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An Observational Study of Ventral Hernias in Adults

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ABSTRACT

Background: Ventral hernias are external hernias that occur through the anterior abdominal wall. The anterior abdominal wall is the site of variety of hernias due to man's erect posture, which renders the anterior abdominal wall weak. In this article, an attempt is made to study anatomical sites, clinical presentations, co-morbidities, surgical techniques and complications among patients of ventral hernia. **Methods:** This prospective observational study was conducted in a tertiary care hospital of North India. 175 clinically diagnosed cases of ventral hernia were observed for demographic details, clinical findings, surgical treatment and complications. **Results:** Commonest age group was 41-50 years (27.43%) with mean age of 50.8 years. Male: female ratio was 1:1.3. Swelling was present in all patients followed by pain. Obesity was noted on 30.86% patients. 102 (58.30%) patients had paraumbilical hernia, 40 (22.85%) had incisional and 33(18.85%) had epigastric hernia. In incisional hernia, lower midline vertical was commonest incision accounting for 47.50% cases. 154 (88%) patients underwent open procedures while 21 (12%) patients were operated by laparoscopy. Seroma was the most frequent(14.28) followed by wound infection(11.69) and dehiscence(7.14). **Conclusion:** Ventral hernias occur in all age groups but are common in forties and in females. All patients present with swelling, many present with pain as well. The commonest ventral hernia is paraumbilical. Obesity is an obvious risk factor for developing post operative complications. Lower midline vertical incision is the most frequent incision preceding incisional hernia. Complications are minimal but seroma formation, wound infection and dehiscence may occasionally occur.

KEYWORDS: Hernia, Ventral, Paraumbilical, Incisional, Laparoscopy

I. INTRODUCTION

Hernia is defined as the protrusion of any organ (tissue) as a whole or part out of its boundary through an anatomical or acquired weak spot. These hernias are basically classified into two types, depending upon their visibility[1]. External hernias are those, which are visible from outside, like inguinal, incisional, femoral, epigastric and ventral hernias. Internal hernias are those, which are not visible from outside; they may be present between two adjacent cavities such as abdomen and thorax and they may herniate into a sub compartment of a pre-existing cavity. Common internal hernias are diaphragmatic hernia or hiatus hernia. Ventral hernias are external hernias that occur through the anterior abdominal wall[2]. The anterior abdominal wall is the site of variety of hernias due to man's erect posture, which renders the anterior abdominal wall weak. Few data is available about the natural history of untreated ventral hernias. Because there is no prospective cohort available to determine the natural history of untreated ventral hernias, most surgeons recommend that these hernias should be repaired when discovered. The use of prosthetic mesh in different types of ventral hernias has brought a phenomenal change in the outcomes of hernia patients all over the world[3]. Today, an ever increasing number of hernias are repaired by implanting prosthetic meshes either by conventional open method or by laparoscopic approach[4]. Open approach remains the standard technique as laparoscopic repair demands significant expertise to achieve comparable outcomes.

In this article, an attempt is made to study the various anatomical sites, clinical presentations, associated co-morbidities, surgical techniques and their complications among 175 patients of ventral hernia.

II. MATERIAL AND METHODS

This observational study was conducted in a tertiary care hospital of North India after ethics approval. 175 clinically diagnosed cases of ventral hernia belonging to the age ≥12 years irrespective

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of gender, visiting the department of surgery between 2018 to 2020 were included in the study. Pediatric age group patients (i.e. <12 years) were excluded. Demographic data in the form of age, gender, occupation, presenting chief complaints were recorded in chronological order along with history of presenting illness, past history, personal history and family history. General physical examination was done. Detailed local examination was recorded followed by systemic examination in every case. Routine blood investigations including haemogram, random blood sugar, liver function tests, blood urea, serum creatinine were measured in all patients. Radiological examination included X-ray chest & flat plate abdomen, ultrasonography of abdomen, contrast enhanced computed tomography scan of abdomen (in selected cases). Procedure of surgical treatment and complications were observed. Categorical data were assessed in the form of absolute numbers and percentages. Quantitative data was assessed by calculating range and measures of central tendency such as mean and standard deviation.

