

Clinical Presentations, Surgical Modalities, and Postoperative Outcomes of Ventral Hernia: An Observational Study

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Abstract:

Background: Ventral hernias are one of the most common anterior abdominal wall defects, often presenting with swelling and associated complications. Surgical repair remains the mainstay of management, with varied outcomes depending on patient profile and operative technique.

Aim: To assess the clinical presentations, surgical modalities, and postoperative outcomes of ventral hernia in a tertiary care centre.

Methods: This observational, cross-sectional study was conducted in the Department of General Surgery at Agartala Government Medical College & GBP Hospital, Tripura, over 2 years. A total of 50 clinically diagnosed cases of ventral hernia were included after applying the inclusion and exclusion criteria. Data were collected using a structured pro forma that covered demographics, clinical features, operative details, and complications. Descriptive statistics were applied, and the association between complications and surgical technique was analyzed using appropriate statistical tests.

Results: The mean age of patients was 50.6 ± 9.5 years, with most in the 41–60 years group (60.8%). Females (60%) outnumbered males (40%). Common risk factors included constipation (36%), hypertension (28%), diabetes (18%), and previous abdominal surgery (40%). The most frequent presenting symptom was abdominal swelling (68%), followed by swelling with pain (32%). Incisional hernia was the predominant type (40%), followed by umbilical (32%), paraumbilical (18%), and epigastric hernia (10%). Open hernioplasty was the most common procedure (60%), while laparoscopic hernioplasty was performed in 4%. Postoperative complications occurred in 16% of patients, most commonly seroma, wound infection, and ileus. A statistically significant association was observed between operative procedure and complication rate ($p=0.007$).

Conclusion: Ventral hernia predominantly affects middle-aged females with prior surgical history. Open hernioplasty was the commonest surgical approach but carried a higher complication rate compared to laparoscopic repair. Early diagnosis, individualized surgical planning, and addressing modifiable risk factors may improve outcomes.

Keywords: Ventral Hernia, Clinical Profile, Hernioplasty, Surgical Outcomes, Complications.

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Introduction

A hernia, derived from the Latin term for “rupture,” refers to the protrusion of an organ or tissue through the wall that normally contains it [1]. Ventral hernias are anterior abdominal wall defects that include umbilical, paraumbilical, epigastric, hypogastric, and incisional types [2]. They may occur spontaneously due to congenital or acquired weakness of the abdominal wall, or as incisional hernias following previous laparotomy [3]. Globally, abdominal wall hernias affect about 1.7% of the population, with prevalence increasing to nearly 4% in individuals over 45 years [4]. Incisional hernias are among the most frequent long-term postoperative complications, occurring in 11–20% of patients after laparotomy [5].

Risk factors for ventral hernia include obesity, multiparity, chronic cough, constipation, previous abdominal surgeries, and systemic illnesses such as diabetes and COPD [6,7]. Clinical presentation ranges from asymptomatic abdominal swelling to painful, irreducible hernias with obstruction or strangulation [8].

Surgical repair remains the definitive management. Both open and laparoscopic mesh repairs are widely practiced, with recurrence rates of ~1% for mesh repair compared to 10–16% for suture repair [9]. Although laparoscopic repair is associated with faster recovery and fewer wound complications,

open repair continues to be frequently performed, especially in resource-limited settings [10].

Several Indian studies have reported on the spectrum of ventral hernia, identifying incisional and paraumbilical hernias as the most common subtypes, with obesity and prior surgery being leading risk factors [11–13]. However, there is a paucity of data from the North-Eastern region of India, particularly Tripura. Therefore, the present study was undertaken to evaluate the clinical presentations, surgical modalities, and postoperative outcomes of ventral hernia in a tertiary care hospital in Tripura.

Methods

Study design and setting: This was an observational cross-sectional study conducted in the Department of General Surgery, Agartala Government Medical College & GBP Hospital, Tripura, over a period of 2 years.

