

Original Research Article

Comparative Efficiency between Laparoscopic versus Open Surgery for Inguinal Hernia Repair

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Abstract: Background: The lifetime incidence of inguinal hernia is 3% in women and 27% in males. Although surgery is the advised course of action, opinions on the most effective technique are divided. Though there are worries about the possibility of chronic groin pain, open repair is the most common method. The recurrence rate of laparoscopic repair is yet unknown, but it is becoming more and more accepted because of the decreased risk of chronic discomfort. This overview compares the risk of chronic groin pain and recurrence between laparoscopic and open inguinal hernia repairs. **Objective:** The aim of this study is to assess the comparative efficiency between laparoscopic versus open surgery for inguinal hernia repair. **Methods:** The cross-sectional observational study was conducted in the Department of Surgery, Avicenna Hospital Limited, Sirajganj, Bangladesh, from July 2022 to June 2023. A total of 50 patients were enrolled and analyzed in this study. The questionnaire was pretested, corrected and finalized. Data were collected by face-to-face interview and analyzed by appropriate computer based programmed software Statistical Package for the Social Sciences (SPSS), version 24. **Results:** In this study, maximum study patients were in the 41 – 50 years age group. The mean age of the study patients was 41.2 ± 9.2 and 45.1 ± 13.2 years in Laparoscopic surgery and Open surgery group respectively. Most of the patients 22(88.0%) and 23 (92.0%) were male in Laparoscopic surgery group and Open surgery group. About 12 (48.0%) and 8 (32.0%) patients BMI were in between 25.0 – 29.9 kg/m², 6 (24.0%) and 14 (56.0%) patients BMI in between 18.5 – 24.9 kg/m² and 7(28.0%) and 3(12.0%) of the patients were overweight (>30 kg/m²) in both Laparoscopic surgery and Open surgery group. Mean \pm SD of the study subjects was 25.13 ± 3.12 and 24.02 ± 2.72 years in Laparoscopic surgery and Open surgery group respectively. The period of complaint prior to surgery was 1 – 2 months of 14(56.0%) patients in Laparoscopic surgery group and >2 months of 15(50.0%) patients in Open surgery group. The period of complaint prior to surgery was marginally longer in OS group, at 1.5 ± 0.21 months than in the laparoscopic surgery group, at 1.1 ± 0.12 months. most of the hernia 6(24.0%) in laparoscopic group and 7(28.0%) and 8(32.0%) in the open surgery group were right direct and right indirect. The average operative time for the open surgery group was 56.17 ± 10.12 minutes. In contrast, in laparoscopic group had a prolonged average operative time of 88.10 ± 15.16 minutes. The average days of hospitalization after surgery were 1.8 ± 0.27 in laparoscopic and 2.13 ± 0.31 in the open surgery group and the average time to return to normal life activities were 6 ± 1.8 and 13.5 ± 1.6 in laparoscopic and open surgery group respectively. In the laparoscopic group, pain and seroma formation was found in 2(8.0%) and 1(4.0%) patient. In contrast, in the OS group, pain and seroma formation was found in 8(32.0%) and 3 (12.0%) patients and wound infection was found in 1(4.0%) patient. **Conclusion:** It has been established that laparoscopic hernia repair is preferable than open hernia repair in terms of less post-operative discomfort, shorter hospital stay, and an earlier return to activities. Open hernia repair is frequently referred to as Lichtenstein surgery. On the other hand, there was no discernible difference between the two groups

regarding post-operative problems including seroma development and wound infections.

Keywords: Inguinal hernia surgery, Laparoscopic repair, Open repair, Primary hernia, Recurrent hernia.

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INTRODUCTION

The approach of repair for inguinal hernias has evolved over the past few decades, and ongoing research is being done in this field. Inguinal hernias are prevalent surgical difficulties [1]. Femoral hernias and direct and indirect inguinal hernias are the two types of groin hernias [2]. An indirect hernia, the most common kind of inguinal hernia, is caused by the peritoneum—with or without peritoneal contents—protruding laterally to the inferior epigastric veins when the internal inguinal ring is patent. Historically, open approaches have been used to handle hernioplasty, a common general surgery procedure. However, the introduction of minimally invasive surgery has changed the landscape in the last 20 years [3, 4].

While female hernias may follow the round ligament into the labia majora, male hernias may develop along the spermatic cord and ultimately reach the scrotum [5]. Abdominal wall hernias are common, with an incidence of 1.7% overall and 4% in those over 45. Inguinal hernias account for 75% of all abdominal wall hernias and affect 3% of women and 27% of men throughout the course of a lifetime [6].

