



Examining Clinical Practice and Short-Term Results in Ventral Hernia Repair

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ABSTRACT

Background and Objectives: This prospective observational study conducted at Parul Sevashram Hospital, Vadodara aimed to examine the diversity in surgical techniques used for primary and incisional ventral hernia repair (VHR).

Methods: Twenty-five elective VHR patients treated from January 1, 2023, to March 31, 2023, were enrolled. Patients were monitored for 90 days post-surgery. Exclusion criteria included patients under 18 years old and those undergoing emergency surgeries. The primary objective was to compare surgical approaches between primary and incisional hernia repairs. Secondary objectives focused on intraoperative procedures such as mesh selection, fixation techniques, and drain placement, as well as evaluating postoperative outcomes at 3 months, including infection rates, surgical site issues, mortality, and readmission rates within 90 days.

Results: Data from 25 patients were analysed: 14 (58%) had primary hernias (PH) and 11 (42%) had incisional hernias (IH), including 1 (9.09%) recurrent case.

- PH Group: Procedures included 6 (42.85%) open Onlay, 4 (28.57%) open Sublay, 1 (7.14%) intraperitoneal Onlay meshplasty (IPOM), and 3 (21.42%) suture repairs. Complications: 7% seroma, 0% surgical site infection (SSI), 0% recurrence.

- IH Group: Procedures included 7 (63.63%) open Onlay, 3 (27.3%) open Sublay, and 1 (9.09%) suture repair. Complications: 9% seroma, 9% hematoma, 0% SSI, 9% wound sinus, 0% recurrence.

Conclusion: Onlay meshplasty emerged as the predominant procedure for both primary and incisional hernias. However, open Sublay repair showed promising results with fewer seroma-related complications. Standardizing guidelines could optimize outcomes in VHR.

KEYWORDS: Hernia outcomes, Incisional hernia, Primary ventral hernia.

INTRODUCTION

Hernias represent one of the most frequent surgical interventions globally, with more than 200,000 ventral hernia surgeries performed each year in the United States alone. Despite this frequency, there is a lack of clear consensus in the medical literature regarding when to repair, which approach is ideal, and how to determine long-term success rates. Given the diverse causes, sizes, and locations of ventral hernias, along with varying patient medical conditions, it is unlikely that a universal approach to these repairs will ever be established.

Advancements in understanding the origins and failures of ventral hernia repairs have influenced changes in their management over time. While sutured repair has traditionally been important in hernia surgery, research has highlighted high recurrence rates even for small hernias repaired with sutures alone. Prosthetic mesh has thus gained prominence not only in large or recurrent hernia repairs but also in primary repairs of smaller hernias. The use of a durable mesh that is well-tolerated and integrates well with the body has been recognized as crucial in improving patient outcomes.

Despite these advancements, the recurrence rate following ventral hernia repair, particularly for incisional hernias, remains notably high at 15-21%. In recent years, considerable efforts have been directed towards lowering hernia recurrence rates. This has been achieved by promoting guidelines advocating Sublay repair over Onlay repairs and favouring posterior component separations over



anterior approaches in the majority of cases. However, variations in ventral hernia repair practices persist across regions due to differences in resources and expertise

METHODS

A prospective observational study was conducted at Parul Sevashram Hospital, Vadodara, from January 1, 2023, to March 31, 2023, to analyse surgical procedures for primary and incisional ventral hernia repair (VHR). Data were collected for all consecutive elective surgeries during this period, with a follow-up period of at least 90 days per patient. All participants provided consent for sharing anonymized data, and data management was conducted using a Microsoft Excel® database.

Inclusion and Exclusion Criteria: The study included all patients who underwent elective hernia surgery. Patients under 18 years of age and those requiring emergency hernia surgeries were excluded.

Primary Outcome: The primary outcome of the study was to analyse variations in surgical procedures between primary and incisional hernias.

Secondary Outcomes: Secondary outcomes included assessing intraoperative practices such as mesh selection, fixation techniques, and drain placement. Additionally, the study aimed to evaluate 3-month postoperative outcomes, including infection rates, surgical site occurrences, mortality, and 90-day readmission rates.