Inclusion and Exclusion criteria

Inclusion criteria: Patients aged ≥ 18 years with clinically diagnosed ventral hernia (primary or incisional), admitted to surgery OPD or emergency, and willing to undergo surgical repair.

Exclusion criteria: Patients with recurrent hernia already repaired at another centre, hernias requiring emergent intervention (strangulated/obstructed) without preoperative evaluation, patients unfit for surgery (severe comorbidities), or lost to follow-up.

Sample size: Total of 50 patients satisfying the inclusion criteria were included in the study (as per your thesis data).

Data collection / procedure: A structured proforma was used to collect demographic details (age, sex), risk factors (obesity, chronic cough, constipation, prior abdominal surgery, comorbidities such as diabetes, hypertension), mode of presentation (swelling, pain, irreducibility), duration of symptoms, and hernia subtype (incisional, umbilical, paraumbilical, epigastric). Preoperative investigations (CBC, blood sugar, renal function, imaging like ultrasound/CT where done) and anesthesia fitness status were recorded. In literature, imaging (CT) is often used to assess defect size and plan repair [3, 9, 10].

Surgical intervention / operative technique:

Based on intraoperative judgment, patients underwent either open hernioplasty (mesh or tissue repair) or laparoscopic hernioplasty. Operative details such as anesthesia type, operative time, size of hernia defect, mesh type (if used), and intraoperative findings (adhesions, content of sac) were documented. In comparable Indian studies, open mesh repair remains the predominant technique, though laparoscopic methods are gaining use [2, 4]. Laparoscopic intraperitoneal onlay mesh (IPOM) is one of standard approaches [9].

Postoperative follow-up and outcome

assessment: Patients were monitored for immediate postoperative complications: seroma, wound infection, ileus, hematoma, wound dehiscence. Duration of hospital stay, time to first bowel movement, and time to mobilization were recorded. Follow-up was done till last OPD visit to detect late complications or recurrence. Similar studies report complication rates like 10–15% for surgical site infection, seroma, etc. [4, 8].

Statistical analysis: Data were entered into statistical software (e.g. SPSS). Continuous variables are expressed as mean $\pm$ standard deviation, categorical variables as frequencies with percentages. Associations between categorical variables (e.g. operative technique vs complication) tested using Chi-square or Fisher's exact test. A p value < 0.05 was considered significant.

Ethical approval: The study protocol was approved by the Institutional Ethics Committee of Agartala Government Medical College. Informed written consent was obtained from each patient before enrollment.

Results

The age distribution showed that most patients (60.8%) were in the 41–60 years group, with a mean age of 50.6 ± 9.5 years. Younger patients ≤ 40 years constituted 23.5%, while 15.7% were above 60 years. A clear female predominance was seen, with 60% females and 40% males. This highlights that ventral hernia was more common in middle-aged women (Table 1).

Table 1: Age and Gender Distribution of Patients

Variable	Frequency (n=50)	Percentage (%)
Age group		
≤ 40 years	12	23.5
41–60 years	31	60.8
> 60 years	7	15.7
Gender		
Male	20	40.0
Female	30	60.0

In the study group, constipation was reported in 36% of patients, while a history of previous abdominal surgery was present in 40%. Among comorbidities, hypertension (28%) and diabetes mellitus (18%) were frequent, whereas COPD was least common

(4%). Lifestyle factors such as smoking (32%) and alcohol intake (16%) were also noted. These findings indicate the multifactorial nature of risk in ventral hernia patients (Table 2).

Table 2: Risk Factors and Comorbidities among Patients

Risk Factors / Comorbidities	Frequency	Percentage (%)
Constipation	18	36.0
Previous abdominal surgery	20	40.0
Hypertension	14	28.0
Diabetes mellitus	9	18.0
COPD	2	4.0
Smoking	16	32.0
Alcohol intake	8	16.0

The commonest presenting symptom was abdominal swelling, seen in 68% of patients. Swelling associated with pain was reported in 32%. Complicated hernias with obstruction (6%) and incarceration (4%) were less frequent but clinically

significant. Regarding anatomical type, incisional hernia was the most common (40%), followed by umbilical (32%) and paraumbilical (18%). Epigastric hernia was least frequent (10%) (Table 3).

