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The Spectrum of Etiopathological Considerations in Ventral Abdominal Wall Hernias, Presenting to A Tertiary Care Center

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Abstract

Ventral hernias, including incisional and umbilical varieties, are common conditions affecting the anterior abdominal wall. Understanding these hernias' demographic and clinical profiles is crucial for effective management and treatment. This study aimed to analyze the demographics, clinical profiles, and etiological factors of ventral hernias in patients visiting a tertiary care center in India. A total of 100 patients presenting with ventral hernias from August 2022 to July 2023 were included. Patients were treated with hernioplasty using Prolene mesh. Demographic data, hernia types, defect sizes, comorbidities, and surgical histories were recorded and analyzed. The study population had a mean age of 42.57 years. Umbilical hernias were the most common (54%), followed by incisional hernias (46%). Among incisional hernia patients, 77% were female, compared to 57% for umbilical hernia patients. The overall male-to-female ratio for ventral hernias was approximately 1:2.5. Factors such as multi parity, reduced abdominal muscle tone, and previous gynecological surgeries contributed to the higher prevalence in females. The distribution of defect sizes showed that 65% of hernias were <4 cm (W1), 31% were 4-10 cm (W2) and 4% were >10 cm (W3). Diabetes was present in 19% of patients, with 15% in incisional and 22% in umbilical hernias. Obesity was noted in 37% of patients, with 42% and 32% in umbilical and incisional hernias, respectively. A significant proportion of incisional hernia patients (73.9%) had a history of gynecological surgeries. The findings underscore the complexity of ventral hernia management and the influence of demographic and regional factors. While some results align with existing literature, others highlight the need for tailored surgical approaches. Future prospective studies with larger sample sizes are recommended to validate these findings and enhance the understanding of ventral hernia repairs.

INTRODUCTION

The term hernia originates from the Latin word rupture. It is defined as a protrusion, of the whole or a part of a viscus through the wall that contains it^[1]. Specifically, a hernia that protrudes through the fascia of the anterior abdominal wall is known as a ventral hernia. Defects present in the fascia of the abdominal wall can be classified into two main types: primary or spontaneous and acquired, the latter commonly referred to as incisional hernias, often stemming from previous surgical procedures, trauma, or repetitive stress on inherently weak areas of the abdominal wall.

Natural vulnerabilities in the abdominal wall, including the umbilicus, semilunar line, ostomy sites, and bilateral inguinal regions predispose individuals to ventral herniation. Obesity, by stretching the abdominal fascia, significantly contributes to hernia development, particularly through repetitive cycles of weight gain and loss^[2]. In October 2008, the European Hernia Society (EHS) introduced a comprehensive classification system for ventral hernias, providing a structured framework for clinical understanding and management^[4]. Ventral hernias can further be delineated based on their location on the abdominal wall, such as epigastric hernias (from the xiphoid process to the umbilicus), umbilical hernias (at the umbilicus) and hypogastric hernias (below the umbilicus). Incisional hernias specifically occur at sites previously operated upon^[3].

The prevalence of abdominal wall hernias varies across different countries, typically ranging from 100 to 300 cases per 100,000 individuals annually^[5]. Incisional hernias represent a frequent long-term complication following abdominal surgeries, with an incidence spanning from 2%-20%^[6,7]. Specifically, the overall occurrence of incisional hernias tends to be slightly elevated in cases involving midline laparotomy incisions compared to transverse incisions^[7].

Understanding the intricacies of abdominal wall anatomy and physiology is paramount for restoring its function effectively. While the prevention of incisional hernias necessitates further evaluation, proper closure techniques for laparotomy and abdominal incisions, along with the use of appropriate suture materials, hold promise in reducing their incidence. Crucially, preventing wound infection plays a pivotal role in averting future occurrences of incisional hernias.

Surgical management of ventral hernias involves different types of surgical solutions, ranging from traditional anatomical repairs to advanced prosthetic and reconstruction methods. Furthermore, the use of minimally invasive procedures provides benefits such as decreased surgical site infections, shorter hospital stays and faster return to normal activities.