III. RESULTS

23 patients (13.14%) belonged to the age group of 18-30 years, 24 patients (13.71%) between 31-40 years, 48 patients (27.43%) between 41-50 years, 31 patients (17.71%) between 51-60 years, 29 patients (16.57%) belonged to the age group of 61-70 years and 21 patients (11.43%) were more than 70 years old. The incidence of ventral hernia was maximum in the age group of 41-50 years (27.43%). In this study the youngest patient was 18 while the oldest was 90 years of age. Mean age at the time of presentation was 50.8 years. Among the 175 patients included in this study, 99 (56.57%) were females and 76 (43.43%) were males. Overall male female ratio noted was 1:1.3.

All the patients had swelling as their chief complaint. 72 (41.14%) patients also had pain along with swelling whereas only 4 (2.29%) patients had systemic symptoms. Obesity was the most common co-morbidity (30.86%) followed by diabetes mellitus in 26 (14.86%) patients. Chronic cough was present in 18 (10.29%), chronic constipation in 11 (6.29%) and only 7 (4%) patients had urinary urgency/ frequency.

While correlating with BMI, 52 (29.71%) patients were overweight and 2 (1.14%) obese whereas maximum patients (66.86%) had normal BMI. According to the type of ventral hernia, 102 (58.30%) patients had paraumbilical hernia, 40 (22.85%) had incisional and 33(18.85%) had epigastric hernia. Table 1 shows distribution of patients of different types of ventral hernia according to age and gender.

Table 1: **Distribution of patients of different types of ventral hernia according to age and gender**

Diagnosis	**18-40 years**		**41-60 years**		**≥61 years**		**Gender**			
							Males		**Females**	
	No.	%	No.	%	No.	%	No.	%	No.	%
Paraumbilical hernia	33	32.35	45	44.12	24	23.53	50	49.02	52	50.98
Incisional hernia	7	17.50	19	47.50	14	35.00	12	30.00	28	70.00
Epigastric hernia	7	21.21	15	45.45	11	33.33	14	42.42	19	57.58
Total	47	26.86	79	45.14	49	28.00	76	43.43	99	56.57

In this study, all 102 patients of paraumbilical hernia had swelling, 50 (49.01%) presented with pain and 3 (2.94%) had systemic symptoms. Among incisional hernia patients all 40 presented with swelling, 18 (45%) presented with pain and only 1 (2.5%) had systemic symptoms. All 33 patients of epigastric hernia presented with swelling & 14 (42.42%) complained of pain. Among the previous incision site preceding incisional hernia, lower midline vertical was the commonest accounting for 19 (47.50%) patients followed by upper midline vertical in 13 (32.50%) patients and 2 (5%) cases of grid iron, right paramedian & pfannenstiel incision each respectively. (Table 2)

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Table 2: **Distribution of patients of incisional hernia according to previous incision site**

Previous Incision Site	No. of patients	Percentage
Lower midline vertical	19	47.50
Upper midline vertical	13	32.50
Grid iron	2	5.00
Right paramedian	2	5.00
Pfannenstiel	2	5.00
Other	2	5.00
Total	40	100.00

26 (65%) patients underwent previous emergency surgery whereas 14 (35%) were previously operated electively. Among 40 patients of incisional hernia, 26 (65%) patients were operated in peripheral hospitals viz a viz 14 (35%) patients in a tertiary care hospital. maximum incidence was observed among 19 (47.50%) patients operated in emergency at peripheral hospitals. 154 (88%) patients underwent open procedures while 21 (12%) patients were operated by laparoscopy. Among open procedures, 4 (2.29%) patients had anatomical repair and in 150 (85.71%) mesh repair was done. Table 3 shows distribution of patients of ventral hernia according to post operative complications among lap and open repair.

Table 3: **Distribution of patients of ventral hernia according to post operative complications among Lap and Open repair**

Complication	No. of patients		Percentage	
	Lap	Open	Lap	Open
Seroma	0	22	0	14.28
Wound infection	0	18	0	11.69
Wound dehiscence	0	11	0	7.14
Nil	21	103	100.00	66.89
Total	21	154	100.00	100.00

22 (14.28%) patients with open repair developed seroma during post operative period while 18 (11.69%) had wound infection & 11 (7.14%) developed wound dehiscence. 103 (66.89%) patients with open repair encountered no complications. All of the patients with lap repair had uneventful post operative recovery. In this study, a total of 4 patients underwent anatomical repair. 2 (50%) patients developed wound infection and among the other 2 patients, 1 (25%) had wound dehiscence and the other had uneventful post operative recovery. Among 150 patients of open mesh repair, 102 (68.00%) patients had uneventful post operative recovery whereas 22 (14.66%) patients developed seroma, 16 (10.67%) encountered wound infection & 10 (6.67%) had wound dehiscence. Maximum incidence of post operative complications was seen among 31 patients of BMI >25 followed by 17 patients with BMI between18.5-24.9 whereas all the cases with BMI <18.5 kg/m^2 had uneventful post operative recovery.

