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CLINICAL PROFILE, OPERATIVE MANAGEMENT, AND SHORT-TERM OUTCOMES OF VENTRAL HERNIA: A HOSPITAL-BASED OBSERVATIONAL STUDY AT A TERTIARY CARE CENTER

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ABSTRACT

Background: Ventral hernia is a common indication for abdominal wall surgery and carries appreciable morbidity and risk of recurrence. This study characterized the clinical profile, operative management, and short-term outcomes of ventral hernia repair at a tertiary care center.

Materials and Methods: This single-center, hospital-based observational study combined cross-sectional assessment of the clinical profile at presentation with prospective follow-up for early postoperative outcomes. Sixty-one consecutive adults (>18 years) were enrolled. Demographics, comorbidities, hernia characteristics, operative procedure, operative time, early complications, and length of stay were recorded on a structured proforma. Obesity was defined as body mass index ≥ 30 kg/m² (World Health Organization criteria). Mean operative time was compared across the four operative techniques by one-way analysis of variance (ANOVA), with two-sided $p < 0.05$ considered significant.

Results: The mean age was 50.26 ± 12.83 years, with a female predominance (63.93%). Incisional hernia was the commonest subtype (42.62%), followed by para-umbilical (36.07%) and umbilical (18.03%) hernia. Hypertension (39.34%), diabetes mellitus (32.79%), and obesity (31.15%) were the leading comorbidities, and 42.62% reported prior abdominal surgery. Sublay mesh repair was performed most frequently (44.26%). Mean operative time differed significantly across techniques ($p < 0.0001$), rising from primary suture repair (54.36 ± 11.28 min) to laparoscopic intraperitoneal onlay mesh repair (98.64 ± 15.92 min). Early complications occurred in 18.03%, predominantly seroma (14.75%) and surgical site infection (3.28%); no hematoma or recurrence was recorded. Mean hospital stay was 6.42 ± 2.18 days.

Conclusion: Ventral hernia predominantly affected middle-aged women and was frequently associated with hypertension, diabetes mellitus, obesity, and prior abdominal surgery. Incisional hernia was the commonest subtype and sublay mesh repair the preferred technique, with a low early complication rate. Because follow-up was confined to the early postoperative period, recurrence and long-term durability could not be assessed.

Keywords: Ventral hernia; Incisional hernia; Herniorrhaphy; Surgical mesh; Postoperative complications; Seroma; Treatment outcome; Obesity

INTRODUCTION

Ventral hernia denotes the protrusion of intra-abdominal contents — fat, peritoneum, or viscera — through a defect in the anterior abdominal wall. The European Hernia Society (EHS) classification distinguishes primary from incisional ventral hernias: primary hernias comprise midline (epigastric and umbilical) and lateral (Spigelian and lumbar) defects, whereas incisional hernias arise at the site of a previous laparotomy as a consequence of failed fascial healing.[1]

Ventral hernias impose a substantial surgical burden. Incisional hernia is the dominant subtype: a meta-regression of 14,618 patients reported a pooled incidence of 12.8% after midline laparotomy at a weighted mean follow-up of approximately two years.[2], and prospective trial follow-up shows this figure rising from 12.6% at one year to 22.4% at three years.[3] Primary ventral hernias — chiefly umbilical and epigastric — affect approximately 2% of adults.[4], although estimates vary with case definition; nationwide register data capture only those coming to operation, with a peak five-year prevalence of umbilical hernia repair of 0.53%.[5] Recurrence remains the principal long-term challenge, and a meta-analysis of 274 studies identified female sex, obesity, and comorbidity as consistent predictors.[6]

The etiology is multifactorial. Patient-related determinants include obesity, diabetes mellitus, smoking, chronic cough, constipation, malnutrition, and immunosuppression, each of which impairs wound healing or raises intra-abdominal pressure; pooled estimates place the odds of recurrence at 1.36 for diabetes and 1.34 for smoking.[6], and obesity is sufficiently influential that consensus guidance addresses weight optimization before elective repair.[7] Underlying these associations is a disturbance of connective-tissue metabolism, with altered type I:III collagen ratios and defective scarring demonstrable in patients with incisional hernia.[8] Technical determinants are equally important: the STITCH trial showed that continuous small-bites fascial closure reduces the one-year incisional hernia rate from 21% to 13%.[9], and current European and American guidance recommends this technique together with consideration of prophylactic mesh in high-risk patients.[10]

