

Transverse versus vertical incision approach in elective ventral hernia repair - A comparative study



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Submission: 31-03-2023

Revision: 30-05-2023

Publication: 01-07-2023

ABSTRACT

Background: Ventral hernias are commonly associated with not infrequent complications and significant recurrence rates, often resulting in future procedures. The relative merits and disadvantages of vertical versus transverse incisions remain subjects of active debate.

Aims and Objectives: The study aims to compare the relative merits, demerits, and outcomes between patients of ventral hernia who have undergone open mesh repair through a transverse incision and a vertical incision. **Materials and Methods:** In this prospective study, 100 patients were admitted to Government Rajaji Hospital for ventral hernia repair and those satisfying the inclusion criteria were divided into two groups, A and B, 50 each. In group A, open mesh repair was done through a transverse incision; in group B, open mesh repair was done via a vertical incision. The study compared the incidence of surgical site infection (SSI), flap necrosis, wound dehiscence, pain, and mean hospital stay. **Results:** On comparing the groups, it has been seen that the incidence of significant pain (taken as a visual analog scale score of 3.5 or more) was 16% in group A (transverse incision) compared to 34% in group B (vertical incision), which is statistically significant. The incidence of SSI, flap necrosis, wound dehiscence, and mean hospital stay were more or less the same and statistically insignificant. **Conclusion:** The group in which a transverse incision was used for ventral hernia repair showed significantly less post-operative pain than the group in which a vertical incision was used. Hence, the use of transverse incision in elective open mesh repair for ventral hernias should be considered.

Key words: Transverse incision; Vertical incision; Elective surgery; Ventral hernia repair

Access this article online

Website:

<http://nepjol.info/index.php/AJMS>

DOI: 10.3126/ajms.v14i7.53609

E-ISSN: 2091-0576

P-ISSN: 2467-9100

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INTRODUCTION

A hernia is a protrusion of an organ or tissue from its normal cavity. A ventral hernia is defined as a protrusion through the anterior abdominal wall. These defects can be categorized as spontaneous or acquired (incisional) or by location on the abdominal wall. Epigastric hernias occur from the xiphoid process to the umbilicus, umbilical hernias occur at the umbilicus, and hypogastric hernias are rare spontaneous hernias below the umbilicus in the midline.¹⁻⁴

Ventral hernias are commonly associated with not infrequent complications and significant recurrence rates, often resulting in future procedures. Appropriate surgical

techniques and biomaterial selection for ventral hernia repair further minimize complications and recurrence rates. The culmination of optimal preoperative care, surgical technique, and postoperative management improves hernia outcomes. Common complications include seroma formation, mesh infection, flap necrosis, wound dehiscence, and enterotomy. Transverse incisions are used conventionally in ventral hernia repair. The relative merits and disadvantages of vertical versus transverse incisions remain subjects of active debate.^{3,4}

The fascial fibers of the anterior abdominal wall are oriented transversely or obliquely. Transverse incisions, therefore, parallel this orientation and allow for ready

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reapproximating with sutures placed perpendicular to the fibers. In contrast, vertical incisions disrupt fascial fibers and must be re-approximated with sutures placed between fibers. Hence, the absence of an anatomic barrier may predispose to the tearing of tissues, resulting in dehiscence or hernia formation.²⁻⁴ Thus, this study aims to compare the relative merits, demerits, and outcomes between patients of ventral hernia who have undergone open mesh repair via a transverse incision and a vertical incision.

Aims and objectives

The study aims to compare the relative merits, demerits, and outcomes between patients of ventral hernia who have undergone open mesh repair through a transverse incision and a vertical incision.

MATERIALS AND METHODS

In this prospective study, we compared the relative merits, demerits, and outcomes between ventral hernias patients who underwent open mesh repair via a transverse incision and a vertical incision. This study was conducted in the Department of General Surgery at Government Rajaji Hospital for 6 months. One hundred patients who underwent open mesh repair for ventral hernia were included and randomized into two groups, with 50 in each group. Patients were included in two groups as follows:

Group A—The mesh repair was done via a transverse incision in these patients. Group B—In these patients, the mesh was repaired via a vertical incision.

Inclusion criteria

Patients over 18 years of age and <70 in both sexes who are planned for open ventral hernia mesh repair in GRH Madurai and consented to inclusion in the study according to designated pro forma were included.

Exclusion criteria

Immuno compromised patients, intraoperative bowel content spillage, ventral hernias operated on in an emergency setting, including obstructed and strangulated hernias, and patients with previous abdominal surgeries were excluded.

This study received approval from the institutional ethics committee. Informed and written consent from all patients was collected before their inclusion in the study. Age, gender, the length of the operation, and the length of the hospital stay were all characteristics related to the patient. The precise type of procedure, the size of the incision, and the length of the procedure were all factors linked to the documented operation. Further, surgical site infection (SSI)

incidence, flap necrosis, wound dehiscence, post-operative pain, post-operative atelectasis, and mean hospital stay were assessed.

Patients were followed up once in 2 weeks for a 1-month postoperatively, and complications were noted. All patients have examined for wound infection, dehiscence, flap necrosis, and pain on postoperative days 3, 7, 14, and 28. SSI, if developed, was graded using Southampton grading.

Data analysis was performed using SPSS software. Quantitative data are represented as mean, standard deviation, and qualitative data are represented as numbers and percentages. The chi-square test assesses the association of the categorical variable with the outcome variable. Results are represented as Tables. $P < 0.05$ is considered statistically significant.