IV. DISCUSSION

The present study was conducted on 175 patients of ventral hernia admitted in various surgical wards of a tertiary care hospital in north India over a period of two years.

In this study, 13.14% of the patients were between 18-30 years of age. 13.71% of the patients were from the 3rd decade of life. Maximum 27.43% cases were noted in 4th decade followed by 17.71, 16.57 & 11.43% patients in 5th, 6th decade & 7th decade onwards respectively. The youngest and oldest patient was 18 and 90 years old respectively. Mean age at time of presentation was 50.8 years. Our study confirms well with the study of Clement SH et al[5] who noted the highest incidence in the 4th and 3rd decade (41.66% and 29.16%). Chavan SS et al[6] found highest incidence of ventral hernia in 4th decade amounting to 31.6% cases. Patil et al[7] in

their study found 55% of total cases in the age group of 30-50 years.

Male: female ratio was 1:1.3 in our study, confirming a female preponderance of ventral hernia. It is comparable to that of Patil et al[7] who found 55% females and 45% males among 80 cases of ventral hernia. Jaykar RD et al[8] also obtained similar incidence of ventral hernia among females to be 66% and 34% in males. The incidence of ventral hernia is higher in females because in multiparous women, the following factors predispose to hernia formation: stretching of anterior abdominal wall, decreased tone of abdominal wall muscles and replacement of collagen with elastic fibres.

In this study, all the patients had swelling as their chief complaint. 72 (41.14%) patients also had pain along with swelling whereas only 4 (2.29%) patients had systemic symptoms. These findings are similar to that of Clement SH et al[5] who encountered pain in 40% of cases, swelling in 100% cases. Chavan SS et al [6] also observed swelling as a presenting complaint in 100% of cases, pain in 29.62% & systemic symptoms in 11.11% of cases.

We found obesity as the most common co-morbidity followed by diabetes mellitus. Clement SH et al[5] also reported 30% cases of ventral hernia obese (12cases), 10% with chronic cough (4 cases), 2(8.33%) cases of obstructive uropathy and diabetes mellitus each.

Among the patients considered in our study 102 (58.30%) patients had paraumbilical hernia, 40 (22.85%) had incisional hernia and 33(18.85%) had epigastric hernia. Patil et al[7] also noted 56.25% patients of paraumbilical hernia, 22.5% of incisional hernia, 12.5% epigastric hernia cases and 8.75% patients of umbilical hernia. Arshad et al[9] also reported maximum incidence of paraumbilical hernias followed by incisional and epigastric hernias. Dabbas N et al[10] did a retrospective study of 2389 patients and found that paraumbilical hernia was the most common ventral wall hernia.

In this study, maximum incidence of different types of ventral hernia was seen among the age group 41-60 years with 47.50% (19) cases of incisional hernia, 45.45% (15) of epigastric hernia, 44.12% (45) of paraumbilical hernia respectively. Chavan SS et al[6] study found most incisional hernia cases in 4th and 5th decade (45.4% and 44.25% respectively), among epigastric hernia almost all cases were noted after 4th decade & paraumbilical hernia was seen more in 3rd and 4th decade (24.48% and 36.73% respectively).

In present study, female preponderance was seen among the patients of incisional hernia (70%) and epigastric hernia (57.58%) whereas no gender predisposition was seen in patients with paraumbilical hernia. Clement SH et al[5] observed 19 (79.16%) females among 24 patients of incisional hernia. Among epigastric hernia all five cases studied were male patients. Almost equal sex distribution was noted in paraumbilical hernia. Similarly, Chavan SS et al[6] noted female predominance in patients of incision hernia with a male: female ratio of 1:3 showing that incisional hernia occurs more commonly in females than in males.