Clinically, ventral hernias present as abdominal wall swellings with variable pain or cosmetic concern, and some remain asymptomatic. Incarceration, intestinal obstruction, and strangulation may supervene and mandate emergency surgery; registry data identify defect widths of 3–4 cm, together with increasing age, obesity, constipation, and diabetes, as risk factors for incarceration.[11] Diagnosis is principally clinical, with ultrasonography and computed tomography serving as adjuncts for confirming the diagnosis, defining defect anatomy, and planning repair; a systematic review of 15 studies found that between 15% and 58% of incisional hernias were detected on imaging alone, computed tomography being the most sensitive modality.[12]

Surgical repair is definitive. Mesh reinforcement reduces recurrence relative to suture repair even for small defects — a double-blind randomized trial in umbilical hernias of 1–4 cm reported recurrence in 4% with mesh versus 12% with suture (hazard ratio 0.31).[13] — and joint EHS/AHS guidance accordingly recommends mesh for umbilical and epigastric hernia repair.[14] Mesh position also matters: a network meta-analysis of 21 studies (n = 5,891) found sublay (retromuscular) placement to carry the lowest odds of both recurrence and surgical site infection.[15] Laparoscopic repair achieves comparable recurrence with a substantially lower risk of wound infection (relative risk 0.26) and a shorter hospital stay.[16], yet open mesh repair remains predominant in resource-limited settings on grounds of accessibility and cost.[17]

Despite this evidence base, the clinical profile, comorbidity burden, and operative practice for ventral hernia vary appreciably across populations and health systems, and contemporary descriptive data from Indian tertiary centers remain limited. The present study was therefore undertaken to characterize the clinical profile, operative management, and short-term outcomes of patients undergoing ventral hernia repair at a tertiary care center.

MATERIALS AND METHODS

Study design and setting: This single-center, hospital-based observational study was conducted in the Department of General Surgery, NKP Salve Institute of Medical Sciences and Research Centre and Lata Mangeshkar Hospital, Nagpur, India, between May 2024 and May 2026. The study protocol was approved by the Institutional Ethics Committee as a cross-sectional observational study.

The design comprised two components. The clinical profile of patients with ventral hernia — demographic characteristics, comorbidities and risk factors, hernia type, defect size, hernial sac contents, and history of prior abdominal surgery — was assessed cross-sectionally at the time of presentation. Patients were then followed prospectively through their operative admission for the early postoperative outcomes reported here, namely operative time, in-hospital complications, and duration of hospital stay. Because exposures and the clinical profile were recorded at a single point in time, no temporal or causal inference regarding risk factors for hernia formation is drawn from these data; the follow-up component is descriptive and is confined to the early postoperative period. The study is reported in accordance with the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) statement.

Ethical considerations: The study was approved by the Institutional Ethics Committee, NKP Salve

Institute of Medical Sciences and Research Centre and Lata Mangeshkar Hospital, Nagpur (approval MUHS/PG/E-1/1503/27/398/2023, dated 01/02/2023), before the commencement of enrolment, and written informed consent was obtained from every participant. Patient confidentiality was preserved throughout, and the study was conducted in accordance with the Declaration of Helsinki.

Participants: Consecutive adult patients presenting with ventral hernia and considered eligible for surgical management were recruited. Inclusion criteria were age greater than 18 years and a ventral hernia deemed suitable for surgical evaluation and management. Patients aged 18 years or younger, and those with inguinal, femoral, or posterior abdominal wall hernia, were excluded.

Sample size: All consecutive eligible patients presenting during the study period were enrolled, yielding a convenience sample of 61 patients. No formal a priori sample-size calculation was performed: the study was designed as a descriptive analysis of consecutive cases rather than to test a prespecified hypothesis, and no minimum detectable effect was defined. This is acknowledged as a limitation.

Variables and data collection: For each patient the following variables were recorded on a structured proforma: demographic details; comorbidities and risk factors; hernia type, classified according to the EHS system,[1] defect size; hernial sac contents; the presence, type, and number of prior abdominal operations and the corresponding incision; the interval between the index operation and the appearance of the hernia; the operative procedure performed; and operative time. Obesity was defined as a body mass index (BMI) of 30 kg/m² or greater, in accordance with World Health Organization criteria, and was recorded as a dichotomous variable. Data were entered into a spreadsheet, organized systematically, and reviewed periodically for accuracy and completeness. Records were stored on a password-protected computer with regular backups.