RESULTS

The study was done on patients in the age group from 27 years to 64 years, and the mean age was 42.16 years. The ratio of male-to-female patients included in both groups was more or less equal (Group A—1:1.27, Group B—1:0.85). There is no significant difference in gender between groups ($P=0.31$).

SSI occurred in 12% of patients in group A and 10% in group B, which was statistically insignificant ($P=0.74$).

Flap necrosis occurred in 8% of patients in group A and 4% in group B, which was statistically insignificant ($P=0.39$).

Wound dehiscence occurred in 4% of patients in group A and 6% in group B, which was statistically insignificant ($P=0.64$).

Significant pain (a visual analog scale [VAS] score of 3.5 or more) was lesser in patients in group A (16%) compared to group B (34%), which was statistically significant ($P=0.037$).

Both groups show more or less the same duration of hospital stay (group A—5.66 days, group B—5.86 days), which was statistically insignificant ($P=0.67$) (Table 1).

DISCUSSION

The study was done on patients in the age group from 27 years to 64 years, and the mean age was 42.16 years. The ratio of male-to-female patients included in both groups

Table 1: Comparison of gender, surgical site infection, flap necrosis, wound dehiscence, pain, mean post-procedure hospital stay

Variables	Group A (%)	Group B (%)	P-value
Gender			
Male	22 (44)	27 (54)	0.31
Female	28 (56)	23 (46)	
Surgical site infection			
Yes	6 (12)	5 (10)	0.74
No	44 (88)	45 (90)	
Flap necrosis			
Yes	4 (8)	2 (4)	0.39
No	46 (92)	48 (96)	
Wound dehiscence			
Yes	2 (4)	3 (6)	0.64
No	48 (96)	47 (94)	
Pain (VAS ≥ 3.5)			
Yes	8 (16)	17 (34)	0.037
No	42(84)	33 (66)	
Mean post-procedure hospital stay	5.66 \pm 1.43	5.86 \pm 1.4	0.67

VAS: Visual analogue scale

was more or less equal. There is a statistically insignificant difference comparing groups A and B regarding SSI, flap necrosis, wound dehiscence, and duration of hospital stay. A significant pain (a VAS score of 3.5 or more) was lesser in patients in group A (16%) compared to group B (34%), which was statistically significant.

Several retrospective clinical studies⁵⁻¹¹ and a meta-analysis¹² do suggest that transverse incisions are superior to vertical incisions concerning long-term and short-term outcomes (e.g., postoperative pain, pulmonary complications, and frequencies of incisional hernia and dehiscence). However, prospective data have been less definitive. This discrepancy may be caused, in part, by these trials' inadequate research designs, which weaken their internal validity. The main issues are insufficiently powered studies (sample size too small) to estimate the real difference accurately, lack of standardization or missing data for the abdominal wall closure surgical technique,^{8,12,13} lack of blinding of patients and assessors,^{5,6} study nonuniform in the meta-analysis,¹¹ and lack of standardized postoperative analgesia and postoperative treatment.^{12,14,15}

The only available meta-analysis¹² concludes that the transverse incision is superior to the midline incision and results in a decrease in early-onset complications (burst abdomen, pulmonary disorders) and late complications (incisional hernia), which is attributed to anatomical and physiological advantages. Yet, the incision style affects the likelihood of these issues and the method used to close the wound. The included studies were retrieved in their original form, and each was reexamined separately based on its endpoint.

Burger et al. examined the prevalence of burst abdomens and could not identify a benefit of the transverse method.⁴ Harikrishnan and Vakayil explained the distribution of pulmonary problems with an early start was compared between the two groups.⁵ None of the analyzed trials found a discernible change in the frequency of wound infections.¹²

According to the data of Greenall et al., the number of incisional hernias is comparable between the two methods.¹⁶ Moreover, the meta-pooling analyses of data from retrospective and prospective studies¹² resulted in an inconclusive finding. Halm et al., have shown a substantial decline (from 14.5% to 1.7%) in incisional hernia incidence using a transverse incision.¹⁷

All abdominal surgeries result in some postoperative pulmonary function deterioration. According to several studies, laparotomies performed through transverse incisions result in fewer postoperative pulmonary complications (such as pneumonia and atelectasis) and less impairment of respiratory function as measured by blood gas analyses and spirometry than those performed through vertical incisions.¹⁷⁻¹⁹

The transverse incision is not better than other incisions for the endpoint's early and late postoperative problems. Hence, it is appropriate to concentrate on this comparison from the patient's standpoint. A randomized controlled observer and patient-blinded trial with uniform circumstances are needed for the closure technique, pain therapy, and postoperative treatment to do this in a scientifically valid way.

Limitations of the study

Limitations of this study include small sample size, single-center study, limited follow-up, and limited outcomes assessed. These factors may impact the generalizability and validity of the study's findings.

CONCLUSION

As per the data obtained, it has been seen that the incidence of significant pain (taken as a VAS score of 3.5 or more) was statistically lower in group A (transverse incision) compared to group B (vertical incision). The incidence of SSI, flap necrosis, wound dehiscence, and mean hospital stay were statistically insignificant. Hence, the use of transverse incision in elective open mesh repair for ventral hernias should be considered.

ACKNOWLEDGMENT

We thank our chief, colleagues and the editors/reviewers for their invaluable support and guidance in the successful

publication of this article. Their contributions were instrumental in improving the quality and clarity of the manuscript.

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RM- Manuscript preparation; **MKP**- Review manuscript, performed the procedure; **SP**- Protocol review, review manuscript; **AT**- Literature review, data collection, data analysis; **JBR**- Study design, editing manuscript.

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Source of Support: Nil, **Conflicts of Interest:** None declared.