The primary objective of this study was to

comprehensively examine the demographic attributes and clinical characteristics associated with different types of ventral hernias prevalent among individuals seeking medical care at a tertiary healthcare institution in India. Through a detailed analysis of patient data, we aimed to shed light on the epidemiological trends and clinical presentations of ventral hernias within this specific population. By elucidating these aspects, our study seeks to provide valuable insights that can inform clinical decision-making, optimize treatment approaches and ultimately enhance the management and outcomes of ventral hernias in this setting.

MATERIALS AND METHODS

The study enrolled patients who presented with ventral hernias at the outpatient department (OPD) and subsequently underwent admission under the care of General Surgery, AIMS. Each patient in the study underwent a hernioplasty procedure utilizing Prolene mesh, the standardized approach employed for hernia repair in our institute. Additionally, a subcutaneous closed suction drain was routinely placed as part of the surgical management protocol for all patients undergoing hernioplasty.

The inclusion criteria for this study encompassed all patients diagnosed with a ventral hernia who sought medical attention at the general surgery outpatient department (OPD).

Conversely, patients presenting with complications such as strangulation or obstruction were excluded from the study to focus specifically on uncomplicated cases of ventral hernias.

A sample size of 100 patients, from the duration of August 2022-July 2023, presenting with ventral hernias were taken as a part of the study

RESULTS AND DISCUSSIONS

Of the 100 patients, 54 patients (54%) were identified as having primary hernias, specifically umbilical hernias, while 46 patients (46%) were diagnosed with acquired hernias, primarily incisional.

Further analysis of the 46 patients with incisional hernias revealed that 12 patients (26%) had lower midline incisions. Among the subset of patients with Pfannenstiel incisions (15 patients), 6 individuals (40%) presented with recurrent hernias following previous hernioplasty, 5 patients (33.3%) had tubectomy scars contributing to their hernias and 6 patients (40%) exhibited vertical midline incisional hernias. Notably, 6 patients (13%) experienced recurrent hernias solely after a prior hernioplasty procedure (Chart 1).

Among the cohort of 46 patients diagnosed with incisional hernias, the preponderance of cases was observed in females, constituting 41 patients (89.1%), whereas male patients comprised a smaller proportion

at 5 cases (10.8%). Among the 54 patients diagnosed with umbilical hernias, the majority were female, comprising 31 patients (57.4%), while male patients accounted for 23 cases (42.5%) (Chart 2)

Among Incisional Hernias, concerning the dimensions of the hernial defects, 16 patients (34.7%) exhibited defects smaller than 4 centimeters, while 26 patients (56.5%) presented with defects ranging between 4-10 centimeters; notably, 4 patients (8%) displayed larger defects exceeding 10 centimeters in size. Among Umbilical Hernias, regarding the size of the defect, 49 patients (90.7%) had a defect size of less than 4 centimeters, whereas 5 patients (9.3%) had a larger defect size ranging from 4 to 10 centimeters (Chart 3).

In terms of comorbidities, 7 patients (15.2%) were diagnosed with diabetes, 11 patients (23.9%) with hypertension, 15 patients (32.6%) with obesity and 9 patients (19.5%) with hypothyroidism among the incisional Hernias. Among umbilical hernias 12 patients (22.2%) had diabetes, 14 patients (25.9%) were hypertensive, 22 patients (40.7%) were classified as obese and 8 patients (14.8%) were diagnosed with hypothyroidism (Chart 4 and 5).

Regarding hernial contents, 20 patients (43.4%) manifested involvement of both omentum and bowel, while 26 patients (56.6%) exhibited omentum as the exclusive content of Incisional hernias. And 13 patients (24.07%) had both bowel and omentum involved, while the majority, 41 patients (76%), had omentum as the sole content of Umbilical hernias (Chart 6).

Ventral wall hernia repair stands as a common surgical intervention, encompassing a substantial portion of the overall surgical caseload in many medical centers. Studies have indicated its prevalence, constituting approximately 15%-18% of the total surgical operations performed. Contributory factors to the onset of ventral hernias may include smoking, advanced age and untreated urinary obstructive symptoms. Additionally, predisposing elements such as multiparity, obesity, malnutrition, and heightened intra-abdominal pressure have been identified.