Outcome measures: The outcomes of interest were early postoperative complications — seroma, surgical site infection (SSI), hematoma, and recurrence — and the duration of hospital stay. SSI was defined according to the Centers for Disease Control and Prevention criteria as an infection occurring at the surgical site with purulent drainage, a positive microbiological culture, clinical signs of infection (pain, tenderness, localized swelling, erythema, or warmth), or a diagnosis of SSI made by the treating surgeon. Seroma was defined as a clinically detectable collection of serous fluid at the operative site requiring observation or aspiration. Patients were followed postoperatively for eight weeks.

Statistical analysis: Continuous variables are expressed as mean ± standard deviation and categorical variables as frequencies and percentages. The distribution of continuous variables was assessed for normality using the Shapiro–Wilk test. Mean operative time was compared across the four operative techniques using one-way analysis of variance (ANOVA). No post-hoc pairwise comparison was performed; the omnibus test therefore supports only the conclusion that mean operative time differed across the four procedures, and not that any specific pair of procedures differed from one another. A two-sided p value below 0.05 was considered statistically significant. Statistical analysis was performed using IBM SPSS Statistics for Windows, Version 20.0 (IBM Corp., Armonk, NY, USA).

RESULTS

Demographic profile: Sixty-one consecutive eligible patients were enrolled during the study period. All 61 underwent ventral hernia repair, completed early postoperative follow-up, and were included in the analysis; none withdrew and none was lost to follow-up. The mean age was 50.26 ± 12.83 years, and women predominated (39/61, 63.93%) over men (22/61, 36.07%) [Table 1].

Table 1: Distribution of study participants according to age and sex (N = 61)

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	Mean ± SD	50.26 ± 12.83	—
Sex	Male	22	36.07
	Female	39	63.93

SD, standard deviation.

Comorbidities and risk factors: Hypertension was the commonest comorbidity (24 patients, 39.34%), followed by diabetes mellitus (20, 32.79%) and obesity (19, 31.15%). Chronic constipation and alcohol consumption were each present in 16 patients (26.23%), smoking in 13 (21.31%), and chronic cough in 6 (9.84%). Less frequent associations included hypoproteinemia (3, 4.92%), chronic liver disease or cirrhosis (2, 3.28%), and benign prostatic hyperplasia or urinary obstruction (2, 3.28%) [Table 2, Figure 1]..

Table 2: Distribution of risk factors and comorbidities among study participants (N = 61)

Risk factor / comorbidity	Frequency (n)	Percentage (%)
Hypertension	24	39.34
Diabetes mellitus	20	32.79
Obesity	19	31.15
Chronic constipation	16	26.23
Alcohol consumption	16	26.23

Smoking	13	21.31
Chronic cough	6	9.84
Hypoproteinemia	3	4.92
Chronic liver disease / cirrhosis	2	3.28
Benign prostatic hyperplasia / urinary obstruction	2	3.28

Obesity was defined as body mass index ≥ 30 kg/m² (World Health Organization criteria). Patients could have more than one risk factor; percentages are calculated on the total cohort (N = 61) and therefore do not sum to 100%.

Hernia characteristics: Incisional hernia was the commonest subtype (26 patients, 42.62%), followed by para-umbilical (22, 36.07%), umbilical (11, 18.03%), and epigastric hernia (2, 3.28%). Omentum was the predominant sac content (48, 78.69%), with small bowel involved in 13 patients (21.31%). Defect size was 2–4 cm in most patients (26, 42.62%), less than 2 cm in 22 (36.07%), and 4–10 cm in 13 (21.31%) [Table 3].

Table 3: Clinical characteristics of ventral hernia among study participants (N = 61)

Variable	Category	Frequency (n)	Percentage (%)
Type of ventral hernia	Incisional	26	42.62
	Para-umbilical	22	36.07
	Umbilical	11	18.03
	Epigastric	2	3.28
Hernial sac contents	Omentum	48	78.69
	Small bowel	13	21.31
Defect size	< 2 cm	22	36.07
	2–4 cm	26	42.62
	4–10 cm	13	21.31
History of prior abdominal surgery	Present	26	42.62
	Absent	35	57.38
Number of prior surgeries (n = 26)	1 surgery	20	76.92
	≥ 2 surgeries	6	23.08

Percentages for the number of prior surgeries are calculated on the 26 patients with a history of prior abdominal surgery; all other percentages are calculated on the full cohort (N = 61).

