

# A Cross Sectional Study on Types, Clinical Assessment and Management of Inguinal Hernia

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## ABSTRACT

**Background:** Hernias can be due to a birth defect, an injury, or repeated strain on the tissue. An inguinal hernia occurs close to the groin area in the abdomen. They develop a bulge of abdominal contents into the left or right inguinal canal through an abdominal wall defect. The main aim was to determine the clinical characteristics and surgical procedure used in patients with Inguinal Hernia and analyze the drugs used in both the preoperative and postoperative management of Inguinal Hernia. **Materials and Methods:** It is a cross-sectional observational study conducted in the Department of Surgery at The Government Medical College and Hospital, Nagapattinam, for six months. **Results:** A total of 89 patients fulfilled the criteria for eligibility. Among those patients, 62 had Inguinal hernias, where males showed a higher predominance than females ( $p = 0.056$ ). The average mean age of inguinal hernia patients was  $51 \pm 13$  years ( $p = 0.021$ ). The most common type of inguinal hernia was an indirect variety with 48 patients ( $p = 0.059$ ), which occurs mostly on the right side in 61.1% of male patients and 38.9% of female patients. Hernioplasty was the most widely used technique in surgical management; it also required a lesser number of hospital stays (1–11 compared to herniorrhaphy, 1–13), and analgesics were mostly given for both pre-operative and post-operative management. **Conclusion:** The problem with hernias is that they are often seen as a minor issue, but they are quite debilitating. Awareness campaigns can help show people that hernias should be taken seriously and can be prevented in earlier stages.

**Keywords:** Hernia, Inguinal Hernia, Surgical management, Hernioplasty.

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## INTRODUCTION

Hernias can occur anywhere in the body, but most commonly in the abdominal area. Hernias occur when there is a weakness or defect in the muscle or tissue that forms the wall of a cavity. This can be due to a birth defect, an injury, or repeated strain on the tissue. The word “hernia” is derived from the Greek (hernias), meaning a bud or shoot. Hernias can be either congenital or acquired.<sup>1-3</sup> Based on anatomical location, the World Society of Emergency Surgery (WSES) broadly divides abdominal wall hernias into groin hernias and ventral hernias.<sup>4</sup>

In surgical practise, hernias are regularly seen and account for 15% to 18% of all surgical procedures. Each year, more than 20 million hernia operations are performed worldwide.<sup>5</sup> Endogenous and exogenous multifactorial processes are involved

in the formation of hernias, which include age, gender, anatomic variations, smoking, comorbidity, and surgical factors.<sup>6</sup> Hernia is divided into external and internal types: External types (Inguinal hernia, Femoral hernia, Incisional hernia, Epigastric hernia, and umbilical hernia) and internal types (Esophagia hernia, Paraesophageal hernia).<sup>7</sup> In the area of the abdomen next to the groin, an inguinal hernia develops. They develop a bulge of abdominal contents into the left or right inguinal canal through an abdominal wall defect. This type of hernia leads to pain, coughing, bending over, or lifting heavy weights, especially when it results in bulging.<sup>8,9</sup> The inguinal canal is a passageway in the lower abdominal region that carries the spermatic cord in men and the ligament that helps hold the uterus in place in women. Hernias can occur when connective tissue from the uterus attaches to surrounding tissue in the canal.<sup>10</sup>

Surgery is the most common treatment for all types of hernias. Multiple repair techniques are available to treat inguinal hernias, according to the patient’s life as well as surgical preferences and the appropriate treatment care given to the individualised patient. (Open anterior repairs, Open Posterior Repairs, Tension-Free Repair (Mesh), Laparoscopic Procedures).<sup>11</sup>



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Hernia repair can be performed under spinal, epidural, general, and local anesthesia, and postoperative analgesia is now regarded as an integral part of surgical care.<sup>12</sup> Insufficient analgesia can have significant pathophysiological and psychological effects manifesting as hemodynamic changes, tachypnoea, altered gastrointestinal motility, and impaired urinary tract function.<sup>13</sup> Surgical procedures and drug prescribing are essential in patients with hernia, so the current study is an attempt to determine the clinical characteristics and surgical procedures used in patients with Inguinal Hernia and to analyze the drugs used in both the pre-operative and post-operative management of Inguinal Hernia.

## MATERIALS AND METHODS

### Study Design

Cross-sectional observational study.

### Study period

The study duration starts from April 2022 to September 2022, for six months.

