e-ISSN: 0975-9506, p-ISSN: 2961-6093

Available online on www.ijpqa.com

International Journal of Pharmaceutical Quality Assurance 2026; 17(3); 48-54

Original Research Article

Pattern and Surgical Outcomes of Hernia Repair: A Retrospective Study at BMIMS, Pawapuri, Nalanda, Bihar

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Received: 04-02-2026 / Revised: 20-02-2025 / Accepted: 15-03-2025

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Conflict of interest: Nil

Abstract:

Background: Hernia is one of the most common surgical conditions worldwide and constitutes a significant portion of the general surgical workload. Understanding the pattern of hernia presentation and surgical outcomes is important for improving patient management and treatment strategies.

Aim: To evaluate the pattern of hernia presentation and assess the surgical outcomes of hernia repair among patients treated at a tertiary care hospital.

Methodology: A retrospective observational study was conducted in the Department of General Surgery at Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Bihar, for 7 months. A total of 90 patients aged 18 years and above who underwent hernia repair were included. Data regarding demographic characteristics, type of hernia, surgical procedures, and postoperative outcomes were collected from hospital records and analyzed using descriptive statistics.

Results: The majority of patients were aged 51–60 years and above 60 years (24.4% each), with a clear male predominance (75.6%). Inguinal hernia was the most common type (60%), followed by umbilical (15.6%) and incisional hernia (13.3%). Open hernioplasty with mesh repair was the most frequently performed procedure (68.9%). Most patients (71.1%) had complete recovery without complications, while minor complications occurred in 17.8% of cases.

Conclusion: Hernia was more prevalent among older males, with inguinal hernia being the most common type. Open mesh repair remained the preferred surgical technique and demonstrated favorable postoperative outcomes with low complication and recurrence rates.

Keywords: Hernia, Inguinal hernia, Hernia repair, Surgical outcomes, Mesh repair, Retrospective study.

DOI: 10.25258/ijpqa.17.3.9

Introduction

Hernia comes as a word that is formed out of the Greek word Hernos which translates to branch or protrusion and the word has been known to be a medical condition as early as thousands of years ago [1]. Hippocrates in 400 BC made the first correct definition of hernia. A hernia is said to be the protrusion of a viscus or part of a viscus, through the defect in the wall of the cavity in which it usually lies. By the anatomical location and the bulging direction, Hernias may be categorized into broad categories of internal and external. External hernias: External hernias are more often met in clinical practice and most frequently are inguinal hernias, then there is the femoral hernia and hernias of the abdominal wall.

Hernia is also one of the most prevalent cases of surgery in the world and is still a substantial source of general surgical practice [2]. Inguinal hernia is the most common of all the hernias of the abdominal wall. Inguinal hernia repair is one of the most carried out surgical operations worldwide. This condition is prevalent, thus clinically, surgically and healthcare planning is important to study. Hernia disease has a heavy burden not only owing to its prevalence but also owing to the complications that it may cause such as incarceration, strangulation, bowel obstruction, and recurrence in case of failure to treat it properly [3].

Most of the hernias can only be treated by surgery. Different methods have been created and perfected

over the years to ensure the best patient outcome and low rates of recurrence. The abdominal wall surgery that is the most undertaken is inguinal hernioplasty. Such surgeries are conducted on high levels every year in different parts of the world. We have been told that in Great Britain there are nearly 80,000 inguinal hernia repairs which are performed annually, in France, nearly 100,000, and almost 700,000 in the United States. These statistics indicate the universal load of the hernia disease and the relevance of the proper surgery management techniques [4].

Hernia presentation pattern is dependent on a number of demographic and anatomical factors. Research has revealed that the prevalence of right sided unilateral hernia is more than left. Also, the indirect form of inguinal hernia is more prevalent than the direct type in either adult or children [5]. This disparity has been widely explained by the persistence of the processus vaginalis as well as other anatomical predispositions which make the subsequent occurrence of indirect hernias to take place. Knowledge of these patterns is significant to surgeons because it helps them in diagnosis, planning of surgery and determining the outcome after surgery.