This study presents a thorough examination of outcomes and patient demographics linked to ventral

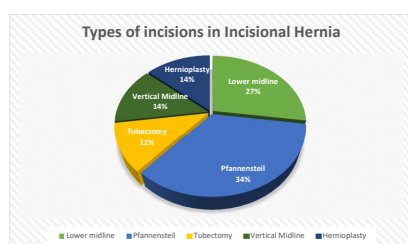


Chart 1: A Pie chart illustrating the proportion of each incision in Incisional Hernias

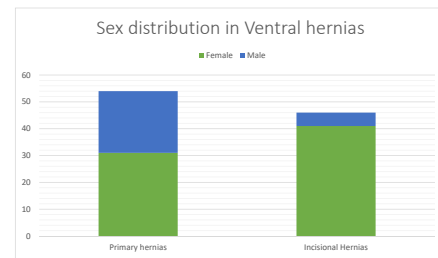


Chart 2: A Bar diagram showing the sex distribution in ventral hernias

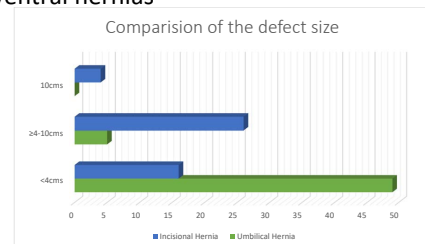


Chart 3: A Bar diagram comparing the size of the defects in each type of hernia

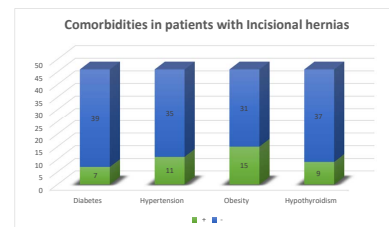


Chart 4: A Bar diagram displaying various comorbidities in Incisional hernias

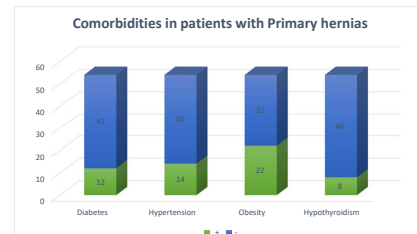


Chart 5: A Bar diagram displaying various comorbidities in Primary hernias

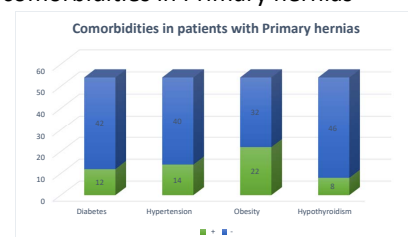


Chart 6: A Bar diagram showing the distribution of contents in Ventral Hernias

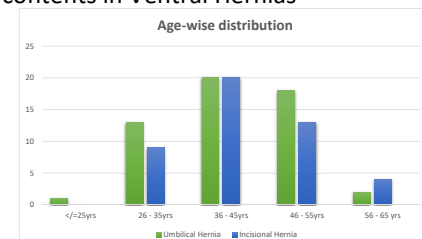


Chart 7: A Bar diagram showing the age distribution in Ventral Hernias

wall hernia repairs conducted at the Apollo Institute of Medical Sciences and Research, Hyderabad. Through a comprehensive analysis, the research illuminates various aspects of etiological comorbidities present in hernia patients, thus enriching the existing body of knowledge in this domain

Our study results have been compared to similar series, enabling a broader understanding of outcomes and demographic profiles in ventral wall hernia repairs. This comparison enhances the robustness of our findings and contributes to the existing knowledge of hernia management

The demographic analysis revealed a mean age of 43 years among the study participants, aligning closely with findings from previous research by Smith *et al.*, which reported a comparable average age of 48 years^[8].