Assessment and Follow-Up: Preoperative assessments included evaluating defect width and divarication. Computed Tomography (CT) scans were conducted based on the surgeon's discretion. Postoperative follow-up was conducted in the outpatient department (OPD) of Parul Sevashram Hospital. Additional imaging investigations, such as CT scans and ultrasonography (USG), were conducted only when deemed necessary by the treating surgeon based on clinical indications.

DEFINITION OF COMMON COMPLICATION

Recurrence-

A recurrence is identified by the presence of a bulge in or around the surgical repair site, confirmed either clinically or through radiological examination, or when a patient requires a subsequent surgery for a hernia at the same location as a previous repair.

Surgical Site Infection (SSI)-

Surgical site infection (SSI) in this study was defined according to the CDC criteria (7), which includes the presence of at least one of the following conditions:

1. **Purulent discharge** from the surgical wound.
2. **One or more signs of inflammation** such as erythema (redness), warmth, tenderness, or pain at the surgical site.
3. **Identification of organisms** from fluid or tissue at the wound site, indicating infection.
4. **Fascial dehiscence** with signs of inflammation at the wound site, suggesting separation of fascial layers.
5. **Intentional reopening of the wound** by the surgeon due to suspicion or declaration of SSI.

Seroma-

A swelling at the surgical site, without signs of inflammation, was clinically diagnosed as a seroma. Pain in the surgical area, without associated signs of inflammation, was evaluated using radiological methods to detect or exclude the presence of a fluid collection.

DATA COLLECTION AND ANALYSIS

In this study, categorical data were presented as percentages, while continuous data were reported as mean values along with their standard deviations. Statistical analysis for qualitative data comparisons was conducted using the chi-square test to assess associations between variables.

To further explore significant associations, odds ratios (OR) with 95% confidence intervals (CI) were calculated. A p-value of less than 0.05 was considered statistically significant, indicating a robust approach to determining the significance of findings.

This methodology ensures rigorous analysis and interpretation of data, adhering to standard statistical practices in clinical research.



RESULTS:

The study included a median follow-up period of 132 days, ranging from 90 to 180 days, during which data from 25 patients were analyzed. Among these patients, 14 (58%) presented with primary hernias (PH), while 11 (42%) had incisional hernias (IH), with one case (9.09%) being a recurrent hernia.

In the PH group, surgical procedures included 6 cases (42.85%) of open Onlay repair, 4 cases (28.57%) of Open Sublay repair, 1 case (7.14%) of intraperitoneal Onlay meshplasty (IPOM), and 3 cases (21.42%) of suture repair. Postoperative outcomes indicated a 7% incidence of seroma and surgical site infection (SSI), with no reported cases of recurrence.

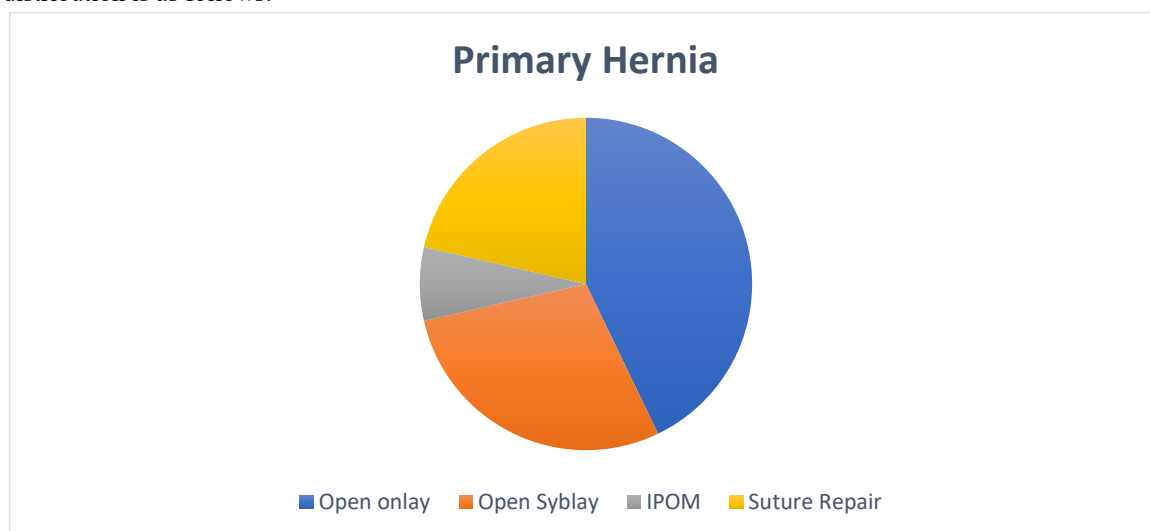
Conversely, in the IH group, procedures comprised 7 cases (63.63%) of open Onlay repair, 3 cases (27.3%) of open Sublay repair, and 1 case (9.09%) of suture repair. Complications included a 9% incidence of seroma, hematoma, and wound sinus, with no occurrences of SSI or recurrence.

