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Research Article

A CLINICAL PROFILE AND RISK FACTORS IN VENTRAL HERNIA PATIENTS: A RETROSPECTIVE STUDY

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ABSTRACT

Objective: About 4% of all hernia patients admitted to the ward had ventral hernias. Obesity, wound infections, malnutrition, immunosuppression, and inappropriate suture materials or incorrect suture placement were important causative factors for ventral hernia.

Methods: This retrospective study was carried out among 50 patients of ventral hernias. Data were compiled in a pre-designed proforma using information from clinical notes, discharge summaries, and operation notes. This study excluded patients under the age of 18, those with femoral, inguinal, or posterior abdominal wall hernias.

Results: The most common subtype of ventral hernia was incisional hernia (54.0%). The most common presenting symptom was swelling only (60.0%). The most common associated risk factor was obesity (36.0%) and constipation (26.0%). About 48.0% hernia occurred following gynecological procedures (hysterectomy - 22.0%, lower segment cesarean section - 8.0%, and tubectomy - 8.0%).

Conclusion: The most common ventral hernia is the incisional hernia, which often occurs after obstetric and gynecological surgeries. Surgical site infection, obesity, and constipation increase the risk of ventral hernias.

Keywords: Hysterectomy, Incisional hernia, Obesity, Surgical site infection, Ventral hernia.

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INTRODUCTION

A protrusion through the fascia of the anterior abdominal wall is referred to as a ventral hernia. These irregularities on the fascia of the anterior abdominal wall might be classified as primary (or spontaneous) or secondary (acquired) [1]. Umbilical, epigastric, lumbar, and spigelian hernias are examples of primary ventral hernias, whereas incisional hernias that develop after a prior procedure are examples of secondary ventral hernias [2]. About 4% of all hernia patients admitted to the ward had ventral hernias [3].

Ventral hernias may or may not be symptomatic. They typically present as abdominal swelling, sometimes with or without pain, and infrequently with complications such as incarceration or strangulation. Obesity, wound infections, malnutrition, immunosuppression inappropriate suture materials or incorrect suture placement were important causative factors for incisional hernia [4].

The surgical treatment of ventral hernias includes a variety of procedures, including traditional anatomical repair of the defect, prosthetic repair, and advanced reconstructive techniques. In addition, the adoption of minimally invasive techniques enables a quicker recovery after surgery, a shorter hospital stay, and an earlier return to work [5]. To prevent recurrence, mesh repair should be performed on all ventral hernias. Small hernias, particularly umbilical and paraumbilical ones, have been treated without mesh, though. The recurrence rate for mesh repairs, namely for umbilical hernias, is 1%, but the recurrence rate for simple suture repairs is up to 16% [6]. This study was conducted to understand the demographics, clinical profile, risk factors, and complication of various types of ventral hernias in a tertiary care health center in Gujarat.

METHODS

Following approval from the institutional ethical committee, this retrospective study was carried out among 50 patients diagnosed as having ventral hernias in the General Surgery department of a tertiary care hospital in Gujarat.

Data were compiled in a pre-designed proforma using information from clinical notes, discharge summaries, and operation notes. It contained information on the patient's demographics, clinical profile, hernia type, prior surgeries, risk factors, and complications. This study excluded patients under the age of 18, those with femoral, inguinal, or posterior abdominal wall hernias, as well as those who were pregnant, immune-compromised patients, or who did not consent.

The data collected was entered and analyzed in Microsoft Excel version 2016. Quantitative data were presented with mean and standard deviation. Qualitative data were presented with frequency and percentage (%).

RESULTS

Total 50 patients with ventral hernia were included in this study. Majority of the patients belonged to 51–60 years (14, 28.0%) age group followed by 41–50 years (13, 26.0%) age group. The mean age was 56.24±10.8 years. Female predominance (30, 60.0%) was observed in the patients with ventral hernia. Most common addiction was tobacco chewing (19, 38.0%) followed by smoking (16, 32.0%) and alcohol (9, 18.0%) (Table 1).