Previous surgery and hernia onset: Among the 26 patients with prior abdominal surgery, laparotomy was the commonest antecedent operation (15, 57.69%), followed by cesarean section (8, 30.77%) and gynecological procedures such as tubectomy or hysterectomy (3, 11.54%); obstetric and gynecological operations therefore accounted for 11 of the 26 index procedures (42.31%). The lower midline incision was the most frequent prior incision (11, 42.31%), followed by the Pfannenstiel (8, 30.77%) and the upper midline incision (7, 26.92%). Most hernias developed 1–5 years after the index operation (9, 34.62%), followed by more than 10 years (6, 23.08%), 5–10 years (5, 19.23%), 6–12 months (4, 15.38%), and less than 6 months (2, 7.69%) [Table 4].

Table 4: Type of previous surgery, previous surgical incision, and time of onset of ventral hernia among patients with prior abdominal surgery (n = 26)

Variable	Category	Frequency (n)	Percentage (%)
Type of previous surgery	Laparotomy	15	57.69
	Cesarean section	8	30.77
	Gynecological (tubectomy / hysterectomy)	3	11.54
Previous surgical incision	Lower midline	11	42.31
	Pfannenstiel	8	30.77
	Upper midline	7	26.92
Time of onset after index surgery	< 6 months	2	7.69
	6–12 months	4	15.38
	1–5 years	9	34.62
	5–10 years	5	19.23
	> 10 years	6	23.08

Percentages are calculated on the 26 patients with a history of prior abdominal surgery.

Operative management and operative time: Sublay mesh repair was the commonest procedure (27 patients, 44.26%), followed by primary suture repair (18, 29.51%), onlay mesh repair (10, 16.39%), and laparoscopic intraperitoneal onlay mesh (IPOM) repair (6, 9.84%). Operative technique was closely related to defect size: all 18 primary suture repairs were performed for defects smaller than 2 cm, whereas all 27 sublay repairs were performed for defects of 2 cm or larger. Mean operative time increased with the complexity of the repair, from primary suture repair (54.36 ± 11.28 min) through onlay (71.42 ± 12.66 min) and sublay mesh repair (92.18 ± 18.47 min) to laparoscopic IPOM (98.64 ± 15.92 min), and differed significantly across the four procedures ($p < 0.0001$) [Table 5, Figure 2].

Table 5: Distribution of operative procedures according to defect size, with mean operative time (N = 61)

Operative procedure	Total cases, n (%)	< 2 cm	2–4 cm	4–10 cm	Mean operative time (min ± SD)
Primary suture repair	18 (29.51)	18	0	0	54.36 ± 11.28
Onlay mesh repair	10 (16.39)	2	6	2	71.42 ± 12.66
Sublay mesh repair	27 (44.26)	0	17	10	92.18 ± 18.47
Laparoscopic IPOM	6 (9.84)	2	3	1	98.64 ± 15.92
Total	61 (100)	22	26	13	p < 0.0001*

IPOM, intraperitoneal onlay mesh; SD, standard deviation. Primary suture repair denotes direct suture approximation of the fascial defect without mesh reinforcement. Defect-size columns give the number of patients. *Mean operative time was compared across the four operative procedures using one-way ANOVA. Allocation to operative technique was determined by defect size and was not randomized; operative time is therefore confounded by case mix, and no pairwise comparison between techniques should be inferred.

Postoperative outcomes: Early postoperative complications occurred in 11 patients (18.03%), while 50 (81.97%) had no complication. Seroma was the commonest complication (9, 14.75%), followed by surgical site infection (2, 3.28%); no hematoma and no recurrence were recorded during the early follow-up period. The mean hospital stay was 6.42 ± 2.18 days, and most patients were discharged within 5–7 days (31, 50.82%) [Table 6].

Table 6: Early postoperative complications and duration of hospital stay (N = 61)

Variable	Category	Frequency (n)	Percentage (%)
Postoperative complications	Present (total)	11	18.03
	Seroma	9	14.75
	Surgical site infection	2	3.28
	Hematoma	0	0
	Recurrence (early follow-up period)	0	0
	No complication	50	81.97
Duration of hospital stay	Mean ± SD (days)	6.42 ± 2.18	—
	2–4 days	14	22.95
	5–7 days	31	50.82
	> 7 days	16	26.23

SD, standard deviation. Recurrence was assessed only during the early postoperative follow-up period; this interval is too short to permit any inference regarding the durability of repair.