In our study, we noted a significant gender disparity, with 28% of participants being male and 72% female. This stands in contrast to findings by Novitsky *et al.*, who observed a more balanced gender distribution in their study cohort^[9]. These discrepancies underscore the impact of regional and population-specific factors on patient demographics. Regarding hernia types, our analysis revealed nearly equal prevalence between incisional hernias and umbilical hernias, with a slight incline towards umbilical hernias (56%). In contrast, LeBlanc reported a higher incidence of incisional hernias and a lower incidence of umbilical hernias^[10].

In our study, umbilical hernia emerged as the most prevalent variety of ventral hernia, accounting for 54% of cases. This finding contrasts with the results of a study conducted by Gauri S Jadhav *et al.*, which demonstrated a higher proportion of incisional hernias among various types of ventral wall hernias^[11]. Conversely, Bose *et al.* reported in their study that incisional hernia constituted the majority (62.8%)^[12]. In our study, the mean age at presentation was 42.57 years, with a comparable average age observed for both incisional (43 years) and umbilical hernias (42.07 years) (Chart 7). This differs from the findings reported by Ana-Maria Stan Soare *et al.*, where the mean age was notably higher at 64.23 years^[13].

Both incisional hernias and umbilical hernias exhibited a female predominance, with 89% and 57% of cases, respectively. Within the cohort of individuals diagnosed with incisional hernias, 77% were female. Overall, ventral hernias demonstrated a higher prevalence in females, with a male-to-female ratio of approximately 1:2.5. This gender disparity may be attributed to various factors, such as multiple childbirths, reduced abdominal muscle strength, changes in collagen composition and past

gynecological procedures involving lower midline incisions^[14,15].

In our study, 73.9% of patients with incisional hernias had previously undergone gynaecological procedures, including classical hysterectomy, Pfannenstiel incisions and tubectomy scars. Interestingly, a comparable incidence of incisional hernias was observed in both Pfannenstiel incisions (32%) and lower midline incisions (30.4%) among patients with incisional hernias.

These findings are consistent with the research by Gauri S Jadhav *et al.*, who reported 55.81% of incisional hernia cases following gynaecological procedures, with a higher incidence noted in lower midline incisions (34.9%), mirroring our study results^[11]. Similar trends were also observed in studies by Parekh *et al.* (51%), Goel *et al.* (44.6%) and Shukla *et al.* (53%)^[16-18]. This observation could be explained by the heightened intra-abdominal pressure experienced in the lower abdomen when standing upright, coupled with the absence of a posterior rectus sheath below the arcuate line^[18].

Diabetes mellitus and obesity are known to be associated with a heightened risk of post-op hernias^[19].

In our study, 19% of patients were found to have diabetes, with rates of 15% and 22% observed in incisional and umbilical hernias, respectively. Ana-Maria Stan Soare *et al.* reported similar rates of 19.44% in their study^[13].

Regarding obesity, 36% of patients in our study were classified as obese, with incidences of 38% and 32% observed in umbilical and incisional hernias, respectively. In contrast, Jayakar *et al.* reported a lower incidence of 16%, while Ana-Maria Stan Soare *et al.* reported similar rates of 34.2% in their study^[13,20]. According to the classification by the European Hernia Society (EHS), hernias are categorized into W1, W2, and W3 based on the size of the defect, defined as <4cms, = 4-10cms and = 10cms, respectively^[4]. Our study revealed that 65 cases (65%) fell under W1, 31 cases (31%) under W2 and 4 cases (4%) under W3. In contrast, Naveen PG *et al.* reported a total of 17 cases falling under W1 and 6 cases under W2 out of 23 cases of ventral hernias within the category of Anterior abdominal wall hernias.

CONCLUSION

In summary, our findings underscore the multifactorial nature of ventral hernias like Type of incision and comorbidities like Diabetes, Hypertension, and Obesity. This study also emphasizes the importance of a holistic approach to their management, incorporating patient demographics, anatomical considerations, and comorbidities into treatment strategies for improved

patient outcomes. Further research in this area is warranted to refine our understanding and enhance therapeutic interventions for individuals affected by ventral hernias.

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