The most common presenting symptom was swelling only (30, 60.0%) followed by swelling with pain (14, 28.0%), features of Incarceration (3, 6.0%), and features of intestinal obstruction (2, 4.0 %). The most common subtype of ventral hernia was incisional hernia (27, 54.0%) and umbilical hernia (13, 26.0%). Pfannenstiel incision (20, 40.0%) was most common followed by right paramedian and lower midline (10 20.0% for each). All the cases were evaluated ultrasonographically to assess the defect size. Total 22 patients (44.0%) had defect size of <2 cm, 16 patients (32.0%) had 2 to 4 cm defect size, and 12 patients

Table 1: Baseline characteristics of patients

Baseline characteristics	Frequency	Percentage
Age group (years)		
<20	3	6
21–30	4	8
31–40	6	12
41–50	13	26
51–60	14	28
>60	10	20
Mean±SD	56.24±10.8	
Gender		
Male	20	40
Female	30	60
Addiction of any substance		
Tobacco chewing	19	38
Smoker	16	32
Alcohol	9	18

SD: Standard deviation

(24.0%) had more than 4 cm defect size. Average defect size was 3.21±0.67 cm (Table 2).

Explorative laparotomy (38.0%) was most common surgery followed by hysterectomy (22.0%), lower segment cesarean section (LSCS) (18.0%), and appendicectomy (8.0%) (Fig. 1).

The most common associated risk factor was obesity (18, 36.0%) followed by constipation (13, 26.0%), HTN (11, 22.0%), DM (9, 18.0%), and COPD (4, 8.0%). Multiparity was reported in 4 patients (8.0%). Seroma (8, 16.0%) was most common complication followed by surgical site infection (5, 10.0%) and recurrence (4, 8.0%) (Table 3).

DISCUSSION

Ventral hernias are a major surgical problem, affecting millions of patients each year. With 25–35% of all hernias, they are the second most common type after inguinal hernias in incidence. Umbilical, epigastric, or spigelian hernias can result from primary abdominal fascia abnormalities and incisional hernias, respectively [7].

Baseline characteristics

In our study, we found that the highest incidence of ventral hernia occurred in the 4th decade (28.0%) and 3rd decade (26.0%). The mean age of patients was 56.24±10.8 years. The majority of patients presented in their sixth decade, with an average age of 52 years, according to Jadhav *et al.* [5] About 60.0% of the participants in our study were female. In their respective research, Behera [3] and Jadhav *et al.* [5] observed similar findings with 66.0% and 59.0% female populations. Numerous reasons, including multiparity, decreased abdominal muscular tone, alterations in collagen tissue, and a history of gynecological procedures performed through a lower midline incision, among others, could be responsible for the higher occurrence of ventral hernias in females [8].

Subtype of ventral hernia

In our study, the most common subtype of ventral hernia was incisional hernia (54.0%), followed by umbilical hernia (26.0%), paraumbilical hernia (14.0%), and epigastric hernia (6.0%). Similar results were reported by Jadhav *et al.* [5] who found that 43.0% of incisional hernias, 29.0% of umbilical hernias, 18.0% of paraumbilical hernias, and 10.0% of epigastric hernias occurred. In the study by Clement *et al.* [9], they noted that incisional hernia accounted for 60% of cases, paraumbilical hernia for 20%, epigastric hernia for 12.5%, and umbilical hernia for 7.5%. Similar results were obtained in the study of Bose *et al.*, who found that 37.1% of cases involved epigastric hernia, 25.1% involved umbilical hernia, and 62.8% involved incisional hernia [10].

Incisional hernias account for 80% or more of the ventral hernias in adult that surgeons treat. The prevalence of incisional hernias following laparotomy varies from 2% to 11%, although it rises sharply in the presence of certain risk factors including obesity or wound infection.