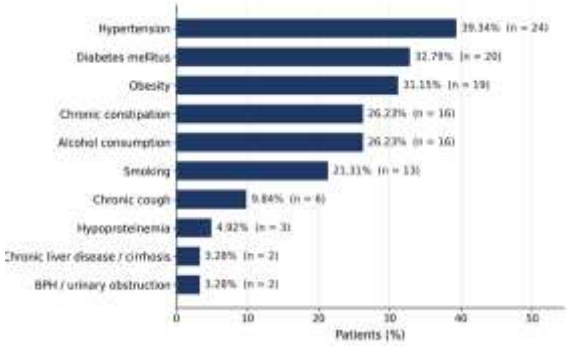

Figure 1: Risk factors and comorbidities among study participants (N = 61).

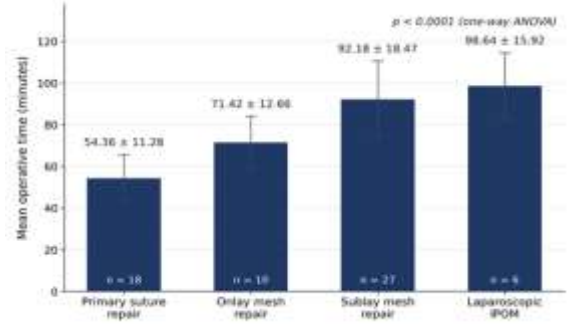

Figure 2: Mean operative time by operative procedure.

[Figure 1] Distribution of risk factors and comorbidities among study participants (N = 61). Obesity was defined as body mass index ≥ 30 kg/m² (World Health Organization criteria). Percentages are calculated on the total cohort; patients could have more than one risk factor.

[Figure 2] Mean operative time (minutes) by operative procedure. Values are mean ± standard deviation. IPOM, intraperitoneal onlay mesh. Allocation to technique was determined by defect size and was not randomized; operative time is confounded by case mix.

DISCUSSION

In this observational series of 61 patients, ventral hernia predominantly affected middle-aged women, was frequently associated with hypertension, diabetes mellitus, obesity, and prior abdominal surgery, and was most often managed by sublay mesh repair. Early morbidity was low and dominated by seroma, and no recurrence was detected within the short follow-up window. These observations are concordant with contemporary literature; equally important, the pattern of complications is largely what the technique mix would predict.

The mean age of 50.26 ± 12.83 years is consistent with Madhu et al. (50.8 ± 5 years),[18] and Soni et al. (48.23 ± 14.52 years).[19] The female predominance (63.93%) likewise mirrors Soni et al. (61.54%).[19]

and Madhu et al. (58%).[18] The present data suggest a mechanism rather than a coincidence: among the 26 patients with prior abdominal surgery, 11 (42.31%) had undergone cesarean section or a gynecological procedure, and Pfannenstiel or lower midline incisions together accounted for 19 of 26 (73.08%) antecedent incisions. Multiparity and obstetric surgery therefore plausibly mediate much of the observed sex difference. A contribution from connective-tissue biology is also likely, since altered type I:III collagen ratios and impaired scarring are demonstrable in patients with incisional hernia,[8] and female sex is an independent predictor of recurrence in pooled analysis.[6]

Hypertension (39.34%), diabetes mellitus (32.79%), and obesity (31.15%) were the three leading comorbidities. Kalyan et al. likewise identified hypertension and type 2 diabetes mellitus as the predominant comorbidities in a comparable tertiary-center cohort,[17] the somewhat higher figures in the present series most likely reflect the referral profile of a tertiary center rather than a difference in disease biology. The diabetes association is mechanistically coherent, as hyperglycemia impairs leukocyte function and collagen deposition, delays maturation of the fascial scar, and independently raises the odds of recurrence (odds ratio 1.36).[6] Obesity merits particular emphasis, being among the strongest modifiable determinants of both hernia formation and repair failure: chronically raised intra-abdominal pressure imposes sustained mechanical strain on the fascial closure, adipose-related impairment of wound healing retards scar maturation, and larger, more complex defects are more difficult to secure. Increasing body mass index independently predicts recurrence in pooled analysis,[6] advanced (class III) obesity materially complicates repair and component separation,[20] and preoperative weight optimization is a central recommendation of consensus guidance.[7].