### Place of study

445-bedded Government Medical College and Hospital, Nagapattinam, Tamil Nadu.

### Study Methodology

Patients receiving treatment at the Government Medical College and Hospital were provided detailed information about the study. Patients willing to participate must complete an informed consent form. A well-designed data collection form was developed to collect the patient's information. Through the patient's case sheets and an interview with the patient, data was gathered on the patient's demographics, lifestyle, medication, anesthetic used, surgical data, and procedures.

Patients of either sex, age 18 or more, and patients who are diagnosed with hernias are included in the study. Patients with intraabdominal malignancies, irreducible or obstructed hernias, pregnant women with incisional hernias, and their recurrent hernias have been excluded from the study.

### Statistical analysis

Data were entered in MS Excel and analyzed using SPSS Statistics for Windows Version IBM 22. A descriptive statistical tool such as a percentage, mean, or range is used to assess the pertinent data. The Chi-square test and student's *t*-test were used to test for significant correlation between variables. *p*-values <0.05 were accepted as statistically significant.

## RESULTS

The study lasted 6 months, and all the information was gathered from the Department of Surgery at the Government Medical College and Hospital. In total, 89 patients were included after meeting the inclusion and exclusion criteria of the study.

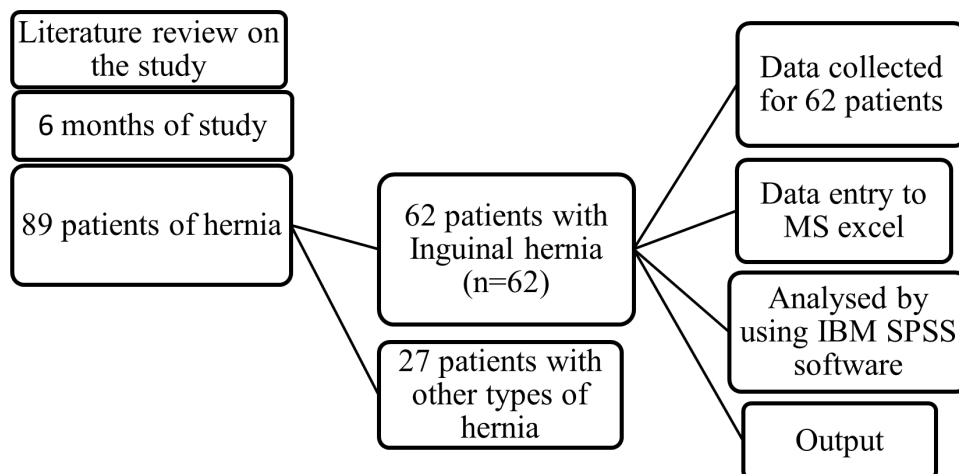
### Sample characteristics

Among the study population, 62 patients had Inguinal hernias, where males show higher predominance over females in the inguinal hernia and also in the other types (umbilical-14 and incisional-13) of hernias, which is also statistically significant (*p* = 0.056). The average mean age of inguinal hernia patients was 51±13 years (*p* = 0.021). Also, the average BMI of the patients with inguinal hernia was 25.5±6 (*p* = 0.0315). These findings are shown in Table 1.

### Clinical characteristics of inguinal hernia

According to our findings, patients with Inguinal hernias are more common in males (*n* = 35) than females (*n* = 27). The most commonly occurring type of inguinal hernia was an Indirect variety, with 58.3% in males and 41.7% in females (*p* = 0.059).

### Method of study



The site of occurrence in the stomach mostly on the right side, with 61.1% of males and 38.9% of females' patients. Involvement of Inguinal hernias in the abdomen cavity larger than 5 cm was more common in males (58.8%) and females (41.2%),  $p = 0.043$ . None of the patients had any complications due to the anesthetic technique; regional anesthetics were highly performed. The surgical management of an inguinal hernia in open mesh repair can be hernioplasty, where the hernia is repaired with stitches, or herniorrhaphy, where the hernia is required with mesh. Patients who had undergone surgery for the inguinal hernia underwent Hernioplasty ( $n = 50$ ), which was highly used compared to herniorrhaphy ( $p = 0.026$ ). These findings are shown in Table 2.

Patients who had undergone the surgery of hernioplasty in the inguinal hernia had hospital stays ranging from 1–11 (5.0–2.5) days, which required a lesser number of stays in the hospital compared to that herniorrhaphy. These findings are shown in Table 3.