The most common method of mesh repair is thought to be the Lichtenstein tension-free mesh repair, in which the mesh is placed anteriorly between the external and internal oblique aponeuroses [7]. Other open mesh techniques include the plug-and-patch technique, the Gilbert Prolene Hernia System (PHS) bilayer-linked device repair, and the implantation of an open preperitoneal mesh through an inguinal incision after hernia reduction; however, the current guidelines do not generally recommend these procedures [8, 9]. Transabdominal preperitoneal repair (TAPP) and total extraperitoneal repair (TEP) are two of the most common laparoscopic (keyhole) surgeries. Laparoscopic operations have increased in popularity recently, and some surgeons have noted a decrease in the incidence of chronic post-operative discomfort. Concerns about the possibility of recurrence after TEP repair, however, still exist [10].

Comparing laparoscopic hernia repair to traditional anterior herniorrhaphy, individuals may recover more quickly. It is yet unknown if the process can be carried out in a safe and efficient manner. Maintaining low recurrence rates, quickly returning the

patient to work, and adhering to the fundamentals of classic hernia repair are all necessary for long-term success. However, there are conflicting results about the incidence of infection and morbidity after surgery. Studies on laparoscopic operations show varying rates of complications, including intraabdominal abscesses. While some studies show equivalent or even lower rates, others show higher risks, particularly in more difficult surgical situations [11, 12].

In addition to enhancing the patient's experience, a speedier recovery lessens the financial and societal costs linked to an extended convalescence. Even though the quick recovery after laparoscopic surgery is a common selling point, actual data comparing laparoscopic surgery to open surgery is needed to substantiate such claims [13].

The decision between laparoscopic and open surgery takes the patient's risks and advantages into account in addition to the surgeon's expertise [14]. This study compares infection rates and traces recovery rates for both methods in an effort to improve the knowledge base for patients and clinicians. As the medical sector constantly advances, consistently evaluating the overall results, safety, and efficacy of these surgical methods remains a cornerstone of providing great patient care.

METHODOLOGY

The cross-sectional observational study was conducted in the Department of Surgery, Avicenna Hospital Limited, Sirajganj, Bangladesh, from July 2022 to June 2023. A total of 50 patients were enrolled and analyzed in this study. Patients who matched the inclusion and exclusion criteria were approached for participation in the study. Patients who were not willing to give consent were excluded. Purposive sampling was done according to the availability of the patients who fulfilled the selection criteria. Face to face interview was done to collect data with a semi-structured questionnaire. After collection, the data were checked and cleaned, followed by editing, compiling, coding, and categorizing according to the objectives and variable to detect errors and to maintain consistency, relevancy and quality control. Statistical evaluation of the results used to be obtained via the use of a window-based computer software program devised with Statistical Packages for Social Sciences (SPSS-24).

RESULT

Table I: Distribution of the patients according to age (n = 50)

Age (years)	Laparoscopic surgery (n=25)	Open surgery (n=25)
20 - 30	2(8.0)	1(4.0)
31 - 40	8(32.0)	9(36.0)
41 - 50	12(48.0)	13(52.0)
>50	3 (12.0)	2(8.0)
Mean ± SD	41.2 ± 9.2	45.1 ± 13.2

Table I shows that, maximum study patients were in the 41 – 50 years age group. The mean age of the study patients was 41.2 ± 9.2 and 45.1 ± 13.2 years in

Laparoscopic surgery and Open surgery group respectively.

Table II: Distribution of the patients according to sex (n = 50)

Sex	Laparoscopic surgery (n=25)	Open surgery (n=25)
Male	22(88.0)	23(92.0)
Female	3(12.0)	2 (8.0)

Table II shows that, most of the patients 22(88.0%) and 23 (92.0%) were male in Laparoscopic surgery group and Open surgery group

Table III: Distribution of the patients according to Body Mass Index (n = 50)

Body Mass Index (kg/m ²)	Laparoscopic surgery (n=25)	Open surgery (n=25)
18.5 – 24.9	6 (24.0)	14 (56.0)
25.0 – 29.9	12 (48.0)	8 (32.0)
>30	7 (28.0)	3 (12.0)
Mean ± SD	25.13 ± 3.12	24.02 ± 2.72

Table III shows that, 12 (48.0%) and 8 (32.0%) patients BMI were in between 25.0 – 29.9 kg/m², 6 (24.0%) and 14 (56.0%) patients BMI in between 18.5 – 24.9 kg/m² and 7(28.0%) and 3(12.0%) of the patients were overweight (>30 kg/m²) in both Laparoscopic

surgery and Open surgery group. Mean ± SD of the study subjects was 25.13 ± 3.12 and 24.02 ± 2.72 years in Laparoscopic surgery and Open surgery group respectively.