Table 2: Distribution of patients according to characteristics of ventral hernia

Characteristics of ventral hernia	Frequency	Percentage
Symptom		
Swelling only	30	60
Swelling with pain	14	28
Swelling with F/S/O Incarceration	3	6
Swelling with F/S/O Intestinal obstruction	2	4
Swelling with urgency	1	2
Type of hernia		
Incisional Hernia	27	5
Umbilical Hernia	13	26
Paraumblical	7	14
Epigastric Hernia	3	6
Type of incision		
Pfannenstiel	20	40
Right paramedian	10	20
Lower midline	10	20
Upper midline	8	16
Umbilical port site	2	4
Defect size (cm)		
<2	22	44
2–4	16	32
>4	12	24
Mean±SD	3.21±0.67	

SD: Standard deviation

Table 3: Distribution of patients according to risk factors and complications

Variables	Frequency	Percentage
Associated risk factor		
Obesity	18	36
Constipation	13	26
Hypertension	11	22
Diabetes mellitus	9	18
Chronic obstructive pulmonary disease	4	8
Multiparity	4	8
CKD	1	2
Complications		
Seroma	8	16
Surgical site infections	5	10
Recurrence	4	8
Enterocutaneous fistula	2	4
Infected sinus	2	4
Skin necrosis	1	2

CKD: Chronic kidney disease

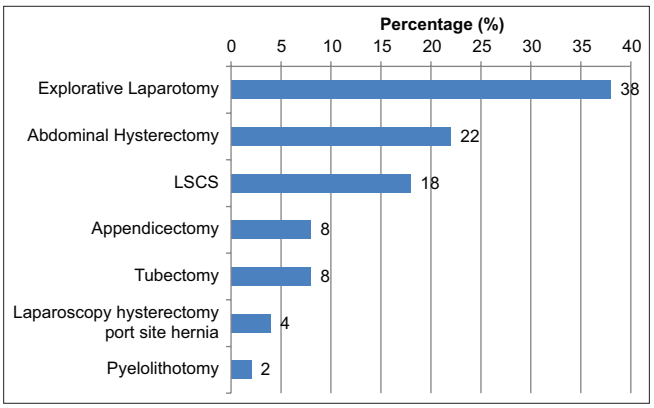

Fig. 1: Distribution of patients according to surgery

Incisional hernias made up 46% of ventral hernias in the study by Behera [3].

Symptoms

In our study, the most common presenting symptom was swelling only (60.0%), followed by swelling with pain (28.0%), features of incarceration (6.0%), and features of intestinal obstruction (4.0%). Similar findings were made in the study by Jadhav *et al.* [5], who reported that abdominal swelling alone (54%) was the most typical mode of presentation, followed by swelling with pain (24%), swelling with irreducibility (11%), and edema with symptoms of intestinal obstruction (10%). Swelling was the most frequent complaint in the study by Behera [3], followed by swelling with pain (46%). Although it may be difficult to clinically identify a hernia mass from a subcutaneous lipoma or fibroma, ultrasound (USG) and/or computed tomography scans can be used to confirm the diagnosis, especially in obese patients [3].

The majority of ventral hernias in the study by Behera [3] were uncomplicated at the time of presentation. In particular, 78% of cases were uncomplicated, with 16% of patients presenting with blockage and 6% with irreducibility. Incisional hernias are defined by a visible and palpable bulge while the patient is standing, frequently requiring support or treatment, according to Cassar and Munro [11]. Abdominal wall hernias can be asymptomatic or manifest as life-threatening situations, according to Toms *et al.* Painful incisional hernias can also result in serious diseases such as imprisonment (6–15%) or intestinal strangling (2%) [12].

Painful incisional hernias can also result in serious diseases such as strangulation of the bowel (2%) or incarceration (6–15%) (Van 't Riet *et al.* 2002) [12]. A significant prevalence of post-operative hernias has been associated with diabetes mellitus, obesity, and smoking [13]. Peripheral tissue hypoxia, an imbalance between proteases and their inhibitors that cause connective tissue disintegration, and a decreased ratio of collagen Type I to Type III are a few of the pathogenic mechanisms at play [14,15]. In their analysis of 109 cases with incisional hernia, Geçim *et al.* [16] reported that chronic constipation was a frequent feature linked with late recurrence

Risk factors

In our study, the most common associated risk factor was obesity (36.0%), followed by constipation (26.0%), hypertension (22.0%), diabetes mellitus (18.0%), chronic obstructive pulmonary disease (COPD) (8.0%), and multiparity (8.0%). The most common addiction reported was tobacco chewing (38.0%), followed by smoking (32.0%) and alcohol consumption (18.0%).

