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Evaluation of Laparoscopic Versus Open Repair for Inguinal Hernias

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ABSTRACT

Background: The inguinal hernia is a protrusion of abdominal contents into the inguinal canal through an abdominal wall defect, and the risk of inguinal hernia increases with age. Currently, inguinal hernia repair with a mesh is the mostly common method through surgical procedure.

Objective: To compare the outcome of laparoscopic versus open repair for inguinal hernias.

Patients and Methods: This prospective comparative study conducted at General Surgery Department, Faculty of Medicine, Zagazig University at the period between January 2021 till July 2021, between open technique (preperitoneal approach, conventional Lichtenstein repair) versus laparoscopic transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) mesh repair of inguinal hernia. 24 patients were randomized into 2 groups by the closed envelop method, 12 patients underwent open repair operation and 12 patients underwent laparoscopic repair operation. The clinical diagnosis of inguinal hernia was based on symptoms and signs elicited during clinical assessment.

Results: we found that mean duration of operation in laparoscopic group was longer than open group with significant difference, as regard length of hospital stay there was significant differences between two groups. Return to daily activity (Days) was early among laparoscopic inguinal hernia repair group with mean 1.67±0.49 and range from 1 to 2 days versus 4.58±1.5 with range from 3 to 7 days in open repair for inguinal hernia group, the difference was highly statistically significant. **Conclusions:** Laparoscopic surgical techniques for inguinal hernia repair (TAPP and TEP) can be carried out with a very low rate of predominantly harmless complications and with an acceptable duration of operation.

Keywords: Inguinal hernia, Laparoscopy, Open repair.

INTRODUCTION

Hernia is the abnormal exit of an organ or fatty tissue, such as the bowel, through the wall of the cavity in which it normally resides. Repair of inguinal hernia is one of the common surgical procedures done worldwide. Irrespective of country, race or socioeconomic status hernia constitutes a major health-care. The definitive treatment of all hernias, regardless of their origin or type, is surgical repair with approximately 20 million repairs done worldwide annually[(1)].

The lack of consensus in the literature as to the optimum repair technique or prosthetic mesh to insure a long term durable result is also surprising[(2)]. The wide use of mesh in the groin hernia repair has gained more popularity and has almost replaced the suture repairs such as Shouldice or Maloney repair. There is, however, a very large debate on relative merits of laparoscopic mesh placement by using two to three small abdominal incisions compared with placement of mesh by using an open approach through a standard groin incision[(3)].

Open inguinal hernia repair (OH) remains the standard approach to inguinal hernias since its initial description over 50 years ago[(4)].

Laparoscopic inguinal hernia repair (LH) has now become routinely employed. Advantages of LH as reported by retrospective studies include better cosmesis, shorter length of stay (LOS), faster recovery, and greater ability to visualize and repair a contralateral hernia but still it is not being commonly performed due to need for general anesthesia and long learning curve[(5)].

We performed this study to compare the outcome of laparoscopic versus open repair for inguinal hernias.

PATIENTS AND METHODS

This prospective comparative study conducted at General Surgery Department, Faculty of Medicine, Zagazig University between open technique (preperitoneal approach, conventional Lichtenstein repair) versus laparoscopic (TAPP and TEP) mesh repair of inguinal hernia. This study was conducted on 24 patients. The selected patients were randomized into 2 groups by the closed envelop method.

Group A: 12 patients underwent open technique by conventional Lichtenstein.

Group B: 12 patients underwent laparoscopic operation: 6 patients by TAPP and 6 patients by TEP.

Ethical considerations:

Written informed consent was obtained from all participants and the study was approved by the Research Ethical Committee of Faculty of Medicine, Zagazig University. The work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

We considered the following inclusion criteria Age above 18 years. All patients of both sex. Patients with a diagnosis of inguinal hernia, either bilateral or unilateral.

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Medical fitness for general anesthesia and laparoscopic inguinal hernia.

