | 0.774 | | | | 1.00 | |

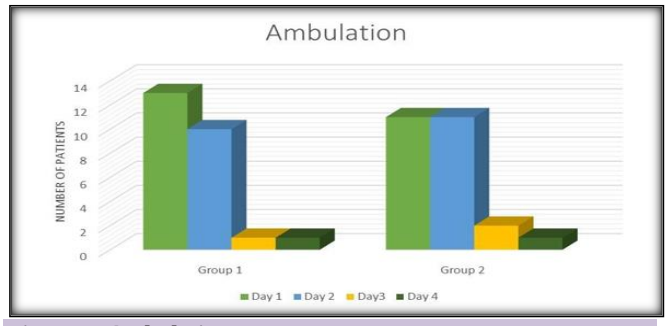


**Figure 1: Ambulation**

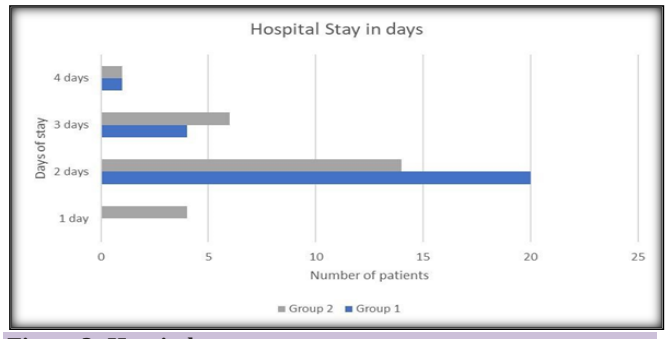


**Figure 2: Hospital stay**


**Figure 3: Complications**

## Discussion

Hernias of the abdominal wall are seen in 10% of the population, with the main reason being complications of previous surgery. Laparoscopic mesh repair is considered the mainstay of treatment for ventral and inguinal hernias.[9] The present study compares two different types of meshes, a partly absorbable lightweight mesh, composed of approximately equal parts of non-absorbable multifilament polypropylene & absorbable multifilament Polyglycolic acid, knitted together to form a macropore mesh

construction, and it is a lightweight mesh. It has less biomass after implantation, and less than 50% the foreign body material remains permanently implanted. Of the 50 patients, the majority were females in both groups. The ratio is comparable between the two groups. The study conducted by Pandya et al showed similar results. The mean age in their study was 49 years, and in the current study, it was 48.53 ± 12.2 years. The female-to-male ratio was comparatively higher than that of the current study, which was 9:1.[9] The prevalence of hernias observed by Le et al was highest in individuals aged 55-69 years, with women aged 50-70 years. The prevalence of epigastric hernias was higher in males, whereas incisional hernias were more common in females.[10] The difference could be due to the smaller sample size of the current study. Both groups underwent Laparoscopic Hernia repair. The intraoperative findings were comparable between the two groups. No intra-abdominal injuries were observed during the procedure in either group. The two groups' operating times did not differ much. Lund et al. reported an average operating duration of 164 minutes, but Pareira et al. reported an average operating time of 116 minutes.[11,12] In their study, Basheer et al. found that the average operating time for laparoscopic ventral hernia repair was 86 minutes.[13] The shorter mean operative time may be due to surgeons' experience and the method of mesh fixation in the current study. The mean defect size in both groups was comparable. The defect size reported by Lindmark et al. varies between 60 and 80mm in their review study conducted across three hospitals.[14] Similarly, Pareira et al reported a mean defect size of 4 cm.[12] These were not in accordance with the current study. The possible reasons could be earlier patient presentation and a higher number of primary hernias in their research.

In the postoperative period, pain was significantly higher in Group II as compared to Group I at 1 month and 3 months duration. Similar findings were reported by Markar et al., who observed a significant reduction in pain with partially absorbable mesh.[15] Rathod et al also reported less pain with the use of partially absorbable mesh.[16] However, both these studies were conducted on inguinal hernias. But the 2017 consensus showed no significant difference in the use of meshes for ventral hernias.[17] In the current study, there was no significant difference between the two groups after 6 6-month follow-up period.

There was no significant difference between the two groups in the occurrence of complications. According to Lund et al., a larger hernia defect, longer operative time, and the use of PTFE mesh were risk factors for mesh infection.[11] Similarly, Lindmark et al observed that complications in ventral hernia surgery are directly related to the defect size.[14] Liang et al. reported that there is no consensus on the type of mesh to use in ventral hernia repair.[17] As per the above-mentioned studies, the two groups in the current study were comparable with respect to operative time and defect size, so there is no significant difference in the occurrence of complications.

There are some limitations to the study, including a small sample size and a short follow-up period. Further evaluation of meshes can be conducted across larger groups and multicenter studies.

## Conclusion

The present study found no significant difference between the two meshes for ventral hernia repair. Although pain is significantly less with partially absorbable mesh, at long-term follow-up, there is no significant difference.


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## Conflicts of interest

There are no conflicts of interest.

