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Original Article

Quality of Life After Laparoscopic Repair and Open Tension-Free Mesh Repair of Inguinal Hernia

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Abstract

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Background: Groin hernia repair is one of the most common operative techniques in surgical practice. There are multiple surgical techniques for the treatment of groin hernias. No one of them is the optimum technique for the treatment of it so we study the quality of life as it may play a role in making the optimum dissension in the treatment of hernia.

The aim of the work: This prospective study aimed to assess outcomes and quality of life [QoL] for patients who have done open tension free mesh and laparoscopic repair techniques for inguinal hernia.

Patients and Methods: This was a prospective study, which included 100 patients operated for inguinal hernia between December 2021 and September 2022 at the Department of general surgery, Al-Azhar University Hospitals in Assuit.

Results: From all operated patients [100%] answered to SF-36 questionnaire. There was no significant differences between the patients Lichtenstein's and laparoscopic procedure [TAPP]. This was recorded for the eight domains analyzed with the SF-36 questionnaire. Quality of life was much better in the laparoscopic group, especially in the physical scales of physical function, role physical, bodily pain, general health, and total physical health, which may reflect the effects of less body pain after laparoscopic surgery. In addition, better but not significant results were noted in mental health scales of vitality, social function, role emotional, and mental health, as well as total mental health

Conclusion: Laparoscopic repair is associated with better results in both physical and mental domains than the Lichtenstein's intervention. However, the difference did not reach statistical significance.

Keywords: Laparoscopy; SF-36; Hernia; Lichtenstein.



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INTRODUCTION

Groin hernias represent a prevalent medical issue, and developments in surgical methodologies have consistently enhanced their therapy. In the last twenty years, the use of mesh prosthesis for wall reinforcement has been thoroughly discussed, with meta-analyses indicating diminished recurrence rates after mesh repairs [1]. Consequently, these efficient techniques now account for 80-90% of groin hernia surgeries [2].

Diverse mesh approaches, such as single-layer, double-layer, and plug repairs, have demonstrated positive results. The European Hernia Society [EHS] Guidelines endorse solely the Lichtenstein and laparoscopic methods due to their adequate scientific assessment [3]. Among these, the Lichtenstein tension-free polypropylene mesh repair remains the gold standard [4].

Hernias arise when stomach contents, including omentum or intestine, herniate through compromised abdominal muscles, resulting in a bulge that may be either asymptomatic or symptomatic, particularly during physical activity [5]. In men, this often occurs in the inguinal canal, where the spermatic cord enters the scrotum, while in women, it typically arises near the connective tissue supporting the uterus [6].

Laparoscopic inguinal hernia repair, first described in 1982 by Ger and colleagues using a stapled closure of the internal ring [7], initially faced resistance. Challenges included technical complexity, higher costs, the need for general anesthesia, and an increased risk of complications compared to open repair. Proficiency in this approach also requires specialized training [8].

Inguinal hernias can significantly impact quality of life, necessitating effective repair procedures. The Lichtenstein tension-free mesh repair is widely preferred due to its low recurrence rates compared to earlier techniques. Beyond the surgical procedure, ensuring optimal postoperative outcomes and quality of life is essential [9].

This study aimed to assess outcomes and quality of life [QoL] for patients who have done open tension free mesh and laparoscopic repair techniques for inguinal hernia.

PATIENTS AND METHODS

This was a prospective study that included 100 patients operated for inguinal hernia between December 2021 and September 2022 at the Department of general surgery, Al-Azhar University Hospitals in Assuit. Patients were divided into two groups: Group A: fifty patients with unilateral inguinal hernia treated by using laparoscopic repair, and Group B: fifty patients with unilateral inguinal hernia treated using open tension free mesh repair. Ethical approval was obtained from the Ethics Board of Al-Azhar University. Our study followed the Helsinki Declaration principles. Written consent was obtained from every patient before enrollment. We recruited the patients according to the following criteria:

The Inclusion criteria were: 1] Age > 18 years [adult patients], 2] Unilateral groin hernia. The Exclusion criteria were: 1] Patients less than 18 years, 2] Morbid obesity, 3] Previous pelvic surgery, 4] Huge inguinal hernia, 5] Complicated inguinal hernia, 6] patients unfit for operation.

Data collection: All patients were submitted to the following pre-operative workup, full history taking including Personal history [age,

sex, special habits of medical importance such as smoking, and occupation], history of chronic diseases, previous operations, drug allergy, previous blood transfusion, etc.), and family history of similar conditions.