In the study by Jadhav *et al.* [5], 34% of the patients were obese, 24% had chronic constipation, 14% had a history of hard lifting, 10% had a persistent cough, 10% had benign prostate hypertrophy (BPH), and 6% had a history of smoking. Similar results were seen in Jaykar *et al.* [17] study, which included 16% obese, 34% chronic constipation, 16% smokers, and 12% BPH. In the study by Behera [3], 5% of the patients had anemia, 15% were obese, 7.5% smoker, 10% alcoholic, and 5% had BPH. Being obese made the chances of herniation and recurrence 3 times higher [18]. According to Rios *et al.* [19], 3.7% had immunological suppression, 9.3% were obese, and 19.9% had diabetes. Obesity is a risk factor for acute fascial dehiscence and incisional hernia, according to Millikan [20].

Previous surgery

In the present study, 48.0% hernia occurred following gynecological procedures (hysterectomy - 22.0%, LSCS - 8.0%, and tubectomy - 8.0%). Other common surgeries were explorative laparotomy (38.0, appendicectomy (8.0%), and laparoscopy port site hernia (4.0%). In the study of Jadhav *et al.* [5], gynecological procedures accounted for 55.8% of hernia cases. Incisional hernias were more common in lower midline incisions (34,9%), which are comparable to research by Shukla and Ahmed [21] (53%), Goel and Dubey [22] (44,6%), and Parekh *et al.* [23] (51%). This might be caused by the absence of a posterior rectus sheath below the arcuate line and the higher intra-abdominal pressure in the lower abdomen during an upright posture [21]. Incisional hernias are more frequent after midline incisions and less frequent after transverse incisions, particularly when there is muscle splitting, according to Toms *et al.* [24].

In our study, 44.0% of cases had a defect size of <2 cm, with an average defect size of 3.21±0.67 cm. This is similar to Jadhav *et al.* [5] study, where 45.0% of patients had a defect size of <2 cm.

Complications

When using mesh for minor ventral hernias, wound morbidity problems such seroma, skin necrosis, and wound infection have been major obstacles. In our investigation, the rate of skin necrosis was 2.0%, the rate of wound infection was 10%, and the rate of seroma development was 16.0%. According to Jadhav *et al.* [5], 2% of cases involved seroma, 3% involved wound dehiscence, and 11% involved wound infection.

In the study by Victor *et al.* [25], the incidence of wound infection was 8.5%, the rate of skin necrosis was 2.4%, and the prevalence of seroma was 10.9%. Poor documentation of seroma formation, skin necrosis, or hematoma formation was found in other investigations in the literature. Most studies reported a surgical site infection rate between 2% and 8% [26-28]. The wound infection incidence and other local problems in our study were somewhat greater than those reported in the literature, however, none of these complications necessitated mesh removal or reoperation. In general, the rate of wound infection in ventral hernias was 4.4% with laparoscopic repair and 23.4% with open repair [29,30]. The wound infection rate in our study was between these numbers, but it is crucial to remember that the patient sample was heterogeneous. The observed recurrence rate of 8.0% in our study is comparable to Victor *et al.* study (6.5%) and the Danish Hernia Database (up to 10%) [31]. Similar studies using Ventralex patch or other patch repairs showed recurrence rates ranging from 2% to 14.8%, which aligns with our study's results [26-28].

CONCLUSION

The most common ventral hernias, in decreasing order, are incisional, umbilical, paraumbilical, and epigastric hernias. They usually occur in the 4th to 5th decades with more cases in females. Swelling and swelling with pain are the common complaints. Incisional hernias are more common after obstetric and gynecological surgeries such as hysterectomy, cesarean section or tubal ligation. Post-operative wound infection, obesity, and constipation increase the risk of ventral hernias. It can be prevented by managing weight, medical conditions, using careful surgical techniques, and preventing wound infections.