## References


1. Chowbey PK, Sharma A, Mehrotra M, Khullar R, Soni V, Baijal M. Laparoscopic repair of ventral / incisional hernias. J Minim Access Surg. 2006 Sep;2(3):192-8. doi: 10.4103/0972-9941.27737. PMID: 21187995; PMCID: PMC2999784.
2. Chelala E, Thoma M, Tatete B, Lemye AC, Dessily M, Alle JL. The suturing concept for laparoscopic mesh fixation in ventral and incisional hernia repair: Mid-term analysis of 400 cases. Surg Endosc. 2007;21(3):391-395. doi:10.1007/s00464-006-9014-x
3. Carbajo MA, Martín del Olmo JC, Blanco JI, Cuesta C, Toledano M, Martin F, et al. Laparoscopic treatment vs open surgery in the solution of major incisional and abdominal wall hernias with mesh. Surg Endosc. 1999;13(3):250-252. doi:10.1007/s004649900956
4. Olmi S, Magnone S, Erba L, Bertolini A, Croce E. Results of laparoscopic versus open abdominal and incisional hernia repair. JSLS. 2005;9(2):189-195.
5. Misra MC, Bansal VK, Kulkarni MP, Pawar DK. Comparison of laparoscopic and open repair of incisional and primary ventral hernia: results of a prospective randomized study. Surg Endosc. 2006;20(12):1839-1845. doi:10.1007/s00464-006-0118-0
6. Barbaros U, Asoglu O, Seven R, Erbil Y, Dinccag A, Deveci U, et al. The comparison of laparoscopic and open ventral hernia repairs: a prospective randomized study. Hernia. 2007;11(1):51-56. doi:10.1007/s10029-006-0160-9
7. Poreca MM, Mehta SG, Thanthvalia A, Udani D. Comparative study of laparoscopic versus Open ventral hernia repair. The Internet Journal of Surgery 2009;22(2). DOI:10.5580/1188
8. Najm A, Niculescu AG, Gaspar BS, Grumezescu AM, Beuran M. A Review of Abdominal Meshes for Hernia Repair-Current Status and Emerging Solutions. Materials (Basel). 2023 Nov 10;16(22):7124. doi: 10.3390/ma16227124. PMID: 38005054; PMCID: PMC10672379.
9. Pandya B, Huda T, Gupta D, Mehra B, Narang R. Abdominal Wall Hernias: An Epidemiological Profile and Surgical Experience from a Rural Medical College in Central India. Surg J (N Y). 2021 Mar 11;7(1):e41-e46. doi: 10.1055/s-0040-1722744. PMID: 33718607; PMCID: PMC7952194.
10. Le TN, Ali MA, Gadzhanova S, Lim R, Bala I, Bogale KN, et al. Hernia repair prevalence by age and gender among the Australian adult population from 2017 to 2021. Critical Public Health 2024;34(1):1–11. https://doi.org/10.1080/09581596.2024.2351981
11. Lund S, Farley D. A decade of experience with laparoscopic ventral hernia repairs. Am J Surg. 2019;217(3):546-549. doi:10.1016/j.amjsurg.2018.10.008
12. Pereira C, Rai R. Open Versus Laparoscopic Ventral Hernia Repair: A Randomized Clinical Trial. Cureus. 2021 Dec 17;13(12):e20490. doi: 10.7759/cureus.20490. PMID: 34938640; PMCID: PMC8684829.

13. Basheer M, Negm A, El-Ghadban H, Samir M, Hadidy A, Dawoud I. Laparoscopic versus open ventral hernia repair: a comparative study. The Egyptian Journal of Surgery 2018 Oct-Dec;37(4):p 465-471. DOI: 10.4103/ejs.ejs_53_18
14. Lindmark M, Strigård K, Löwenmark T, Dahlstrand U, Gunnarsson U. Risk Factors for Surgical Complications in Ventral Hernia Repair. World J Surg. 2018 Nov;42(11):3528-3536. doi: 10.1007/s00268-018-4642-6. PMID: 29700567; PMCID: PMC6182761.
15. Markar SR, Karthikesalingam A, Alam F, Tang TY, Walsh SR, Sadat U. Partially or completely absorbable versus nonabsorbable mesh repair for inguinal hernia: a systematic review and meta-analysis. Surg Laparosc Endosc Percutan Tech. 2010;20(4):213-219. doi:10.1097/SLE.0b013e3181ed86a2
16. Rathod RA, Shah HV, Suthar KR, Baria BK. Efficacy of Partially Absorbable versus Non-Absorbable Mesh in Laparoscopic Inguinal Hernia Repair: A Comparative Study. International Journal of Pharmaceutical and Clinical Research 2024; 16(9); 393-397
17. Liang MK, Holihan JL, Itani K, Alawadi ZM, Gonzalez JRF, Askenasy EP, et al. Ventral Hernia Management: Expert Consensus Guided by Systematic Review. Annals of Surgery 2017 Jan;265(1):p80-89. DOI: 10.1097/SLA.0000000000001701.