

# Assessment And Comparison Of Laparoscopic Hernia & Open Lichtenstein Repair A Retrospective Study

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## Abstract

**Objective:** Laparoscopic hernia repair (LH) is widely practiced, yet the available evidence regarding its superiority over Lichtenstein open hernia repair (OH) is still inconclusive. So, we compare the safety and effectiveness of LH and OH in this study.

**Study Design and Setting:** A retrospective comparative cross-sectional study was done in Civil Hospital Karachi and Bantva Memon Hospital Karachi for four years (Jan 2014- Dec 2017) using a non-probability consecutive sampling method.

**Methodology:** 84 patients were included, with 52 (62%) undergoing OH repair (Group A) and 32 (38%) undergoing LH (TAPP) repair (Group B). The mean operative time, complications, and duration of hospital stay were compared between the two groups.

**Results:** Our results showed that the mean operative time was significantly longer in Group B than in Group A (52±15 minutes vs 34±10 minutes, respectively). The incidence of scrotal hematoma was significantly lower in Group B than in Group A (1% versus 8%, respectively). The postoperative pain score was significantly higher in Group A than in Group B ( $P>0.01$ ), and the recovery time and time to return to work were significantly longer in the OH repair group, wound infection was observed in 6% of patients in Group A. The mean hospital stay was significantly shorter in Group B than in Group A (1±0.025 days versus 2±0.5 days, respectively).

**Conclusion:** Our study demonstrated that LH is a safe and effective technique associated with fewer complications compared to OH. These findings suggest that LH could be considered as a preferred method over LH.

**Keywords:** inguinal hernia Lichtenstein repair, laparoscopic hernia repair, Transabdominal preperitoneal repair (TAPP), Total extraperitoneal repair (TEP).

**Introduction:** The groin is a natural defect in the anterior abdominal wall, considered a weak muscular area in the inguinal region. It has been named after surgeon and anatomist Henri Fruchaud. The anatomical extents of this orifice are as follows: cranially and medially this is bordered by the conjoined tendon and the rectus abdominis muscle, laterally by the iliopsoas muscle, and caudally by the superior ramus of the os-pubis. This area is usually covered by the fascia transversalis, split in two by the inguinal ligament, and penetrated by the spermatic cord (in men)/round ligament (in women) and femoral vessels. The integrity of the area is hence primarily dependent on fascia transversalis, whose failure to sustain the preperitoneal fat and varying intraabdominal pressure is therefore the fundamental cause for the formation of congenital or acquired inguinal hernia. Inguinal hernias are treated by repairing the fascial defect in the myopectineal orifice of Fruchaud or by strengthening the weakened fascia transversalis by placement of a prosthesis (mesh). Inguinal hernia repair is a widely performed surgical procedure globally. Conventionally, inguinal hernias have been treated using open techniques such as herniorrhaphy or hernioplasty. However, with the evolution of minimally invasive surgery, laparoscopic inguinal hernia repair has gained popularity in recent years [1]. Open hernia repair encompasses various techniques, including the Lichtenstein repair, the Shouldice repair, and Bassini's repair - the oldest technique [2]. In contrast, laparoscopic hernia repair involves transabdominal preperitoneal (TAPP)

and total extraperitoneal techniques (TEP) [3]. The works done by Krishna and Simon demonstrated that the total extraperitoneal (TEP) approach for laparoscopic hernia (LH) repair is associated with fewer postoperative complications and faster recovery when compared to the open hernia (OH) repair technique [4,5]. In OH repair, mesh placement is performed via an anterior approach and is positioned interior to the transversalis fascia, while in LH repair, mesh placement is performed via a posterior approach and is positioned pre-peritoneal. The Lichtenstein hernia repair (open, tension-free mesh technique) is considered a simple and safe method for the treatment of inguinal hernia. The recurrence rate is low, both in the hands of experts and for the average surgeon [6,7,8]. With over 20 million surgeries per year, inguinal hernioplasty is the most commonly performed surgical procedure worldwide. The risk of developing inguinal hernia throughout the entire life is 27–43% for men and 3–6% for women [9]. Inguinal hernia (IH) accounts for 75% of all abdominal wall hernias with peaks around the age of 5 and after the age of 70 with a 90% incidence in men and approximately 800000 IH surgeries performed annually in the USA. In Bulgaria, this number reaches 20000 [10]. Inguinal hernias are always symptomatic, and the only cure is surgery. A minority of patients are asymptomatic but the end approach in this group results in surgery in approximately 70% within 5 years [13]. In Pakistan, for multiple reasons, laparoscopic surgery has not shown significant development beyond cholecystectomy. However, hernia repair using synthetic mesh has gained some acceptance although there is a lack of available published data to support this observation. The survey was conducted to find out the perceptions and practices of general surgeons in Karachi concerning various aspects of the management of inguinal hernias including their preferred technique of repair, type of anesthesia, and use of prophylactic antibiotics, and to describe the extent to which mesh repair has been assimilated into general surgical practice in Karachi [11]. Although LH repair is gaining popularity, it is premature to label it as the gold standard without further investigations through multiple studies. This retrospective study aimed to compare and analyze the outcome of LH and OH repair techniques in terms of operative and postoperative outcomes and also explore the advantages and disadvantages of laparoscopic hernioplasty by comparing them with conventional surgeries.