In this study, all 102 patients of paraumbilical hernia had swelling, 50(49.01%) presented with pain and 3(2.94%) had systemic symptoms. Among incisional hernia patients all 40 presented with swelling, 18 (45%) presented with pain and only 1 (2.5%) had systemic symptoms. All 33 patients of epigastric hernia presented with swelling & 14(42.42%) complained of pain. Clement SH et al[5] in their study reported swelling as the presenting complaint in all ventral hernia patients. Pain was observed in 27.3%, 29.2% and 40% patients of paraumbilical, incisional & epigastric hernia respectively.

In present study, among the previous incision site preceding incisional hernia, lower midline vertical was the commonest followed by upper midline vertical, grid iron, right paramedian & pfannenstiel incision. The increased incidence of incisional hernia in midline vertical incision is probably due to the fact that contraction of abdominal wall muscles retract the wound edges laterally & the avascular nature of the midline incision may impair wound healing. Also the fibres of linea alba, which are continuous with abdominal wall muscle aponeurosis, cross midline mostly in transverse or oblique directions. Therefore, a vertical incision cuts most of them perpendicularly. Goel et al[11] reported 48% incisional hernias associated with lower midline vertical incision, 29% with upper midline vertical and 5% with grid iron incision. Whereas Manohar et al[12] observed 74% incisional hernias associated with lower midline vertical incision, 8% with upper midline vertical and 2% with grid iron incision.

We observed that 65% patients underwent previous emergency surgery whereas 35% were operated electively. Bose et al[13] reported in their study that 50% of incisional hernias developed following emergency surgery. Our findings were similar as 65% of patients of incisional hernia in our study developed following emergency surgery.

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Among complications, we noted maximum incidence of seroma after open repair followed by wound infection & wound dehiscence. 66.89% patients with open repair encountered no complications. All of the patients with lap repair had uneventful post operative recovery.

Chavan SS et al[6] also observed seroma was relatively more common (6.8%) than surgical site infection (4%).

Table 4 depicts the comparison of incidence of wound infection in various studies in comparison with the present study.

Table 4: The comparison of incidence of wound infection in various studies in comparison with the present study

Study	Year	No. of Cases		Wound Infection			
		Lap	Open	Lap	%	Open	%
Park[14]	1998	56	49	0	0	1	2.04
Zenghi[15]	2000	11	15	0	0	1	6.66
Van 'T Reit[16]	2002	25	76	1	4	11	14.47
Bencini[17]	2003	42	49	0	0	6	12.24
OlmiS et al[18]	2005	50	50	1	2	7	14.00
Present study		21	154	0	0	18	10.28

In this study, a total of 4 patients underwent anatomical repair. 2 (50%) patients developed wound infection and among the other 2 patients, 1 (25%) had wound dehiscence and the other had uneventful post operative recovery. Among 150 patients of open mesh repair, 102 (66.89%) patients had uneventful post operative recovery whereas 22 (14.28%) patients developed seroma, 16 (11.69%) encountered wound infection & 10 (7.14%) had wound dehiscence.

In our study, maximum incidence of post operative complications was seen among 31 patients of BMI >25kg/m^2 followed by 17 patients with BMI between 18.5-24.9 kg/m^2 (Normal) whereas all the cases with BMI <18.5 kg/m^2(Underweight) had uneventful post operative recovery. According to Owei et al[19] normal BMI (18.5-24.99 kg/m^2) had the lowest complication risk (7.7%). Complication rates then increased steadily with increasing BMI; 8.2% for overweight patients, 9.7% for the obese, 12.2% for the severely obese, 16.1% for the morbidly obese, and 19.9% for the super obese. Kurmann A et al[20] in their study observed an increase in operation time for the obese and a longer operation time as a significant predictor of postoperative wound infections. Hopf HW et al[21] study inferred that excessive subcutaneous fat tissue predisposes obese patients to impaired healing due to low regional perfusion and oxygen tension.

To conclude, ventral hernias occur in all age groups but are common in forties and show slight preponderance in females. All patients present with swelling, many present with pain as well. The commonest ventral hernia is paraumbilical accounting for more than half of the patients. Obesity is significant co morbidity as well as an obvious risk factor for developing post operative complications among ventral hernia patients. Lower midline vertical incision is the most frequent incision preceding incisional hernia. Patient who underwent emergency surgeries in peripheral hospitals are most susceptible to develop incisional hernia. Complications are minimal in ventral hernia repair; seroma formation, wound infection and dehiscence may occasionally be encountered in post operative period.

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