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CONFLICTS OF INTEREST

The authors declare that there were no conflicts of interest in this research.

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REFERENCES

1. Lassandro F, Iasiello F, Pizza NL, Valente T, Stefano ML, Grassi R, *et al.* Abdominal hernias: Radiological features. World J Gastrointest Endosc 2011;3:110-7. doi: 10.4253/wjge.v3.i6.110, PMID 21860678

2. Muysoms FE, Miserez M, Berrevoet F, Campanelli G, Champault GG, Chelala E, *et al.* Classification of primary and incisional abdominal wall hernias. Hernia 2009;13:407-14. doi: 10.1007/s10029-009-0518-x, PMID 19495920
3. Behera M. The clinical profile and management of ventral hernia. Int J Pharm Clin Res 2023;15:353-8.
4. Cruse PJ, Foord R. The epidemiology of wound infection. A 10-year prospective study of 62,939 wounds. Surg Clin North Am 1980;60:27-40. doi: 10.1016/s0039-6109(16)42031-1, PMID 7361226
5. Jadhav GS, Adhikari GR, Purohit RS. A prospective observational study of ventral hernia. Cureus 2022;14:e28240. doi: 10.7759/cureus.28240, PMID 36158325
6. Christoffersen MW, Helgstrand F, Rosenberg J, Kehlet H, Strandfelt P, Bisgaard T. Long-term recurrence and chronic pain after repair for small umbilical or epigastric hernias: A regional cohort study. Am J Surg 2015;209:725-32. doi: 10.1016/j.amjsurg.2014.05.021, PMID 25172168
7. Kingsnorth AN, Giorgobiani G, Bennett DH. Hernias umbilicus and abdominal wall. In: Bailey and Love's Short Practice of Surgery. 25th ed. London: Hodder Arnold; 2008. p. 968-90.
8. Shah PP, Shama S, Panchabhai S. Prevalence of anterior abdominal wall hernia and its associated risk factors. Int J Anat Radiol Surg 2016;5:SO07-10.
9. Clement SH, Bharath PV, Omkar HM, Reddy BK. A clinical study on ventral hernia at a tertiary care hospital. Int Surg J 2018:5714-8.
10. Bose SM, Lal R, Kalra M, Wig JD, Khanna SK. Ventral hernia: A review of 175 cases. Indian J Surg 1999;61:180-4.
11. Cassar K, Munro A. Surgical treatment of incisional hernia. Br J Surg 2002;89:534-45. doi: 10.1046/j.1365-2168.2002.02083.x, PMID 11972542
12. Van 't Riet M, Steyerberg EW, Nellensteyn J, Bonjer HJ, Jeekel J. Meta-analysis of techniques for closure of midline abdominal incisions. Br J Surg 2002;89:1350-6. doi: 10.1046/j.1365-2168.2002.02258.x, PMID 12390373
13. Howard R, Thompson M, Fan Z, Englesbe M, Dimick JB, Telem DA. Costs associated with modifiable risk factors in ventral and incisional hernia repair. JAMA Netw Open 2019;2:e1916330. doi: 10.1001/jamanetworkopen.2019.16330, PMID 31774525
14. Jensen JA, Goodson WH, Hopf HW, Hunt TK. Cigarette smoking decreases tissue oxygen. Arch Surg 1991;126:1131-4. doi: 10.1001/archsurg.1991.01410330093013, PMID 1929845
15. Klinge U, Si ZY, Zheng H, Schumpelick V, Bhardwaj RS, Klosterhalfen B. Abnormal collagen I to III distribution in the skin of patients with incisional hernia. Eur Surg Res 2000;32:43-8. doi: 10.1159/000008740, PMID 10720845
16. Geçim IE, Koçak S, Ersoz S, Bumin C, Aribal D. Recurrence after incisional hernia repair: Results and risk factors. Surg Today 1996:26:607-9.