Table IV: Distribution of the patients according to period of complaint (n = 50)

Period of complaint (months)	Laparoscopic surgery (n=25)	Open surgery (n=25)
≤ 1 month	5(20.0)	2(8.0)
1 – 2 months	14(56.0)	8(32.0)
>2 months	6(24.0)	15(50.0)
Mean ± SD	1.1 ± 0.12	1.5 ± 0.21

Table IV shows that, the period of complaint prior to surgery was 1 – 2 months of 14(56.0%) patients in Laparoscopic surgery group and >2 months of 15(50.0%) patients in Open surgery group. The period of

complaint prior to surgery was marginally longer in OS group, at 1.5 ± 0.21 months than in the laparoscopic surgery group, at 1.1 ± 0.12 months

Table V: Distribution of the patients according to type of hernia (n = 50)

Type of hernia	Laparoscopic surgery (n=25)	Open surgery (n=25)
Bilateral direct	4(16.0)	1(4.0)
Bilateral indirect	1(4.0)	1(4.0)
Right direct	6(24.0)	7(28.0)
Left direct	3(12.0)	4(16.0)
Right indirect	6(24.0)	8(32.0)
Left indirect	5(20.0)	4(16.0)

Table V shows that, most of the hernia 6(24.0%) in laparoscopic group and 7(28.0%) and

8(32.0%) in the open surgery group were right direct and right indirect.

Table VI: Distribution of the patients according to average operative time (n = 50)

Average operative time (minutes)	Laparoscopic surgery (n=25)	Open surgery (n=25)
50 - 65	0(0)	7 (28.0)
66 - 80	2(4.0)	11 (44.0)
81 - 95	12(48.0)	5 (20.0)
96 - 110	9(36.0)	2 (4.0)
>110	2(4.0)	0 (0)
Mean ± SD	88.10 ± 15.16	56.17 ± 10.12

Table VI shows that, average operative time for the open surgery group was 56.17 ± 10.12 minutes. In

contrast, in laparoscopic group had a prolonged average operative time of 88.10 ± 15.16 minutes.

Table VII: Distribution of the patients according to days of hospitalization after surgery and return to normal life activities (n = 50)

Variables	Laparoscopic surgery (n=25)	Open surgery (n=25)
Days of hospitalization after surgery	1.8 ± 0.27	2.13 ± 0.31
Return to normal life activities	6 ± 1.8	13.5 ± 1.6

Table VII shows that, the average days of hospitalization after surgery were 1.8 ± 0.27 in laparoscopic and 2.13 ± 0.31 in the open surgery group

and the average time to return to normal life activities were 6 ± 1.8 and 13.5 ± 1.6 in laparoscopic and open surgery group respectively.

Table VIII: Distribution of the patients according to post-operative complications reported during follow-up (n = 50)

Post-operative Complications	Laparoscopic surgery (n=25)	Open surgery (n=25)
Pain	2 (8.0)	8 (32.0)
Seroma formation	1 (4.0)	3 (12.0)
Wound infection	0 (0)	1 (4.0)

Table VIII shows that, in the laparoscopic group, pain and seroma formation was found in 2(8.0%) and 1(4.0%) patient. In contrast, in the OS group, pain and seroma formation was found 8(32.0%) and 3 (12.0%) patients and wound infection was found in 1(4.0%) patient.

DISCUSSION

The cross-sectional observational study was conducted in the Department of Surgery, Avicenna Hospital Limited, Sirajganj, Bangladesh, from July 2022 to June 2023. A total of 50 patients were enrolled and analyzed in this study.

In this study, the maximum study patients were in the 41 – 50 years age group. The mean age of the study patients was 41.2 ± 9.2 and 45.1 ± 13.2 years in Laparoscopic surgery and Open surgery group respectively. Most of the patients 22(88.0%) and 23 (92.0%) were male in Laparoscopic surgery group and Open surgery group. In another study, the majority of study participants were male (94%), and 40% of them were between the ages of 41 and 55. They documented 84 inguinal hernia repairs, including both open (n=42)

and laparoscopic (n=42) hernia repairs. In this sample, the average age was 47.8 ± 14.3 years [15]. While Charles *et al.*, [16] stated that 93.2% of all their cases were male, Gupta *et al.*, [17] reported that inguinal hernia occurs 96% more frequently in men, demonstrating a low prevalence in females. The average age of study participants was 47.8 ± 14.3 years. About 12 (48.0%) and 8 (32.0%) patients BMI were in between 25.0 – 29.9 kg/m², 6 (24.0%) and 14 (56.0%) patients BMI in between 18.5 – 24.9 kg/m² and 7(28.0%) and 3(12.0%) of the patients were overweight (>30 kg/m²) in both Laparoscopic surgery and Open surgery group. Mean ± SD of the study subjects was 25.13 ± 3.12 and 24.02 ± 2.72 years in Laparoscopic surgery and Open surgery group respectively. The period of complaint prior to surgery was 1 – 2 months of 14(56.0%) patients in Laparoscopic surgery group and >2 months of 15(50.0%) patients in Open surgery group. The period of complaint prior to surgery was marginally longer in OS group, at 1.5 ± 0.21 months than in the laparoscopic surgery group, at 1.1 ± 0.12 months.