Complete general and local examinations were done for every patient at the baseline. Local examination of the inguinal region and scrotum was done to determine the following: type of the hernia, size of the hernia, a scar of previous hernia surgery like appendectomy, whether the hernia is reducible or not, examination of the scrotum [skin, testes, spermatic cord, and epididymis], condition of the skin of the groin and scrotum. If there is any dermatological pathology and examination of counter inguinal region in the same order.

The following routine investigations were done preoperatively;

Complete blood count, coagulation profile, fasting and post-prandial blood sugar, ECG, chest X-ray for all smokers and non-smokers above 40 years, liver function tests, renal function tests, viral hepatitis markers, pelvi-abdominal ultrasound, and scrotal ultrasound for cases associated with hydrocele or varicocele and special investigations were requested for patients with specific complaints as pulmonary function tests for a patient with manifestations of chronic obstructive airway disease.

The two groups were compared for the type of anesthesia, operative time, operative blood loss, postoperative pain and use of analgesics, postoperative hospital stay, and postoperative complications early like wound hematoma, scrotal hematoma, bleeding from trocar placement, pneumonia and diarrhea and late complication like infection, recurrence and any gastrointestinal or urinary problem and postoperative Quality of life (QoL).

RAND 36-Item Health Survey 1.0 Questionnaire items were used to assess postoperative QoL. The preoperative and intraoperative and postoperative data of all patients were used for descriptive statistics. After the operations, all patients answered the RAND 36-Item Health Survey 1.0 Questionnaire to evaluate the quality of life after the operation and there was an example for this questionnaire the first for the laparoscopic method and the second for the open method [10].

Preoperative preparations:

The following steps were followed in all patients, kin preparation: By taking shower with antiseptic solution the night before surgery and/or the morning of surgery. Shaving pubic hair: Patients were advised to remove hair either by razor or immediately before surgery. Depilatory creams were allowed one day before surgery. DVT prophylaxis: According to DVT risk assessment all studied patients were of low to moderate risk and were advised only for early ambulation. Prophylactic antibiotics: Cephalosporin 2 gms IV was given 30 minutes before induction of anesthesia and repeated after 8 hours intervals. Identification: of the hernia side with a marker.

Surgical technique

Open hernioplasty:

Lichtenstein repair approach, utilizing a polypropylene mesh, was implemented for hernia repair in the examined patients. A 5-7 cm skin incision was executed under spinal anesthesia, located two-thirds medially and one-third laterally along the line linking the pubic tubercle to the anterior superior iliac spine. Subsequent to the incision, the subcutaneous tissue along with Camper's and Scarpa's fasciae were

meticulously dissected to reveal the aponeurosis of the external oblique muscle. The incision was meticulously made parallel to the fibers, safeguarding adjacent nerves. In cases of indirect hernias, the hernia sac was generally detached from the spermatic cord without difficulty. In instances where separation proved difficult, the sac was transected at the distal deep inguinal ring, retained within the inguinal canal, and closed proximally. Dissection proceeded to establish a 3-4 cm interval between the peritoneum and the cord along with its associated tissues. The polypropylene mesh was inserted blindly into the pre-peritoneal region. The retractor was employed for guidance, positioning the mesh with three-fifths overlaying the inguinal ligament and two-fifths beneath it. Coughing was generated intraoperatively in individuals under spinal anesthesia to confirm correct mesh insertion and identify any herniation. The mesh was modified as needed. The aponeurosis was closed anterior to the cord structures with 2/0 Prolene sutures. The treatment ended with the closure of subcutaneous tissue with absorbable sutures and the skin with non-absorbable sutures. This technique did not utilise a drainage system.

Laparoscopic hernioplasty:

After general Anesthesia, the patient was placed in a supine position. The urinary catheter was inserted after anesthesia was completed and Ryle's tube was used if needed. Antibiotic prophylaxis was given just before the operation. Pneumo-peritoneum is established through a small infra-umbilical incision and identification of the hernial sac. Creation of a peritoneal flap through a transverse incision in the peritoneum was done. We calculated the amount of blood loss by monitoring the amount of blood suctioned by the suction device in the canister. We closed the peritoneum flaps over the mesh then we removed the trocars then closed the opening site of the trocars.