The observed obesity prevalence of 31.15% aligns closely with contemporary Indian series: Jadhav et al. reported obesity in 34% of patients,[21] and Hariyani et al. in 36%,[22] and in both cohorts obesity was the single most frequent predisposing factor. One methodological caveat deserves emphasis. Obesity was ascertained here using the World Health Organization threshold of BMI ≥ 30 kg/m², yet a WHO expert consultation concluded that the proportion of Asian people at high risk of type 2 diabetes and cardiovascular disease is substantial at BMI values below the conventional cutoffs, and identified additional public health action points at 23.0 and 27.5 kg/m² while retaining the standard categories as international classifications.[23]. Applying the ≥ 30 kg/m² criterion in a South Asian cohort is therefore likely to under-ascertain clinically meaningful adiposity, and the true burden of adiposity-related surgical risk in this population probably exceeds the 31.15% reported. Chronic constipation (26.23%) and chronic cough (9.84%) act through sustained elevation of intra-abdominal pressure, and constipation is itself a recognized risk factor for incarceration.[11].

Incisional hernia was the commonest subtype (42.62%), closely matching Jadhav et al. (43%).[21] and consistent with Hariyani et al. (54%),[22] and Clement et al. (60%).[24] Omentum was the predominant sac content (78.69%), a higher proportion than the 49% reported by Jadhav et al., who found bowel in 32% and both omentum and bowel in 18% of cases,[21] the difference is most plausibly explained by defect size, as the present cohort was weighted toward small and medium defects (78.69% measuring less than 4 cm), which preferentially admit omentum rather than bowel. Most defects measured 2–4 cm (42.62%), whereas Jadhav et al. reported 45% below 2 cm.[21] This distribution is clinically relevant: defect widths of 3–4 cm carry the highest odds of incarceration in registry data.[11], placing a substantial fraction of this cohort in precisely the size band that most favors timely elective repair.

Prior abdominal surgery in 42.62% of patients underscores the causal link between laparotomy and incisional hernia; laparotomy was the commonest antecedent operation and the lower midline the commonest incision. This is biomechanically coherent. The linea alba bears its greatest stresses in the transverse direction and the abdominal wall is markedly anisotropic, so a midline closure must resist the highest tissue loads with fascia alone.[25] Upper-midline incisions carry a higher hernia rate than lower-midline incisions in pooled analysis,[2] and the corollary — that closure technique is a modifiable lever — is now established: continuous small-bites closure with a slowly absorbable suture reduces the one-year incisional hernia rate from 21% to 13%.[9] and is a formal guideline recommendation.[10] That most hernias in this series appeared 1–5 years after the index operation (34.62%), with a further 42.31% presenting beyond five years, reinforces the point that incisional hernia is a late complication whose true incidence is systematically underestimated by short surveillance.[3].

Sublay mesh repair predominated (44.26%), a choice supported by the best available evidence: in a network meta-analysis of 21 studies, sublay placement carried the lowest odds of both recurrence (odds ratio 0.218) and surgical site infection (odds ratio 0.449), with a 94.2% probability of being the best of the four mesh positions assessed.[15] Primary suture repair was reserved exclusively for defects smaller than 2 cm. This is a defensible pragmatic policy, but it should be acknowledged that randomized evidence favors mesh even for small umbilical defects of 1–4 cm, in which mesh reduced recurrence from 12% to 4%,[13] and that EHS/AHS guidance recommends mesh for umbilical and epigastric hernia repair.[14] Because 18 patients (29.51%) underwent repair without mesh, this subgroup in particular will require longer surveillance before the strategy can be regarded as validated. Mean operative time rose monotonically

with the complexity of the repair and differed significantly across the four techniques ($p < 0.0001$). This finding must be interpreted with caution: allocation to technique was not random but driven by defect size — every primary suture repair was performed for a defect smaller than 2 cm, whereas every sublay repair was performed for a defect of 2 cm or larger — so operative time is confounded by case mix, and in the absence of post-hoc testing no pairwise inference is warranted. The gradient reflects the operation performed rather than the relative merit or efficiency of the techniques.