**Methodology:** A retrospective comparative study was conducted between January 2014 and December 2017 at Surgical Unit 1 of Civil Hospital Karachi and Bantva Memon Hospital Karachi to compare the operative and postoperative outcomes of laparoscopic trans-abdominal preperitoneal (TAPP) repair and open Lichtenstein repair for inguinal hernia. Ethical approval was obtained from the Ethical Review Committee of the hospital (serial number Ref: IRB-247/BMH/Approval/2018/60). A total of 84 adult patients, aged 18 years or above, with inguinal hernia were included using non-probability consecutive sampling. The study excluded patients with strangulated or incisional hernia and those who had undergone lower abdominal and pelvic surgery. Eight patients had recurrent inguinal hernias, and four had bilateral hernias.

The patients were randomly divided into two groups: Group A (52 patients) underwent classical Lichtenstein repair, while Group B (32 patients) underwent TAPP repair by an experienced surgeon. Primary outcomes, such as wound infection, scrotal hematoma, and postoperative pain, and secondary outcomes, such as operative time, hospital stay, and return to work, were recorded on a proforma promptly (immediately after the procedure, during a hospital stay, and at follow-up in the outpatient department). TAPP repair was performed using three ports, with the mesh placed preperitoneally and fixed with a tacker. The peritoneum was closed with Vicryl to isolate the mesh from the abdominal contents. Lichtenstein repair was performed using a classical inguinal incision placed 1-2 cm above the inguinal ligament. After dealing with the contents and sac, a proline mesh was placed over the transversalis fascia.

As a retrospective study, a sample size calculation was not applicable. Ethical considerations were followed throughout the study, and written informed consent was obtained from all participants before the procedure.

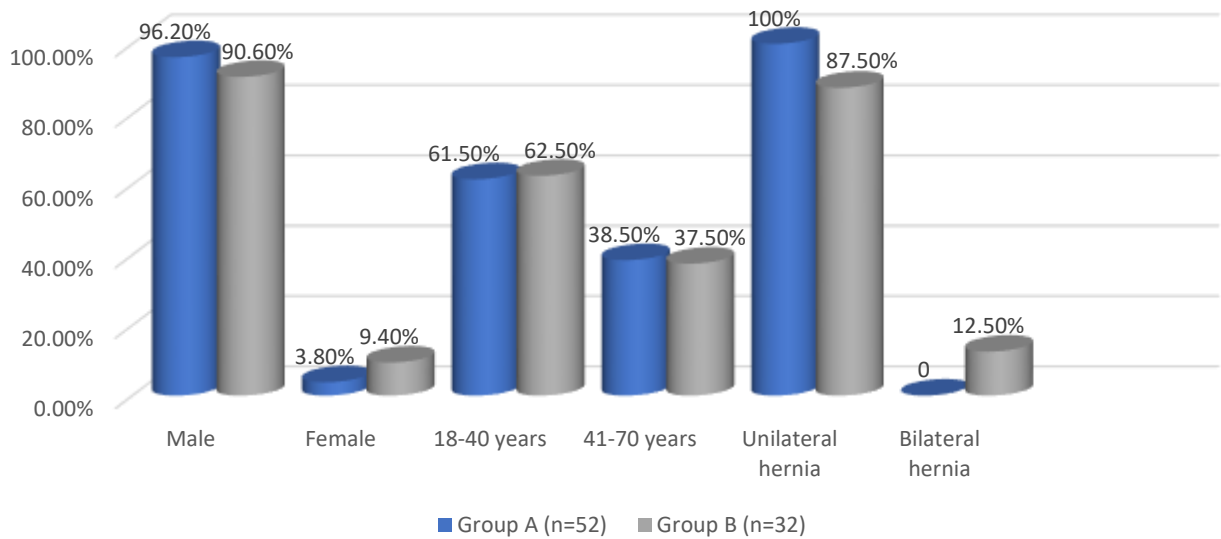
**STATISTICAL ANALYSIS:** The data obtained from the study were analyzed using the Statistical Package for Social Sciences (SPSS) version 23. Descriptive statistics were calculated for continuous variables, including mean, standard deviation, and minimum and maximum values. Categorical variables were reported as frequencies and percentages. The significance level was set at p-value < 0.05. The statistical analysis was performed by a statistician who was blinded to the grouping of the patients.