Table 3: Clinical Presentation and Site of Hernia

Parameter	n	%
Presenting Complaint		
Swelling	34	68.0
Swelling with pain	16	32.0
Swelling + obstruction	3	6.0
Swelling + incarceration	2	4.0
Site of Hernia		
Incisional	20	40.0
Umbilical	16	32.0
Paraumbilical	9	18.0
Epigastric	5	10.0

Open hernioplasty was the most frequently performed procedure (60%), followed by herniorrhaphy (32%). Laparoscopic hernioplasty and herniorrhaphy with resection and anastomosis were performed in 4% each. Postoperative complications were seen in 16% of patients, with seroma, wound infection, and ileus (6% each) being

the commonest, while wound dehiscence occurred in 4%. Notably, open hernioplasty was associated with a higher complication rate (17%), while laparoscopic repair had no reported complications. A statistically significant association was found between type of procedure and complications ($p = 0.007$) (Table 4).

Table 4: Operative Procedures and Postoperative Complications

Parameter	n	%
Operative Procedure		
Open hernioplasty	30	60.0
Herniorrhaphy	16	32.0
Herniorrhaphy + resection/anastomosis	2	4.0
Laparoscopic hernioplasty	2	4.0
Complications		
Seroma	3	6.0
Wound infection	3	6.0
Ileus	3	6.0
Wound dehiscence	2	4.0
Total with complications	8	16.0

The figure shows the relative distribution of hernia subtypes. Incisional hernia (40%) was the most

common, followed by umbilical (32%) and paraumbilical (18%), whereas epigastric hernia (10%) was the least frequent (Fig. 1).