Exclusion criteria:

Patients with age less than 18 years. Contraindication to general anesthesia (for laparoscopic repair)/ regional anesthesia (for open repair). Patients with complicated inguinal hernia like obstruction, strangulation or gangrene. Immune compromised patients, chronic liver or renal disease, coagulopathy, high-risk patients unfit for major surgery (ASA III or IV), massive scrotal and groin pain due to any other pathology. Patients who have undergone previous lower abdominal surgeries. Patients with bleeding diathesis. Patients with cardiopulmonary or cerebrovascular disorders. Pregnant females.

All patients were subjected to demographic data taking, clinical examination local examination of the inguinal region and scrotum to confirm the diagnosis of inguinal hernia and its type, and for the presence of complications. Laboratory investigations including Complete blood picture, Coagulation profile, Liver function tests, Kidney function tests, Random blood sugar, ECG for those patients over 40 or with positive cardiac history, and Radiological evaluation with ultrasonography to rule out prostate enlargement and computed tomography if possible.

Postoperative management:

Postoperative analgesia was received as declofenac sodium (voltaren) 75 mg IM/12 hours for one day. Then, declofenac sodium (voltaren) 50 mg tablets were given on demand later on. The postoperative pain assessment was done in the first postoperative day, six hours after last analgesic dose administration at rest. Before discharge, all patients received the same postoperative instructions (limitation on heavy weight lifting for 4 weeks) and were encouraged to return to normal activities as soon as possible. Patients were followed up for a period of minimum six months after surgery. That is one week after surgery, once in a month for 3 months, and once in three months thereafter. At the end of the study comparison was made between open Lichtenstein's repair and laparoscopic repair regarding safety and efficacy, duration of surgery with hospital stay and cost effectiveness, postoperative morbidity and patient satisfaction.

Statistical analysis

The collected data were coded, processed and analyzed using the SPSS (Statistical Package for the Social Sciences) version 22 for Windows® (IBM SPSS Inc, Chicago, IL, USA). Data were tested for normal distribution using the Shapiro Wilk test. Qualitative data were represented as frequencies and relative percentages. Chi square test (χ^2) was used to calculate difference between groups of qualitative variables. Quantitative data were expressed as mean ± SD (Standard deviation). One-way ANOVA was used to compare among the studied groups of normally distributed variables (parametric data). P value < 0.05 was considered significant.

RESULTS

Table 1 shows that there was no significant difference among the studied groups as regard age and sex.

Table (1): Comparison between basic characters of studied groups

Demographic characters	Studied groups			Test of significance	P
	Laparoscopic group N.12		Open Repair for inguinal hernia group N. 12		
	TAPP group N. 6	TEP group N. 6			
Age per years Mean ± SD (Range)	50.66±15.65 25-69	51±12.36 35-70	49.16±9.47 32-67	F=0.06	0.94
Gender Females Males	1 (16.7%) 5 (83.3%)	0 (0.0%) 6 (100%)	1 (8.3%) 11 (91.7%)	X^2 1.14	0.58

Table 2 shows that there was statistically insignificant difference of the studied groups as regard hernia types' classification.

Table (2): Hernia types classification of studied groups

		Studied Groups			χ^2	P
		Laparoscopic group N.12		Open Repair for inguinal hernia group N.12		
		TAPP group N.6	TEP group N.6			
Bilateral direct indirect	N	1	1	0	12.17	0.144
	%	16.7%	16.7%	0.0%		
Bilateral indirect	N	0	1	0		
	%	0.0%	16.7%	0.0%		
Direct unilateral	N	0	0	2		
	%	0.0%	0.0%	16.7%		
Indirect unilateral	N	4	2	10		
	%	66.6%	33.3%	83.3%		
Recurrent direct	N	1	2	0		
	%	16.7%	33.3%	0.0%		

There was statistically significant difference among the studied groups as regard severity of pain. Whereas, all patients of both groups requested pain medications (Table 3).