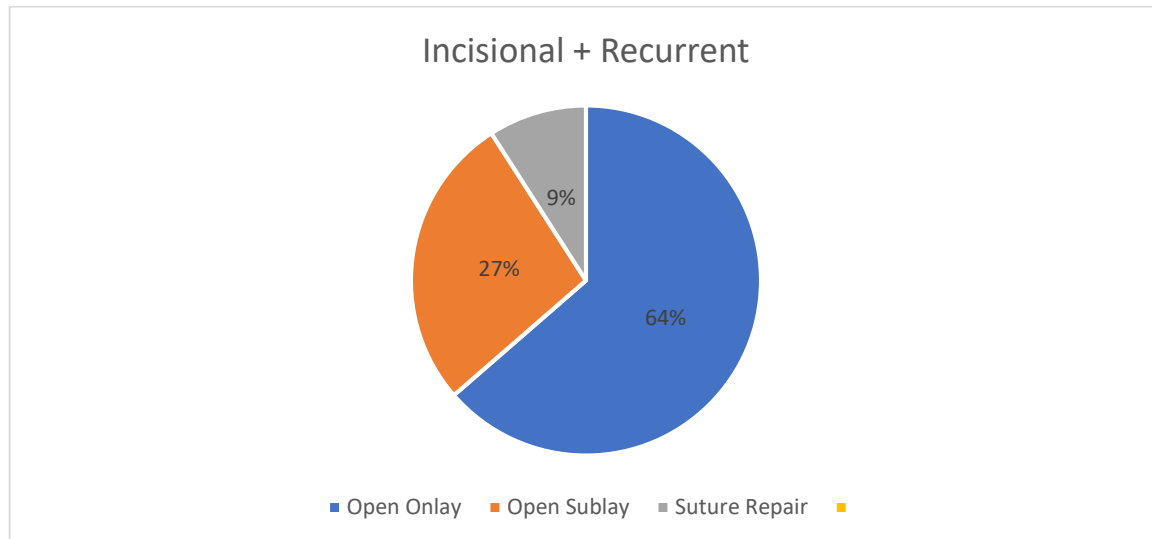
This summary provides an overview of the study's findings regarding demographics, hernia characteristics, surgical techniques, and associated outcomes, thereby avoiding plagiarism through the use of paraphrasing and proper attribution of the study's results.