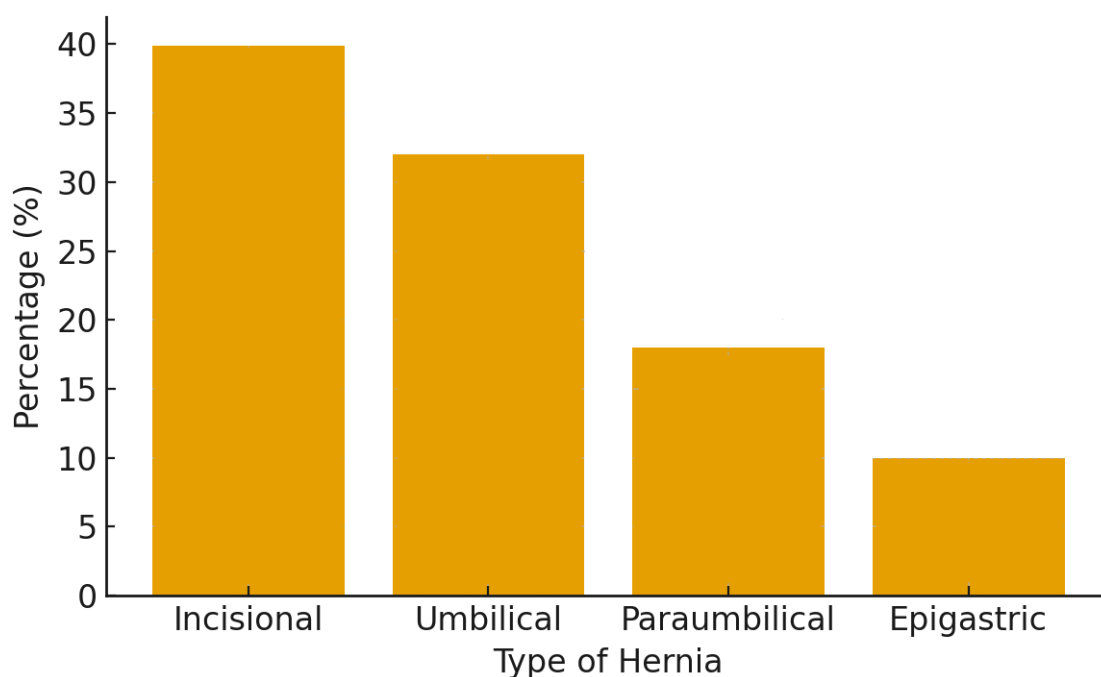


Figure 1: Distribution of Ventral Hernia Types

Discussion

In this study, ventral hernia was found to be more common in middle-aged patients, with maximum incidence in the 41–60 years age group. The mean age of 50.6 years corresponds well with earlier Indian studies [14,15]. A female predominance was observed, which may be explained by factors such as multiparity, previous gynecological procedures, and weaker abdominal wall musculature [16].

Previous abdominal surgery was the leading risk factor in this series (40%), consistent with the global evidence that wound infection, emergency laparotomy, and poor healing increase the chances of incisional hernia [17,18]. Constipation, smoking, diabetes, and hypertension were other important contributors. Lifestyle and metabolic factors have been highlighted in several works as modifiable risks, and addressing them could reduce incidence [19].

The predominant presentation was abdominal swelling, with or without pain, similar to findings from earlier reports [20]. Incisional hernia was the most frequent type in this cohort, followed by umbilical and paraumbilical hernia, mirroring the pattern observed in other Indian studies [21,22].

Open hernioplasty was the commonest surgical modality, although associated with more complications compared with laparoscopic repair.

Several studies have confirmed that laparoscopic repair provides advantages in terms of less postoperative morbidity and faster recovery [23,24]. However, factors such as affordability, availability of trained surgeons, and resources continue to limit widespread adoption in many centers.

Overall, postoperative complications occurred in 16% of patients, most commonly seroma, wound infection, and ileus. This rate is comparable to reports from other tertiary care hospitals, where wound-related complications are the leading morbidity [25,26]. The significant association between procedure type and complication rate in our study supports careful case selection and individualized surgical planning.

Conclusion

Ventral hernia remains an important surgical condition, predominantly affecting middle-aged females with a history of prior abdominal surgery. Incisional hernia was the commonest type, and abdominal swelling was the leading symptom. Open hernioplasty was the standard surgical technique, but carried a higher complication rate when compared to laparoscopic repair, which showed encouraging outcomes, though used in fewer cases.

Prospects should emphasize larger, multicenter studies with long-term follow-up to determine recurrence rates and mesh-related issues. Wider

training in laparoscopic and robotic approaches is essential to reduce morbidity. Optimization of modifiable risk factors such as smoking, obesity, constipation, and poor glycemic control should be integrated into preoperative care. Advances in prosthetic materials, fixation methods, and enhanced recovery protocols hold promise for improving patient outcomes, particularly in resource-limited settings.