There is another important element of hernia epidemiology, which is the evident gender difference in the prevalence of hernia. Hernias especially inguinal hernias are more common in males as compared to females [6]. The increased rate among males is due to the anatomical variations on the inguinal canal and the existence of the spermatic cord forming a natural weak point on the abdominal wall. Late surgical intervention may result in child imprisonment or strangulation which may interfere with blood flow to the herniated contents and result in greater morbidity. Thus, prompt diagnosis and surgical intervention are necessary to avoid severe complications and enhance patient outcomes.

The life time risk of getting inguinal hernia has been estimated at about 25 percent in men and 2 percent in women which means that there is a significantly more predisposition to getting the condition in men [7]. Advanced age also adds to the likelihood of developing a hernia since the abdominal wall musculature and connective tissues become weaker with age which predisposes an individual to developing a hernia. According to epidemiological studies, the annual incidence has been found to rise exponentially with age with almost half of the incidences being experienced by age 75 years and above. Moreover, approximately 10 percent of herniae are bilateral and this might demand a special clinical evaluation as well as bilateral surgical correction during the operation.

In spite of the innovations in surgical methods, hernia recurrence is an issue in the clinical practice. The recurrence rates have been reported to be between 1-5 percent based on various factors that include the nature of surgical repair done, experience of the surgeon, risk factors related to the patient and postoperative management [8]. It has been noted that the introduction of tension-free mesh repair procedures has greatly lowered the chances of recurrence and also the recovery of the postoperative period has been enhanced as opposed to the traditional tissue-based repair procedures. Nevertheless, there is always a risk of complications like infection, chronic pain, recurrence, and others, which makes it important to constantly assess the outcomes of surgery.

In recent surgery, hernia repair has changed significantly due to the development of new methods, better prosthetic devices and less invasive methods like laparoscopic surgeries [9]. The development is meant to minimize the postoperative pain, decrease the length of stay and decrease the level of recurrence and enhance the overall quality of life of a patient. The selection of surgical method however is usually based on variables like the nature of hernia, nature of the patient, the experience of the surgeon and the resources at the health facility.

The tertiary care hospitals have a significant role in handling hernia cases since they usually get patients presenting in a broad spectrum with complex and recurrent hernia cases. Retrospective studies carried out in these environments aid in the interpretation of the trend of hernia presentation, demographic population of the patients, the type of surgery procedure done and the postoperative outcomes. The studies are valuable information about the efficiency of various surgical methods; they assist in determining the factors that affect the success and complication of surgery.

The assessment of surgical results serves two vital purposes which include advancing medical procedures and providing the best possible treatment to patients. Surgical treatment results depend on three main outcomes which include postoperative complications and recurrence and duration of hospital stay and total recovery time. Healthcare providers can use these factors to find areas that need improvement and create solutions that will better patient results.

The current study involved a retrospective evaluation of patients who had hernia surgeries at a tertiary care hospital. The study aims to evaluate the pattern of hernia presentation and the surgical outcomes associated with different repair procedures. The examination of these patterns and results will enable better clinical decision-making and more effective surgical methods and better patient treatment during hernia management.

Methodology

Study Design: The present study was conducted as a retrospective observational study to evaluate the

pattern and surgical outcomes of hernia repair among patients treated at a tertiary care hospital.

Study Area: The study was carried out in the Department of General Surgery, Bhagwan Mahavir Institute of Medical Sciences, Pawapuri, Nalanda, Bihar, India.

Study Duration: The study was conducted over a period for 7 months.

Study Participants

Inclusion Criteria

- Patients who underwent hernia repair surgery in the Department of General Surgery during the study period.
- Patients aged 18 years and above.
- Patients diagnosed with different types of abdominal wall hernias such as inguinal, femoral, umbilical, or incisional hernia.
- Patients with complete medical records and operative details available in the hospital records.