**Results:** The study included 84 adult patients with inguinal hernia, of whom 95% (80 patients) were male and 5% (4 patients) were female. Out of these patients, 80 (95%) had unilateral inguinal hernia, and 4 (5%) had bilateral inguinal hernia. The patients were randomly divided into two groups: Group A, in which 62% (52 patients) underwent classical Lichtenstein repair, and Group B, in which 38% (32 patients) underwent trans-abdominal preperitoneal (TAPP) repair. The demographic variables are shown in table and figure 1,

**Table 1. Demographic characteristics of study participant**

Characteristic	All patients (n=84)	Group A (n=52)	Group B (n=32)	P value
Gender, n (%)				
Male	80 (95%)	50 (96.2%)	29 (90.6%)	0.34
Female	4 (5%)	2 (3.8%)	3 (9.4%)	
Age, n (%)				
18-40 years	52 (62%)	32 (61.5%)	20 (62.5%)	0.91
41-70 years	32 (38%)	20 (38.5%)	12 (37.5%)	
Presentation, n (%)				
Unilateral hernia	80 (95%)	52 (100%)	28 (87.5%)	0.03
Bilateral hernia	4 (5%)	0	4 (12.5%)	

**Figure 1 Demographic characteristics of Group A & Group B**



**Table 2: Associated disorder of patients with hernia**

	Group A (n=52)	Group B (n=32)	Total (n=84)
Diabetes Miletus (DM)	10 (19.2%)	9 (28%)	19 (22.6%)
Hypertension (HTN)	15 (28.8%)	13 (40%)	28 (33.6%)
Ischemic Heart Disease	2 (4%)	1(3.1%)	3 (4%)
No Disorder	25 (48%)	10 (31.2%)	35 (42%)

Figure 2 associated disorder of patients with hernia in group A & group B

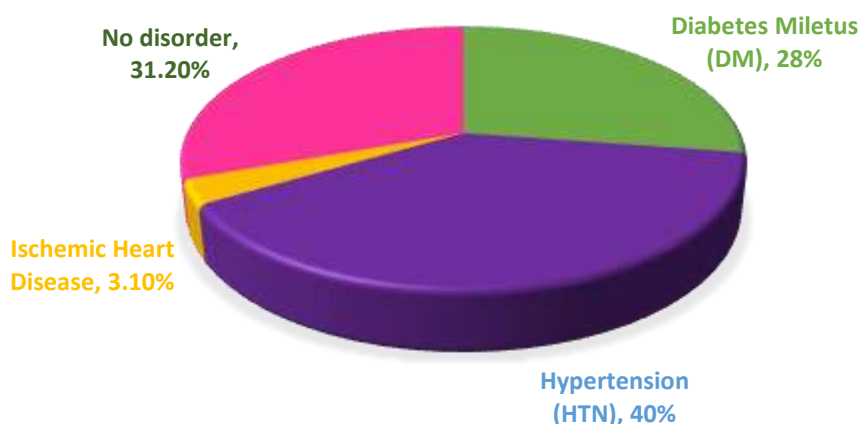
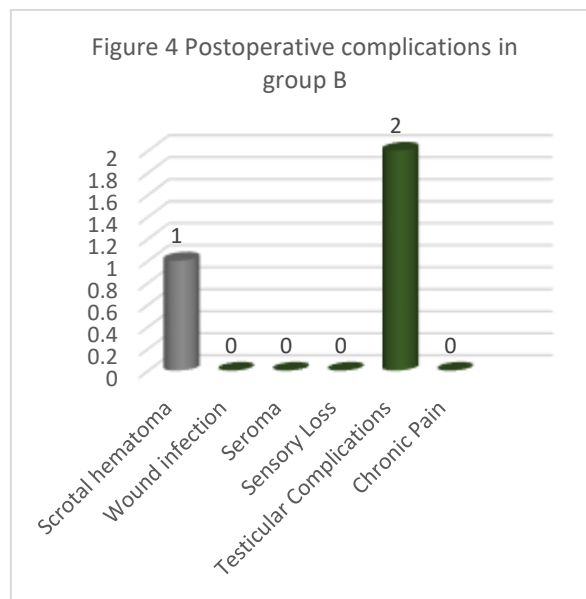
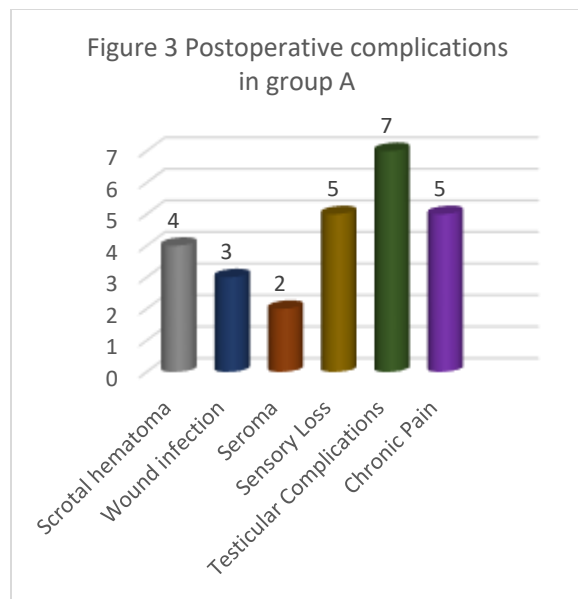