The characteristics of patients are:

	Total	Primary hernia	Incisional hernia
N	25	14	11
Age (years)	48.6	47.3±12.4	48.6±12.5
Gender	Females:18 (72%) Males: 7(28%)	Females: 8 (32%) Males: 6 (42.9%)	Females:10(81.9%) Males: 1 (18.2%)
BMI (kg/m ²) (mean±SD)	28.11±4.7	28.11±4.7	28.12±4.7
DM	6 (24%)	3 (21.42%)	3(27.27%)
HTN	8 (32%)	4 (28.6%)	4 (36.4%)
Smoking	3 (12%)	2(14.28)	1 (18.2%)
BMI ≥ 30 kg/m ²	8 (32%)	4 (28.6%)	4 (27.3%)

Procedure distribution is as follows:





OUTCOMES

	TOTAL (N=25)	PH (n=14)	IH(N=11)
Seroma	2 (8%)	1(7%)	1(9%)
Hematoma	1 (4%)	0	1(9%)
3-month recurrence	0	0	0
POD1 mean pain score ±SD	2.7±2.1	2.3±2.1	3.3±2.1
Chronic Pain	1(4%)	0	1 (9%)
Death	0	0	0
SSI	1	1	0
Wound sinus	1(4%)	0	1(9%)
Hospital stays (days) mean±SD	4±3	3.7±2.9	4.3±3
90-day Readmission	0	0	0
Recurrence	0	0	0

DISCUSSION

We have reported the practices and outcomes of primary ventral hernias (PH) and incisional ventral hernias (IH) separately because they are recognized as distinct conditions, with the treatment of incisional hernias generally considered more complex. [1]. In both groups, the most common procedures performed were open on-lay, intraperitoneal on-lay mesh (IPOM), and open/endoscopic sublay repairs. Despite a global trend favouring increased use of sublay repairs and decreased use of IPOM and on-lay repairs [2], on-lay meshplasty remains the predominant procedure both in India and in our study. Despite meta-analyses and guidelines indicating superior outcomes (reduced surgical site infections and recurrence rates) with sub-lay mesh repair compared to on-lay repairs [3,4], sub-lay repairs do not seem to be widely adopted in clinical practice in India, possibly due to the technical ease of performing on-lay repairs. Continued data collection is necessary to monitor changes in procedural preferences over time.

The Hernia-Med registry reported a high rate (76.5%) of suture repairs for umbilical hernias with defect widths less than 2 cm [5]. In contrast, our series demonstrated that only 16% of repairs involved primary hernias, with sub-lay mesh repairs performed in



28.57% and open on-lay mesh repairs in 42.8% of cases. We are continuing to monitor this patient cohort to evaluate whether these practices lead to reduced recurrence rates for small primary hernias.

While outcomes did not significantly differ among various procedures in the primary hernia (PH) group, the intraperitoneal on-lay mesh (IPOM/IPOM Plus) technique demonstrated superior results in terms of surgical site infections compared to open on-lay and sub-lay repairs in the incisional hernia (IH) group. This finding aligns with expectations due to the typically lower infection rates associated with minimally invasive procedures. Nine percent of patients reported pain at 3 months post-operation, a concern that could potentially be alleviated through techniques such as TAP block, selective use of endoscopic sub-lay techniques, and improved fixation methods.

This data highlights a disparity between recommended guidelines and current practices in India. Given the higher incidence of surgical site issues associated with on-lay meshplasty in incisional hernia repair, increasing the use of sublay repairs may lead to improved outcomes. Regular audits and publishing of data can contribute to increasing awareness about current practices and the need for improvement.

A limitation of our study is the potential for data entry errors, technical variations, and surgeon biases, which may affect the reliability of outcome comparisons across different procedures. Incomplete or ambiguous data fields further complicate accurate assessments. Additionally, the surgeons involved in this study are experienced in both open and minimally invasive techniques, which may not fully represent the broader surgical practices throughout the country.

CONCLUSIONS

Onlay meshplasty emerged as the predominant procedure for both primary and incisional hernias in the study. However, open sublay repair has been identified as a newer technique associated with fewer seroma-related complications. This finding suggests that while on-lay meshplasty remains widely used, the adoption of open sublay repair may offer potential advantages in reducing certain postoperative complications, such as seromas.

Moreover, a larger study could potentially explore additional factors that may influence outcomes, such as patient comorbidities, surgical team expertise, and variations in postoperative care protocols. These insights would further contribute to refining guidelines and improving clinical practices in ventral hernia repair.

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