Exclusion Criteria

- Patients with incomplete or missing medical records.
- Patients who were managed conservatively without surgery.
- Patients with recurrent hernia surgery performed outside the institution with inadequate documentation.
- Patients with associated severe systemic illnesses that could significantly influence surgical outcomes.

Sample Size: A total of 90 patients who underwent hernia repair surgery during the study period and fulfilled the inclusion criteria were included in the study.

Procedure: The present retrospective study involved the review and analysis of hospital records of patients who underwent hernia repair surgery in the Department of General Surgery during the study period. Prior to the commencement of the study Bhagwan Mahavir Institute of Medical Sciences, Pawapuri. As the study was retrospective in nature, patient confidentiality was strictly maintained and only relevant clinical data were collected from medical records.

Data were retrieved from hospital registers, inpatient case sheets, operative notes, and discharge summaries. Information related to demographic characteristics such as age, gender, and residence was recorded. Clinical details including type of hernia, site of hernia, presenting symptoms, duration of symptoms, and associated risk factors were also documented. Preoperative evaluation findings and relevant laboratory investigations were reviewed from the patient records.

Details regarding the type of surgical procedure performed, such as open hernioplasty or other surgical techniques, type of anesthesia used, and intraoperative findings were collected. Information related to postoperative outcomes including duration of hospital stay, postoperative complications such as wound infection, seroma formation, hematoma, recurrence, and overall recovery status were also noted. The length of hospitalization from admission to discharge was recorded for each patient.

All collected data were carefully reviewed, coded, and entered into a structured data sheet for further analysis. The study aimed to identify the common patterns of hernia presentation and evaluate the surgical outcomes following hernia repair procedures in the study population.

Statistical Analysis: The collected data were compiled and entered into Microsoft Excel and subsequently analyzed using Statistical Package for Social Sciences (SPSS) version 27.0. Descriptive statistics such as frequency, percentage, mean, and standard deviation were used to summarize the demographic and clinical characteristics of the study participants. The results were presented in the form of tables and charts for better interpretation. Appropriate statistical tests were applied wherever required to assess associations between variables. A p-value of less than 0.05 was considered statistically significant.

Result

Table 1 shows the age distribution of the study participants included in the study (n = 90). The findings indicate that the highest proportion of participants belonged to the 51–60 years and >60 years age groups, each accounting for 22 participants (24.4%). This was followed by the 41–50 years age group with 18 participants (20%). Participants aged 31–40 years constituted 16 individuals (17.8%), while the 18–30 years age group represented the lowest proportion with 12 participants (13.3%). Overall, the results demonstrate that the majority of the study participants were from the middle-aged and elderly population, particularly those aged 51 years and above, indicating a higher occurrence of the condition among older individuals in the study population.

Table 1: Age Distribution of Study Participants (n = 90)		
Age Group (Years)	**Frequency (n)**	**Percentage (%)**
18–30	12	13.3
31–40	16	17.8
41–50	18	20
51–60	22	24.4
>60	22	24.4
Total	**90**	**100**

Table 2 shows the gender distribution of the study participants included in the study (n = 90). The majority of participants were male, accounting for 68 individuals (75.6%), whereas female participants comprised 22 individuals (24.4%) of the total sample. This indicates that males formed nearly three-fourths of the study population, while females represented less than one-fourth. Overall, the findings demonstrate a clear predominance of male participants compared to females among the individuals included in the study.

Table 2: Gender Distribution of Study Participants (n = 90)		
Gender	**Frequency (n)**	**Percentage (%)**
Male	68	75.6
Female	22	24.4
Total	**90**	**100**

Table 3 shows the distribution of different types of hernia among the study participants (n = 90). The majority of patients were diagnosed with inguinal hernia, accounting for 54 cases (60%), making it the most common type observed in the study. Umbilical hernia was the second most common type, reported in 14 patients (15.6%). This was followed by incisional hernia, which was present in 12 cases (13.3%). Femoral hernia was identified in 6 patients (6.7%), while epigastric hernia represented the least common type with 4 cases (4.4%). Overall, the findings indicate that inguinal hernia constituted the predominant form of hernia among the patients, whereas other types such as femoral and epigastric hernias were comparatively less frequent.