17. Jaykar RD, Varudkar AS, Akamanchi AK. A clinical study of ventral hernia. Int Surg J 2017;4:42326-9. doi: 10.18203/2349-2902.isj20172791
18. Deysine M. Epigastric hernias. In: Bendavid R, Abrahamson J, Arregui ME, Flament JB, Phillips EH, editors. Abdominal Wall Hernias: Principles and Management. 1st ed. New York: Springer-Verlag; 2001. p. 685-7.
19. Ríos A, Rodríguez JM, Munitiz V, Alcaraz P, Flores DP, Parrilla P. Antibiotic prophylaxis in incisional hernia repair using a prosthesis. Hernia 2001;5:148-52. doi: 10.1007/s100290100026, PMID 11759801
20. Millikan KW. Incisional herniarepair. Surg Clin North Am 2003;83:1223-34. doi: 10.1016/S0039-6109(03)00129-4, PMID 14533912
21. Shukla A, Ahmed S. Abdominal incisional hernia: Retrospective study. Int J Res Med Sci 2018;6:62990-4. doi: 10.18203/2320-6012.ijrms20183631
22. Goel TC, Dubey PC. Abdominal incisional hernia-anatomical technique of repair. Indian J Surg 1981:43324-7.
23. Parekh JN, Shah DB, Thakore AB. Incisional hernia-a study of 76 cases. Indian J Surg 1988:5049-53.
24. Toms AP, Dixon AK, Murphy JM, Jamieson NV. Illustrated review of new imaging techniques in the diagnosis of abdominal wall hernias. Br J Surg 1999;86:1243-9. doi: 10.1046/j.1365-2168.1999.01211.x, PMID 10540124
25. Victor C, Titus D, Roopavathana B, Nadarajan AR, Chase S, Nayak S. Clinical outcomes of ventral hernia repair with ventralex patch-a retrospective study from a tertiary care centre. J Clin Diagn Res 2021;15:PC01-4. doi: 10.7860/JCDR/2021/47550.14826
26. Hadi HI, Maw A, Sarmah S, Kumar P. Intraperitoneal tension-free repair of small midline ventral abdominal wall hernias with a ventralex hernia patch: Initial experience in 51 patients. Hernia 2006;10:409-13. doi: 10.1007/s10029-006-0127-x, PMID 16932846
27. Vychnevskaia K, Mucci-Hennekinne S, Casa C, Brachet D, Meunier K, Briennon X, *et al.* Intraperitoneal mesh repair of small ventral abdominal wall hernias with a ventralex hernia patch. Dig Surg 2010;27:433-5. doi: 10.1159/000318783, PMID 21051893
28. Berrevoet F, Van den Bossche B, de Baerdemaeker L, de Hemptinne B. Laparoscopic evaluation shows deficiencies in memory ring deployment during small ventral hernia repair. World J Surg 2010;34:1710-5. doi: 10.1007/s00268-010-0600-7, PMID 20422186
29. Castro PM, Rabelato JT, Monteiro GG, del Guerra GC, Mazzurana M, Alvarez GA. Laparoscopy versus laparotomy in the repair of ventral hernias: Systematic review and meta-analysis. Arq Gastroenterol 2014;51:205-11. doi: 10.1590/s0004-2803201400030008, PMID 25296080
30. Rogmark P, Petersson U, Bringman S, Eklund A, Ezra E, Sevonius D, *et al.* Short-term outcomes for open and laparoscopic midline incisional hernia repair: A randomized multicenter controlled trial: The ProLOVE (prospective randomized trial on open versus laparoscopic operation of ventral eventrations) trial. Ann Surg 2013;258:37-45. doi: 10.1097/SLA.0b013e31828fe1b2, PMID 23629524
31. Helgstrand F, Jorgensen LN. The danish ventral hernia database-a valuable tool for quality assessment and research. Clin Epidemiol 2016;8:719-23. doi: 10.2147/CLEP.S99501, PMID 27822119