In the current study, most of the hernia 6(24.0%) in laparoscopic group and 7(28.0%) and

8(32.0%) in the open surgery group were right direct and right indirect. The average operative time for the open surgery group was 56.17 ± 10.12 minutes. In contrast, the laparoscopic group had a prolonged average operative time of 88.10 ± 15.16 minutes. In another study, a total of 28 (33%) of the 84 instances had right indirect hernias, whereas bilateral (2%) were rare. In the current study, it was shown that the average operating times for open and laparoscopic hernia repairs were 47.14 ± 7.2 minutes and 84.24 ± 13.8 minutes, respectively, for unilateral direct hernias, whereas 52.51 ± 5.61 minutes and 89.94 ± 9.54 for unilateral indirect hernias. Therefore, compared to open surgery, which was also consistent with other studies [18], the time needed to execute a laparoscopic hernia repair in cases of unilateral hernia, whether indirect or direct, was considerably longer ($p < 0.001$). The average time to repair a bilateral direct inguinal hernia using open surgery was 58.75 ± 6.8 minutes, while adopting a laparoscopic approach took 107.42 ± 8.9 minutes; in bilateral indirect hernias, it took 61.21 ± 3.87 minutes and 112.5 ± 5.73 minutes, respectively. Due to this, bilateral hernia laparoscopic repairs took longer than bilateral open mesh surgery. These findings are consistent with previous studies [19-21], but they contrast with other studies that showed no statistically significant difference in the mean operative times between the two groups [22, 23].

In the laparoscopic group, pain and seroma formation was found in 2(8.0%) and 1(4.0%) patient. In contrast, in the OS group, pain and seroma formation was found in 8(32.0%) and 3 (12.0%) patients and wound infection was found in 1(4.0%) patient. In another study, the open repair (Lichtenstein technique) in their study caused more post-operative pain than the laparoscopic repair (TEP), which (p -value <0.5) may be related to the considerable dissection required for tissue repair. As a result, since it is not statistically significant, the number of days of post-operative pain experienced after Lichtenstein's repair and a laparoscopic repair are not comparable. This study was in line with that of Shah *et al.*, [24]. Patient early mobilization and improved post-operative satisfaction are both enhanced by minimal postoperative discomfort [25].

In accordance with the current study, the average days of hospitalization after surgery were 1.8 ± 0.27 in laparoscopic and 2.13 ± 0.31 in the open surgery group and the average time to return to normal life activities were 6 ± 1.8 and 13.5 ± 1.6 in laparoscopic and open surgery group respectively. In another study, the average hospital stays following open and laparoscopic hernia repairs are 2.21 ± 0.41 days and 1.9 ± 0.29 days, respectively. The study observed that patients who underwent laparoscopic hernioplasty had significantly shorter hospital stays compared to those who underwent open surgery ($p < 0.001$). Specifically, the mean hospital stay for the laparoscopic group was 1.56 days, while for the open group, it was 1.9 days ($p = 0.002$) [26]. In open hernia surgery, there were nine cases of seroma

development, whereas laparoscopic hernia repair resulted in three cases ($p > 0.05$). This difference in seroma occurrence could potentially be associated with the use of a larger incision and/or the presence of a larger hernial sac. In the current study, laparoscopic and open hernia repairs took 14.5 days and seven days, respectively, to allow patients to return to their regular jobs. When compared to other studies [27], laparoscopic hernia repair took considerably less time to recover than open repair ($p < 0.001$). The results of other investigations were ambiguous in comparison with this [28].

CONCLUSION

The goal of the study was to compare the benefits of laparoscopic repair vs open surgery, as well as any possible drawbacks. Laparoscopic hernia repair is preferable over Lichtenstein surgery due to its reduced risk of complications, faster recovery period, and shorter hospital stay. Regarding complications following surgery, such as seroma development and wound infections, there were no statistically significant differences observed across the groups. Inguinal hernia correction is often considered to be better off with laparoscopic treatment, albeit with its own set of disadvantages, such as a lengthier recovery period. More research and longer follow-up are needed to evaluate persistent discomfort and recurrence rates following laparoscopic hernia surgery.

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