Table 3: Distribution of Types of Hernia (n = 90)		
Type of Hernia	**Frequency (n)**	**Percentage (%)**
Inguinal Hernia	54	60
Umbilical Hernia	14	15.6
Incisional Hernia	12	13.3
Femoral Hernia	6	6.7
Epigastric Hernia	4	4.4
Total	**90**	**100**

Table 4 shows the distribution of the type of surgical procedures performed among the study participants (n = 90). The majority of patients underwent open hernioplasty (mesh repair), accounting for 62 cases (68.9%), indicating that it was the most commonly preferred surgical technique for hernia management in this study. Open herniorrhaphy (non-mesh repair) was performed in 18 patients (20%), representing the second most common procedure. In contrast, laparoscopic hernia repair was carried out in only 10 patients (11.1%), making it the least frequently performed technique. Overall, the findings suggest that open surgical approaches, particularly mesh repair, were predominantly utilized for hernia treatment in the study population.

Table 4: Type of Surgical Procedure Performed (n = 90)		
Surgical Procedure	**Frequency (n)**	**Percentage (%)**
Open Hernioplasty (Mesh Repair)	62	68.9
Open Herniorrhaphy (Non-mesh Repair)	18	20
Laparoscopic Hernia Repair	10	11.1
Total	**90**	**100**

Table 5 shows the postoperative outcomes of hernia repair among the study participants (n = 90). The majority of patients experienced complete recovery without complications, accounting for 64 cases (71.1%), indicating a favorable surgical outcome in most patients. Minor complications such as seroma

and wound infection were observed in 16 patients (17.8%), suggesting that although complications occurred, they were generally manageable and not severe. Major complications were reported in 6 patients (6.7%), representing a relatively small proportion of the study population. Recurrence of hernia was noted in 2 patients (2.2%), indicating a low recurrence rate following surgical repair. Mortality was also reported in 2 patients (2.2%), which may be attributed to associated comorbidities or postoperative complications. Overall, the findings demonstrate that hernia repair resulted in satisfactory postoperative outcomes for the majority of patients, with relatively low rates of severe complications, recurrence, and mortality.

Table 5: Postoperative Outcomes of Hernia Repair (n = 90)

Outcome	Frequency (n)	Percentage (%)
Complete recovery without complications	64	71.1
Minor complications (seroma/wound infection)	16	17.8
Major complications	6	6.7
Recurrence	2	2.2
Mortality	2	2.2
Total	**90**	**100**

Discussion

The current research assessed the demographic information and hernia types and surgical techniques and postoperative results of patients who underwent hernia repair procedures at a tertiary care hospital. The study results were compared with existing research from various locations to identify the commonalities and differences between hernia patterns and surgical results.

The study found that hernia appeared more frequently among middle-aged and elderly people. The study showed that 51 to 60 years and above 60 years age groups made up 48.8 percent of the total study population. Malik et al. (2010) [10] reported similar results because they found that elderly patients who needed inguinal hernia surgery showed higher rates of surgery requirements after they reached 50 years because their abdominal wall muscles lost strength and their intra-abdominal pressure increased with aging. The study by Mansouri et al. (2005) [11] found that elderly patients showed high rates of abdominal surgery including hernia repair because their age-related medical conditions and body changes contributed to their hernia development. The studies show similar results because aging creates a major risk factor that leads to hernia development.

The study found that male patients made up 75.6 percent of the study group while female patients accounted for 24.4 percent of the total. Earlier studies on epidemiological data show that these findings match with previous research. Schneider (2011) [12] reported that inguinal hernia occurs far more frequently in men due to anatomical differences such as the presence of the inguinal canal and the descent of the testes which create a natural weakness in the abdominal wall. The Epocrates database reports that approximately 90 percent of inguinal hernia cases occur in males while only about 10 percent of cases affect females (Epocrates 2010) [13]. The current study found male patients made up 75.6 percent of the research population which shows a pattern that matches previous studies that found most patients undergoing hernia repair were male. The higher prevalence of the condition in males can be attributed to their work environment which requires them to perform physical labor and their bodies which experience higher intra-abdominal pressure.