Table 2 and Figure 2 show the comorbidities present in the study population, most of the population in both groups is Hypertensive (33.6%) followed by the Diabetes group (22.6%). The mean operative time was  $34 \pm 10$  minutes in Group A and  $51 \pm 11$  minutes in Group B, with p-value  $<0.01$ . Postoperative complications are more (8%, 4%, 10%, 14% & 10%) in Group A i.e., scrotal hematoma, seroma, sensory loss, testicular complication, and chronic pain. The postoperative pain score was significantly higher in Group A than in Group B p-value  $<0.01$ . There was no early recurrence in either group after six months of follow-up. Three patients (6%) in Group A had wound infection, whereas none in Group B had wound infection. The mean hospital stay was  $2 \pm 0.5$  days in Group A and  $1 \pm 0.025$  days in Group B as shown in Table 3. Postoperative complications are visually shown in Figures 3 & 4.

Table 3: Comparison of Operative & Postoperative Variables

	Group A	Group B	P value
Operative time (minutes)			
Unilateral	$34 \pm 10$	$46 \pm 12$	0.01
Bilateral	-	$56 \pm 10$	0.09
Post-operative complications			
Scrotal hematoma	4 (8%)	1 (3%)	0.001
Wound infection	3 (6%)	0	1.00
Seroma	2 (4%)	0	0.08
Sensory Loss	5 (10%)	0	0.006
Testicular Complications	7 (14%)	2 (6.25%)	0.06
Chronic Pain	5 (10%)	0	0.003
Recurrence rate	0	0	1.00
Length of Hospital Stay	$2 \pm 0.5$	$2 \pm 0.5$	
Return to work	20 (5+/- 1 days)	24 (2 days)	