### Prescribing pattern of drugs in both the pre-operative and post-operative period in Inguinal Hernia

Analgesics were mostly used in the pre- and post-operative management, with paracetamol at 61.2%, followed by lignocaine at 37%, diclofenac at 32%, and tramadol at 31% in the pre-operative management, and diclofenac at 80.6%, paracetamol at 74.1%, and tramadol at 39% in the post-operative management in the patients with inguinal hernia.

On prophylaxis of surgical site infections, antibiotics were also given highly in both the pre-(cefotaxime, 61.2%, and ceftriaxone, 26%) and post-(cefotaxime, 71.4%, and ceftriaxone, 32.2%) management of inguinal hernias.

There is a similarity in the medications between pre- and post-surgery inguinal hernia patients (analgesics and antibiotics). The antibiotic linezolid (19.3%) was used in patients with postoperative inguinal hernia. Lignocaine (37%), which was

**Table 1: Basic characteristics of patients with hernia.**

Sl. No.	Characteristics		Inguinal hernia			p value
			Yes (n = 62)	No (n = 27)	Total (n = 89)	
1	Sex	Male	35	15	50	0.056*
		Female	27	12	39	
2	Age (years)		51±13	48±15		0.021**
3	BMI		25.5±6	24.3±3		0.315**

\*chi-square test \*\* Student's *t*-test.

**Table 2: Clinical characteristics and surgical procedures in inguinal hernia.**

Characteristics of inguinal hernia	Male (n = 35)	Female (n=27)	Total (n = 62)	p value*
Type of Inguinal Hernia				0.059
Direct	7(50%)	7(50%)	14(22.5%)	
Indirect	28(58.3%)	20(41.7%)	48(77.5%)	
Side of Occurrence				0.270
Right	22(61.1%)	14(38.9%)	36(58.6%)	
Left	13(50%)	13(50%)	26(41.4%)	
Size of Inguinal Hernia				0.043
<5 cm	15(53.6%)	13(46.4%)	28(45.2%)	
>5 cm	20(58.8%)	14(41.2%)	34(54.8%)	
Anesthetic Type Used in Surgery				0.524
Local	10(58.8%)	7(41.2%)	17(27.4%)	
Regional	25(55.6%)	20(44.4%)	45(72.6%)	
Surgical Management (Open mesh repair)				0.026
Hernioplasty	29(58%)	21(42%)	50(80.6%)	
Herniorrhaphy	6(50%)	6(50%)	12(19.4%)	

**Table 3: Duration of Hospital stays.**

	Hernioplasty	Herniorrhaphy
Range (days)	1-11	1-13
Mean (days)	5.0±2.5	6.8±2.8

**Table 4: Drugs used in Inguinal hernia.**

Pre-operative management of hernia				Post-operative management of hernia			
Sl. No.	Drugs	n = 62	Percentage	Sl. No.	Drugs	n = 62	Percentage
1	Paracetamol	38	61.2	1	Diclofenac	50	80.6
2	Cefotaxime	38	61.2	2	Cefotaxime	46	74.19
3	Ranitidine	36	58	3	Paracetamol	46	74.19
4	TT	36	58	4	Ranitidine	36	58
5	Lignocaine	23	37	5	BCT	27	43.5
6	Diclofenac	20	32	6	Tramadol	24	39
7	Tramadol	19	31	7	Ceftriaxone	20	32.2
8	Ceftriaxone	16	26	8	Linezolid	12	19.3

only used in pre-operative management, was used for ulcerative management; ranitidine received 58% in both preoperative and postoperative management. These findings are shown in Table 4.