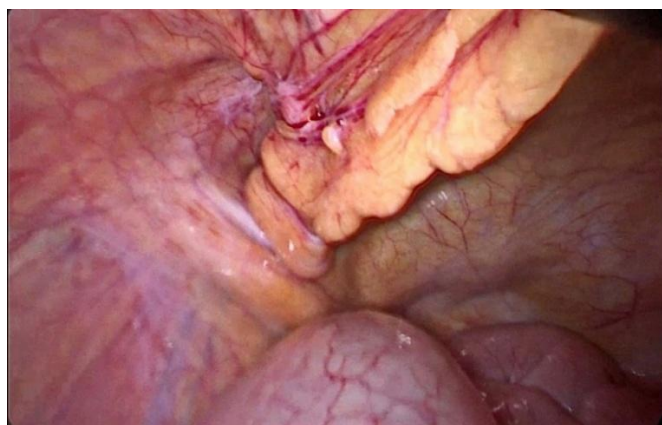


Figure (1): Identification of hernial sac

Postoperative care: All Patients were monitored in a recovery room for a minimum of 2 hours. Systematic analgesia as non-steroidal anti-inflammatory drugs were used. Intake of fluids was resumed 2 hours after the operation and a normal diet was allowed in the evening. Patient discharge to home was allowed from 1 to 2 days after surgery. Patients are advised to resume their usual activities as they see fit.

Follow-up: the patients were followed up at the outpatient clinic after one week, one month, and then every 3 months.

Statistical analysis: All statistical analysis was done using the SPSS version 26 [IBM Corp., Armonk., NY., USA]. Continuous data were first examined for normality using the Kolmogorov-Smirnov test. Continuous data were described as medians and Inter Quartile Range [IQR]. Categorical data were described as absolute frequencies [N] with percentages [%] and were compared between study groups using the chi-square test. Continuous parametric data were compared between study groups using the independent t-test; however, nonparametric data were compared between study groups using the Mann-Whitney U-test. P-values less than 0.05 were considered statistically significant.

RESULTS

This is a prospective study that included 100 patients operated for inguinal hernia. The two groups were comparable regarding their demographics. The mean age of the patients in the open group was 39 ± 8.6 years and in the laparoscopic group was 39.6 ± 7.2 years. Ninety-eight percent of the studied patients were male and only 2% were female. As regards the Mesh type and size, in the open method 6×11 BARD soft mesh was inserted in all patients [100%] with plug insertion in 6 cases [12%] due to the wide internal ring. For the laparoscopic method, 6×11 BARD soft mesh was inserted in 25 patients [50%], 4×11 VENTRA-LIGHT ST was inserted in 20 patients [40%] and 4×6 3D max was inserted in 5 patients [10%].

In terms of the operative time, the median operative time was significantly higher in the laparoscopic method than in the laparoscopic method [P value = 0.001]. The intraoperative blood loss was higher in the open method group with a statistically significant difference between the 2 groups [P value = 0.001]. In our study, the median postoperative hospital stays and return to the work were 2 days in the open group and one day in the laparoscopic group [Table 1].

Postoperative problems were self-resolving and subsided spontaneously without necessitating surgical intervention. In the open repair cohort, seroma was observed in 4 instances [8%], wound infection in 2 instances [4%], haematoma in 3 instances [6%], scrotal oedema in 6 instances [12%], and urine retention in 4 instances [8%]. In the laparoscopic repair cohort, seroma was noted in 2 instances [4%], with no occurrences of wound infection. Subcutaneous emphysema was present in 3 cases [6%], haematoma in 2 cases [4%], scrotal oedema in 4 cases [8%], and urine retention in 2 cases [4%]. No drains were employed in either the open or laparoscopic operations. No recurrences were observed in either group during the follow-up period [Table 2].

In terms of quality-of-life assessment, from all operated patients [100%] answered to SF-36 questionnaire. There were no statistically significant differences between the patients who operated with Lichtenstein's procedure and the patients who operated with a laparoscopic procedure [TAPP] in any of the eight categories analyzed with the SF-36 questionnaire [Table 3].

Table [1]: Clinical outcomes of the studied patients.

Variables	Open method	Laparoscopic method	P – value
Operative time	41 [32.7 – 46.2]	62.5 [50 – 71.2]	0.001*
Intra-operative blood loss [cc]	28 [22.7-34.2]	12 [10.7-14]	0.001*
Post-operative hospital stays [days]	2 [1.7-2.2]	1 [0]	0.001*
Return to work [days]	2 [0]	1 [0]	0.001*

a: Mann-Whitney U test.

Table [2]: Postoperative complications of the studied patients.

		Open method	laparoscopic	total	P – value
Post-operative complications	Seroma	4[8%]	2[4%]	6[6%]	0.5
	Wound infection	2[4%]	0[0%]	2[2%]	
	subcutaneous emphysema	0[0%]	3[6%]	3[3%]	
	hematoma	3[6%]	2[4%]	5[5%]	
	Scrotal edema	6[12%]	4[8%]	10[10%]	
	Urinary retention	4[8%]	2[4%]	6[6%]	

a: Chi-square test.