The present study found that inguinal hernia should be considered the most prevalent hernia type because it made up 60% of all hernia cases. The second most prevalent hernia type was umbilical hernia with a rate of 15.6% and third most common type was incisional hernia which occurred in 13.3% of cases. Lau (2002) found that inguinal hernia represents the most common abdominal wall hernia type which makes up about 70 to 75 percent of all worldwide hernia cases (Lau, 2002) [14]. The present study found that inguinal hernias occurred at a rate of 60% which represents a lower rate than the worldwide estimate because of differences in healthcare access and referral systems used by different study locations.

The research show that surgical procedures used in the present study most frequently selected open herniorrhaphy with mesh repair which accounted for 68.9% of operations whereas open herniorrhaphy without mesh was selected in 20% of cases and laparoscopic repair was used in only 11.1% of operations. The results of this study match the findings of multiple international research studies. The Lichtenstein tension-free mesh repair serves as the most common surgical technique in Paajanen and Varjo (2010) [15] research because its usage becomes popular among medical facilities thanks to its easy-to-use design which maintains safe operations and results in a low rate of patient return. Hynes et al. (2006) [16] research showed that patients who choose laparoscopic repair experience less postoperative pain and faster recovery but need to pay higher expenses than open mesh repair users which makes

it difficult to extend this technique across various medical facilities. McCormack et al. (2005) [17] found through their systematic review that hospitals need specialized tools and staff who possess specific skills in order to perform laparoscopic hernia repair procedures (McCormack et al., 2005). The current study showed that open mesh repair procedures served as the main surgical method because of these research findings.

The study found that postoperative results showed positive results. The study showed that 71.1 percent of patients achieved complete recovery without experiencing any medical issues. The study revealed that 17.8 percent of cases experienced minor complications while 6.7 percent of patients developed major complications. The study found that 2.2 percent of cases resulted in recurrence while 2.2 percent of cases resulted in death. Previous research studies have reported similar outcomes to the current study results. Paajanen (2002) observed low recurrence rates following Lichtenstein mesh repair and reported that postoperative complications such as infection or chronic pain were relatively uncommon when the procedure was performed appropriately. The research by Malik et al. (2010) determined that elderly patients experience higher risks of postoperative complications because of their existing medical conditions yet hernia surgery continues to show high success rates especially with mesh repair techniques. The present study demonstrated that surgical procedures resulted in positive outcomes, which occurred with minimal complications and recurrence rates.

The current research results show that hernia epidemiology patterns and treatment methods have not changed since earlier studies. The majority of research studies have found that males experience higher rates of hernia while older individuals show more frequent hernia occurrences and inguinal hernia remains the most common type. The surgical method of open mesh repair remains the most common procedure used in hospitals because of its successful results and low costs and simple implementation. The study results show that present surgical methods successfully treat hernias according to their results. The research results help establish new evidence which demonstrates that urgent surgical treatment needs to be performed within specific timeframes to guarantee patients achieve their best health results.

Conclusion

The present retrospective study evaluated the pattern and surgical outcomes of hernia repair among patients treated at a tertiary care hospital. The findings demonstrated that hernia was more commonly observed among middle-aged and elderly individuals, particularly those above 50 years of age. A clear male predominance was also noted among the study participants. Inguinal hernia emerged as the most common type of hernia, followed by umbilical and incisional hernias. Regarding surgical management, open hernioplasty with mesh repair was the most frequently performed procedure, indicating its preference in routine clinical practice. Postoperative outcomes were generally favorable, with the majority of patients achieving complete recovery without complications, while only a small proportion experienced minor or major complications, recurrence, or mortality. Overall, the study highlights that timely surgical intervention and appropriate surgical techniques contribute to satisfactory outcomes in the management of hernia in tertiary care settings.

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