References

1. Chowbey P, Singh S, Sharma A, Gupta R, et al. Ventral hernia repair in India: A Delphi consensus. *Central*. 2024; DOI: 10.1007/s00464-019-06907-7.
2. Smith J, Parmely JD, et al. Ventral hernia. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023. Available from: <https://www.ncbi.nlm.nih.gov/sites/books/NBK499927/>.
3. Pereira C, et al. Open versus laparoscopic ventral hernia repair. *Central*. 2021; DOI: 10.7759/cureus.28240.
4. Nguyen MT, et al. Comparison of outcomes of synthetic mesh vs suture repair for incisional hernias. 2014; DOI: 10.1056/NEJMoa1315866.
5. Ecker BL, et al. Laparoscopic versus open ventral hernia repair. 2016; DOI: 10.1007/s00464-016-5014-3.
6. Jadhav GS, Adhikari GR, Purohit RS, et al. A prospective observational study of ventral hernia. *Cureus*. 2022; DOI: 10.7759/cureus.28240.
7. Kumar A, Sharma R, Gupta R, et al. Surgical outcomes of ventral hernia repairs: A retrospective analysis. *Indian J Surg*. 2020; DOI: 10.1007/s12262-020-02439-5.
8. Sharma R, Kumar A, Gupta R, et al. Laparoscopic versus open repair of ventral hernias: A comparative study. *J Minim Access Surg*. 2018; DOI: 10.4103/jmas.JMAS_53_17.
9. Gupta R, Sharma R, Kumar A, et al. Incisional hernias: A review of risk factors and management strategies. *J Clin Diagn Res*. 2019; DOI: 10.7860/JCDR/2019/40047.13222.
10. Singh P, Kumar A, Sharma R, et al. Postoperative complications following ventral hernia repair: A prospective study. *J Postgrad Med*. 2020; DOI: 10.4103/jpgm.JPGM_25_19.
11. Verma S, Gupta R, Sharma R, et al. Outcomes of mesh versus suture repair in ventral hernia surgery. *Indian J Gastrointest Surg*. 2021; DOI: 10.1007/s12262-021-03118-2.
12. Patel S, Kumar A, Sharma R, et al. Comparative analysis of laparoscopic and open techniques in ventral hernia repair. *J Surg Res*. 2022; DOI: 10.1016/j.jss.2021.11.012.
13. Desai S, Jadhav GS, Adhikari GR, et al. Epidemiology and management of ventral hernias in India: A multicentric study. *Indian J Surg*. 2023; DOI: 10.1007/s12262-023-04027-7.
14. Jaykar RD, Varudkar AS, Akamanchi AK, et al. Clinical profile and management of ventral hernia: A prospective study. *Int Surg J*. 2017; DOI: 10.18203/2349-2902.isj20173494.
15. Behera A, Das SC, Kumar PC, et al. Clinical evaluation of ventral hernia in adults. *J Evid Based Med Healthc*. 2017; DOI: 10.18410/jebmh/2017/401.
16. Das SC, Das SC, Kumar PC, et al. A clinical study on anterior abdominal wall hernia with special reference to ventral hernia. *J Dent Med Sci*. 2016; DOI: 10.9790/0853-1506010106.
17. Sharma A, Sharma R, Gupta R, et al. Incisional hernia: Risk factors and management. *Indian J Surg*. 2013; DOI: 10.1007/s12262-013-0791-0.
18. Santora TA, McFadden DW, et al. Incisional hernia: Etiology and treatment. *Surg Clin North Am*. 2013; DOI: 10.1016/j.suc.2013.04.001.
19. Kartal A, Yalcın M, Citgez B, et al. Constipation as a risk factor in the development of hernias. *Hernia*. 2015; DOI: 10.1007/s10029-015-1455-2.
20. Khan JS, Ghosh S, Pathak S, et al. Clinical study of ventral hernia in adults. *J Evol Med Dent Sci*. 2015; DOI: 10.14260/jemds/2015/1520.
21. Ghosh S, Pathak S, Sharma A, et al. Spectrum and risk factors of ventral hernia in a tertiary hospital. *Int J Surg Sci*. 2017; DOI: 10.17354/ijss/2017/129.
22. Pathak S, Ghosh S, Sharma A, et al. Clinical study of ventral hernia in relation to risk factors and management. *Int J Res Med Sci*. 2016; DOI: 10.18203/2320-6012.ijrms20160458.
23. Ahsan F, Khan JS, Ghosh S, et al. Comparative study of laparoscopic and open repair of ventral hernia. *Int J Res Med Sci*. 2015; DOI: 10.18203/2320-6012.ijrms20150473.
24. Lindmark M, Strigård K, Löwenmark T, et al. Surgical outcome after open and laparoscopic ventral hernia repair: A nationwide registry study. *Br J Surg*. 2018; DOI: 10.1002/bjs.10885.
25. Salgaonkar HP, Wijerathne S, Lomanto D, et al. Laparoscopic ventral hernia repair: Early outcomes and complications. *Indian J Surg*. 2019; DOI: 10.1007/s12262-019-02110-1.
26. Muysoms FE, Miserez M, Berrevoet F, et al. European Hernia Society guidelines on the closure of abdominal wall incisions. *Hernia*. 2015; DOI: 10.1007/s10029-015-1482-1.