Table [3]: Distribution of cases according to Quality of life assessment by RAND SF-36 questionnaire

		Open method	laparoscopic	P – value ^a
Quality of life	Physical functioning	85.67 ± 20.71	89.72 ± 16.90	0.2
	Physical health	56.28 ± 42.17	78.19 ± 33.79	0.2
	Emotional problems	72.94 ± 37.84	79.21 ± 36.78	0.5
	Energy/ fatigue	73.09 ± 21.19	75.71 ± 20.08	0.8
	Emotional well being	83.16 ± 21.19	83.59 ± 22.31	0.6
	Social functioning	79.35 ± 19.83	78.84 ± 24.45	1
	Pain	83.18 ± 18.42	77.35 ± 23.33	0.5
	General Health	68.15 ± 19.56	72.66 ± 16.23	0.3

a: Independent t test.

DISCUSSION

Our study was more centered on other outcomes of interest such as operative time, postoperative pain, postoperative complications, and postoperative hospital stay time to return to normal daily activities, recurrence, and post-operative quality of life after laparoscopic or open repair of inguinal hernia according to RAND SF-36 questionnaire.

In our study, spinal anesthesia was utilized for all open procedures, whereas general anesthesia was administered for laparoscopic cases, with no discernible effect on postoperative recovery rate or quality of life. Patients were comprehensively apprised of the advantages and disadvantages linked to each anesthesia modality. The principal disadvantage of laparoscopy was the extended operating duration relative to the Lichtenstein cohort. The prolonged length was ascribed to the learning curve, with seasoned surgeons executing the treatment in around half the time taken by their less experienced peers ^[11, 12]. This result is in agreement with our study.

Persistent postoperative groin pain presents a significant challenge for both patients and doctors. **Krishna et al.** ^[13] documented residual discomfort in 5.3% of patients following open mesh surgery at three

months or longer, in contrast to 1.4% after TEPP repair. The majority of cases resolve progressively with cautious management. Likewise, additional research has demonstrated diminished postoperative pain rates with TEPP surgery, with current trials validating a markedly lower occurrence of chronic groin discomfort in comparison to open repair ^[14].

Dedemadi et al. ^[15] discovered that the laparoscopic method led to diminished postoperative discomfort and decreased analgesic consumption, as indicated by Visual Analogue Scale [VAS] scores, underscoring its superiority compared to the open procedure. Furthermore, there were no intraoperative complications, including visceral injuries, port site hemorrhage, or hernias. Our research substantiates the safety and viability of laparoscopy in comparison to open surgery.

Memon et al. ^[16] indicated that the complication risk in open inguinal hernia repairs was 1.76 times greater than in laparoscopic repairs, with over 3% of open repair patients encountering complications compared to 1.8% in laparoscopic cases, underscoring the benefits of the laparoscopic method. Despite the existence of pricing disparities, comprehending the advantages of each treatment is essential for both physicians and patients. In our analysis, urinary retention was noted in 6% of patients, whereas scrotal edema was seen in 12% of open repairs

and 8% of laparoscopic repairs, with no significant differences, likely attributable to anesthesia rather than the surgical technique employed. Postoperative wound infections occurred in 4% of the open surgery group and were absent in the laparoscopic group. Seroma occurred in 8% of the open group and 4% of the laparoscopic group, with no statistical significance seen. Subcutaneous emphysema was observed in three TEPP instances, with no significant differences noted in other sequelae. Significantly, there were no recurrences in either cohort during the research.

McCormack et al.^[17] found no significant disparity in recurrence rates between laparoscopic and open-mesh hernia repair techniques. Laparoscopic repair facilitates a swifter resumption of normal activities, while it entails prolonged operation durations and an elevated risk of severe consequences, especially visceral and vascular damage.

Likewise, **Pokorny et al.**^[18] observed no significant disparities in recurrence or complication rates between the two methodologies in a multicenter investigation. **De Jonge et al.**^[19] underscored the necessity for standardized quality-of-life evaluations, asserting that TAPP markedly surpasses the open Lichtenstein technique in terms of quality of life.

Gholghesaei et al.^[20] found the laparoscopic method as the favored alternative from the patient's standpoint, owing to its beneficial effects on quality of life.

Conclusion: Our study demonstrated enhanced quality of life in the laparoscopic cohort, especially on physical dimensions such as functionality, pain, and overall health, presumably attributable to less postoperative discomfort. Mental health results, encompassing energy and social function, exhibited improvement, but not significantly different.

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