**Discussion:** The more important thing to understand is that our present and future challenge is to provide ever more effective, less invasive, and safe hernia surgery to a broadening array of complex, aged, and sicker patients. More studies are needed on these high-risk groups to determine acceptable safety and outcome parameters. The available evidence supports the idea that many patients are well served by day surgery repair. A hernia is a protrusion of a viscus or part of a viscus through the wall of the cavity in which it normally resides. Conditions like coughing, straining, obesity, and intra-abdominal malignancy can precipitate a hernia. Hernias can occur in a number of different anatomical locations, including the abdominal, femoral, umbilical, and inguinal regions. Inguinal hernia is the most common type of abdominal hernia found in the general population in our country and can be repaired using open Lichtenstein tension-free mesh repair or laparoscopic techniques (TAPP or TEP) [12]. The use of mesh has shown a significant reduction in recurrence rates. Lichtenstein et al described the use of mesh in the operative technique for tension-free inguinal hernia repair with satisfactory outcomes, which popularized the use of polypropylene mesh among the general surgeons. The open Lichtenstein mesh repair of inguinal hernia has become a standard for inguinal hernia repair due to ease of performance along with low recurrence rates. Early studies reported a high recurrence rate of approximately 25% for LH repair, but with time, LH repair has become the first choice in many tertiary care hospitals [13]. Our study found that the age distribution was concentrated between 18-70 years, with 52 (62%) patients between 18-40 years and 32 (38%) patients between 41-70 years, which is comparable to previous studies [14]. The gender ratio in our study was 20:1 (80 males, 4 female), reflecting the lower incidence of inguinal hernia in females. In our study, 52 patients (62%) opted for OH repair, while 32 patients (38%) chose LH repair. Additionally, 95% of patients had a unilateral inguinal hernia, whereas only 5% had a bilateral presentation, which differs from what has been observed in earlier investigations where the percentage of bilateral inguinal hernia was reported to be around 22% [15,16]. Lichtenstein mesh repair is associated with increased chances of hematoma formation, high incidence of urinary retention, and increased postoperative pain. LH repair is a minimally invasive surgery performed with three small 5mm incisions, compared to 5-10cm incisions in OH repair, which involve significant dissection and can lead to an increased risk of wound infection, seroma, and poor scarring [1, 2, 4, 17, 13]. Our study found that LH repair resulted in less post-operative pain, shorter hospital stays, early return to work, and smaller scars, consistent with previous studies [18]. However, the main concerns with LH repair are the associated costs, training requirements, learning curve, and longer operative time [2,19]. Our experience found that the mean operative time for LH repair was 52±15 min, compared to only 34±10 minutes for OH repair, although operative time is related to surgeon experience. Some studies suggest that overall, LH repair is less expensive than OH repair, as OH repair requires longer hospitalization, and more analgesics, and is associated with a higher recurrence rate. Furthermore, the literature suggests that patients who undergo LH repair return to normal activities much earlier than those who undergo the open procedure [2, 18,14]. The overall risk of complications after inguinal hernia operations varies from 15 to 28%, with the most frequent early complications being hematomas, seromas, urinary retention, and early pain, and late complications being mainly persistent pain and recurrence [2, 4]. In our study, we found scrotal hematoma in 8% of patients and wound infection in

3% of patients who underwent OH repair, compared to 3% and 0%, respectively, for those who underwent LH repair. This is consistent with previous studies, although a study by Abbas et al. found no difference in complication rates between OH and LH repair, except for chronic inguinal pain, which was more common in the open hernia group [13,15]. Scrotal hematoma in all of our patients resolved with conservative treatment. Recurrence in hernia can be either early (within 2 years) or late (after 2 years), with reported recurrence rates of 10-15%. However, the use of tension-free mesh has decreased the recurrence rate to less than 1% [1, 3]. Meticulous tension-free repair with mesh can prevent recurrence in OH, while adequate medial and lateral dissection with adequate coverage and overlap of mesh can prevent recurrence in LH [16,20]. Mesh is a foreign antigen; theoretical reasoning supports the notion of increased chances of infection but practically this complication is well taken care of. Standard polypropylene mesh is most frequently used because of its low cost, easy availability, and reasonable strength to avoid recurrence. Foreign body sensations and chronic postoperative pain have discouraged the regular use of established polypropylene mesh. Newer light meshes have been developed to overcome these problems but they are fairly expensive and only reduce the foreign body sensation without a difference in recurrence rate compared to heavyweight mesh. Biologic meshes, on the other hand, may gain importance in the future as they have been proposed to be advantageous in contaminated areas but they are extremely expensive, and not widely available and studies supporting the use of biologic meshes are limited and need further in-depth analysis and studies. In our study, there was no early recurrence of hernia in either group following six months of follow-up, although longer follow-ups of up to two years may be required to assess for late recurrence.

## Conclusion:

the findings of this study support the safety and benefits of LH repair as a surgical option for inguinal hernia. Specifically, LH repair demonstrated significant advantages over OH repair in terms of reduced post-operative pain, shorter hospital stays, and earlier return to work. Additionally, LH repair was associated with a decreased incidence of wound infection and scrotal hematoma. These findings provide important insights into the management of inguinal hernia and support the continued use of LH repair in appropriate patient populations. Further research is needed to evaluate the long-term outcomes and cost-effectiveness of LH repair compared to OH repair, as well as to identify factors that may influence patient and provider preferences for these surgical approaches.

**Conflict of interest:** All authors declare no conflict of interest.

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**Authors' contributions:**

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**Data collection or management-;** Kumar D<sup>3</sup>, ,Khalil ur Rehman<sup>4</sup>

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**Manuscript writing/editing-** Rauf Shaikh<sup>6</sup>

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