Early complications occurred in 18.03% of patients, and seroma was dominant (14.75%) — the expected signature of this cohort's technique mix. Meta-analysis of randomized trials shows that onlay mesh carries a 2.6-fold higher risk of seroma than sublay placement (relative risk 2.61),[26] and the PRIMA trial recorded seroma in 34 of 188 onlay patients compared with 13 of 185 sublay and 5 of 107 suture-only patients.[27] That a sublay-predominant series should nonetheless yield seroma as its leading complication is a useful reminder that residual dead space, and not mesh position alone, drives fluid collection. Surgical site infection was uncommon (3.28%), consistent with the low infection profile attributed to sublay placement,[15] laparoscopic repair, used in 9.84% of patients, is itself associated with a marked reduction in wound infection (relative risk 0.26).[16] The mean hospital stay of 6.42 ± 2.18 days was comparable to that reported by Soni et al,[19] but is longer than in many contemporary series, and most plausibly reflects institutional discharge practice and drain management rather than complication burden, given that 81.97% of patients had no complication at all. Complications were not graded with a validated instrument such as the Clavien–Dindo classification, which limits direct comparability with other series.

No recurrence was observed. This must not be read as evidence of durability. Recurrence after ventral hernia repair accrues over years: in prospective trial follow-up the incisional hernia rate rose from 12.6% at one year to 22.4% at three years, leading the investigators to conclude that one year of clinical follow-up is insufficient and that a minimum of three years should be mandatory in any study reporting hernia rates.[3] A follow-up window confined to the early postoperative period is therefore structurally incapable of detecting recurrence, and the observation of zero recurrences in this series is an expected consequence of the study design rather than a finding.

Strengths and limitations: The strengths of this study include consecutive enrollment, standardized proforma-based data capture, prospective and complete early follow-up, and use of the internationally accepted EHS classification. Several limitations warrant emphasis. First, the design is descriptive: the clinical profile was characterized cross-sectionally at presentation, so no temporal or causal inference regarding risk factors for hernia formation can be drawn. Second, this was a single-center convenience sample recruited without an a priori power calculation, which limits precision and external validity. Third, follow-up was confined to the early postoperative period, precluding assessment of recurrence and mesh-related complications — the outcomes of greatest long-term relevance. Fourth, obesity was recorded categorically using the World Health Organization threshold of BMI ≥ 30 kg/m²; BMI was not analyzed as a continuous variable, patients were not stratified by obesity class, and the lower action points proposed for Asian populations were not applied,[23] so adiposity-related risk is likely to have been under-ascertained. ASA grade and EHS defect grade were likewise not recorded, so risk-adjusted comparison between techniques was not possible. Fifth, complications were not graded using the Clavien–Dindo classification, and neither patient-reported nor quality-of-life outcomes were captured. Sixth, allocation to operative technique was surgeon-determined and confounded by defect size, so the observed differences in operative time cannot support causal comparison between techniques. Seventh, selection and referral bias are inherent to a tertiary care setting. Finally, several comparator studies are published in journals not indexed in MEDLINE, and their estimates should be interpreted with corresponding caution.

Future directions: Future work should prioritize adequately powered multicenter cohorts and hernia registries with a minimum of three years of follow-up.[3], standardized complication grading, systematic recurrence surveillance including cross-sectional imaging — given that up to 58% of incisional hernias are detected on imaging alone.[12] — and validated patient-reported outcome measures. Prospective capture of body mass index as a continuous variable, ASA grade, and EHS defect grade would permit the risk-adjusted comparison of sublay, onlay, and minimally invasive repair that the present data cannot support. Minimally invasive and robotic approaches merit particular attention: pooled analysis of 32 ventral hernia studies comprising 158,384 patients found robotic repair to be associated with fewer surgical site infections than open surgery (odds ratio 0.47) and a shorter hospital stay, albeit at the cost of longer operating time.[28] Finally, because fascial closure technique is the single most modifiable determinant of incisional hernia, institutional adoption of guideline-concordant small-bites closure.[9,10] is likely to deliver greater population-level benefit than any further refinement of repair technique.

CONCLUSION

In this hospital-based observational study, ventral hernia predominantly affected middle-aged women and was commonly associated with hypertension, diabetes mellitus, obesity, and prior abdominal surgery, with incisional hernia the leading subtype.

Sublay mesh repair was the most frequently performed technique, and short-term outcomes were favorable, with a low early complication rate dominated by seroma and no early recurrence. Mean operative time differed across techniques but was confounded by defect size and does not permit comparison of the techniques themselves. Because follow-up was confined to the early postoperative period, no inference regarding recurrence or long-term durability of repair is possible. These findings support early diagnosis, systematic optimization of comorbid conditions, and guideline-concordant fascial closure and mesh strategy, and they underscore the need for adequately powered multicenter studies with follow-up of at least three years.

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