## DISCUSSION

The current study witnessed males ( $n = 50$ ) predominance over females in all types of hernias, yet it was similar to the study of Basavaraj Badadal *et al.*,<sup>1</sup> which had males ( $n = 57$ ) predominance over females. The mean age  $\pm$  SD of the inguinal hernia patients in the study population ( $51 \pm 13$  years) was found to be similar to that reported earlier as  $50.67 \pm 17.59$  years in the study of Anitha *et al.*,<sup>14</sup> The study population had a total of 62 inguinal hernias, with most of them being indirect types of hernias (77.5%). It is relevant to the study of Vaishali Bapat *et al.*,<sup>15</sup> in which there were indirect types with 65%. Patients getting hernias on the right side ( $n = 36$ ) of the stomach was higher than the left side and it is similar to the reports of Anitha *et al.*,<sup>14</sup> ( $n = 95$ ). This may be due to the attachment of the small bowel and mesentery to the right side of the midline. The attachments of the bowel loops on the right side allow them to remain in the right groin more easily. In our study population, 45 patients were involved in anesthetic care for regional anesthetic in hernia surgery and it is relevant to Jolon AM *et al.*,<sup>16</sup> Hernioplasty (80.6%) may be particularly beneficial in older, less healthy patients, and herniorrhaphy (19.6%) is usually reserved for inguinal hernias due to Mesh repair being the standard procedure applicable for most of the population. This is similar to the study of Agrawal *et al.*,<sup>17</sup> and Nitin Kalaskar *et al.*,<sup>18</sup> in which most of their ( $n = 38$ ) patients received surgery for hernioplasty. The mean length of hospital stays ( $5.0 \pm 2.5$  days) was found to be less when compared to the study conducted by Kai Xiong Cheong *et al.*,<sup>19</sup> ( $2.7 \pm 10.9$  days) in an hernioplasty surgery. Third-generation cephalosporin was the antibiotic used

in the most common cases of abdominal wall hernia. Cefazolin was the antibiotic used in studies done by Hill C *et al.*,<sup>20</sup> two grammes of Cephalosporins were given intravenously 1 hr before induction of anesthesia, and acetaminophen and calcium channel blockers were commonly used in our study due to decreased causes of symptoms and according to their co-morbidities, which is similar to our study in that antibiotics and analgesics are given before and after the surgery for inguinal hernia.

## CONCLUSION

Hernias occur when there is a weakness or a defect in the muscle or tissue that forms the wall of a cavity, and they should be followed for a longer period to allow for the development of complications. Hernias can vary greatly in size, and the smaller ones may not be noticeable until they become more pronounced.

Inguinal hernias are the most commonly seen type of hernia and occur when a portion of the small intestine protrudes through a weakness in the abdominal wall. Surgery is the only way to repair an inguinal hernia, and the procedure must be performed by a qualified surgeon who has a thorough knowledge of the anatomy to avoid complications.

A quality assessment of hernia surgery is essential. It is necessary for education and the evaluation of new methods. It is also essential for enhancing and defending accomplishments for surgeons and surgical units. We have a long way to go to make hernia repair a "once-in-a-lifetime experience" for our patients.

The problem with hernias is that they are often seen as a minor issue, but they are quite debilitating. Awareness campaigns can help show people that hernias should be taken seriously and can be prevented in earlier stages.

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## CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

## ABBREVIATIONS

**WSES:** World Society of Emergency Surgery; **IG:** Inguinal Hernia; **BMI:** Body Mass Index; **SD:** Standard Deviation; **TGMCH:** The Government Medical College and Hospital; **OMR:** Open Mesh Repair; **IPD:** Inpatient Department; **IBM:** International Business Machines; **SPSS:** Statistical Package for Social Science; **MS:** Microsoft; **N:** Number; **CM:** Centimetre; **TT:** Tetanus Toxoid; **BCT:** Vitamin B Complex Tablet.

## SUMMARY

Hernias occur when there is a weakness or defect in the muscle or tissue that forms the wall of a cavity. In the area of the abdomen next to the groin, an inguinal hernia develops. They develop a bulge of abdominal contents into the left or right inguinal canal through an abdominal wall defect. In total, 89 patients were included after meeting the inclusion and exclusion criteria of the study. Among those 62 patients had Inguinal hernias, and the average mean age of inguinal hernia patients was  $51 \pm 13$  years.

The most commonly occurring type of inguinal hernia was an Indirect variety (77.5%), with the site of occurrence in the stomach mostly on the right side with involvement  $>5$  cm. Regional anesthetics were highly used during the surgery (72.6%). The surgical management of an inguinal hernia in open mesh repair can be hernioplasty or herniorrhaphy, with hernioplasty 80.6% highly used compared to herniorrhaphy 19.4%, and the duration of hospital stays in hernioplasty ranging from 1–11 (5.0–2.5) days, which required a lesser number of stays in the hospital compared to herniorrhaphy. Analgesics were mostly used in the pre- and post-operative management, with paracetamol at 61.2%, diclofenac at 32% in the pre-operative management, diclofenac at 80.6%, and paracetamol at 74.1% in the post-operative

management in the patients with inguinal hernia. Surgery is the only way to repair an inguinal hernia, and the procedure must be performed by a qualified surgeon who has a thorough knowledge of the anatomy to avoid complications.

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