Table (3): Postoperative pain scale of studied groups

			Studied Groups			χ^2	P
			Laparoscopic group N.12		Open Repair for inguinal hernia group N.12		
			TAPP group N.6	TEP group N.6			
Pain scale	Mild	N	2	5	1	10.6	0.031*
		%	33.3%	83.3%	8.3%		
	Moderate	N	4	1	10		
		%	66.7%	16.7%	83.3%		
	Severe	N	0	0	1		
		%	0.0%	0.0%	8.3%		
Pain medications	Yes	N	6	6	12	0	1
		%	100%	100%	100.0%		
	No	N	0	0	0		
		%	0.0%	0.0%	0.0%		

***: Significant**

Table 4 shows that there was statistically significant longer duration of hospital stay for open inguinal hernia repair, return to daily activity and to work.

Table (4): Hospital stay per hours and return of usual activity of studied groups

		Studied Groups			F	P
		Laparoscopic group N.12		Open Repair for inguinal hernia group N.12		
		TAPP group N.6	TEP group N.6			
Hospital stay per hours	Mean±SD	12±1.33	13±3.46	24±5.7	121.7	0.0001**
Start of oral intake hours	Mean±SD	2±0.42	2±0.39	2±0.41	0	1
Return to daily activity (Days)	Mean±SD	1.67±0.49	1.45±0.36	4.58±1.5	21.66	0.0001**
Return to work (days)	Mean±SD	12.5±2.47	13.7±3.59	24.42±5.02	21.19	0.0001**

**: Highly significant

Table 5 that there was statistically insignificant difference of both groups as regard occurrence of postoperative complications except scrotal swelling, which was significantly higher at TEP group.

Table (5): Postoperative complications of studied groups

			Studied Groups			χ^2	P
			Laparoscopic group N.12		Open Repair for inguinal hernia group N.12		
			TAPP group N.6	TEP group N.6			
Complication	Yes	N	0	2	5	3.43	0.18
		%	0.0%	33.3%	41.7%		
	No	N	6	4	7		
		%	100%	66.7%	58.3%		
Types Complication	Hematoma	N	0	0	2	2.18	0.33
		%	0.0%	0.0%	16.7%		
	Prolonged groin pain	N	0	0	1	1.04	0.593
		%	0.0%	0.0%	0.0%		
	Scrotal swelling	N	0	2	0	6.54	0.037*
		%	0.0%	33.3%	0.0%		
	Seroma	N	0	0	1	1.04	0.593
		%	0.0%	0.0%	8.3%		
	Recurrence	N	0	0	1	1.04	0.593
		%	0.0%	0.0%	8.3%		
	Infection	N	0	0	1	1.04	0.593
		%	0.0%	0.0%	8.3%		

*: Significant

DISCUSSION

In the present study 91.7% of patients in both groups were males with insignificant differences between the two groups as regard gender and age.

In the current we found that there was insignificant difference between the two groups as regard hernia type. ***Yang et al.,*** showed that ten patients in the laparoscopic group had more than one type of hernia present on the same side detected at the time of laparoscopy. In total, there were 24 direct inguinal hernias, 43 indirect inguinal hernias. In the open group, nine patients had multiple types of hernias present on the same side detected during surgery. In total, there were 36 direct inguinal hernias, 89 indirect inguinal hernias[(6)].

In the present study, laparoscopic inguinal hernia repair group was associated with high percent of mild pain 10 (83.3%), versus 10 (83.3%) in open repair for inguinal hernia had moderate pain, there was statistically significant difference. This came in agreement with **Murthy and Ravalia**[(1)] who found that Pain score was significantly less in laparoscopic group with 75% patients giving score 1-2 (mild pain) and 3 patients with discomforting pain with $p<0.05$.

In the current study we found that mean duration of operation in laparoscopic group was longer than open group with significant difference, as regard length of hospital stay there was significant differences between the two groups. Return to daily activity (Days) was early among laparoscopic inguinal hernia repair group with mean 1.67±0.49 versus 4.58±1.5 in open repair for inguinal hernia group, the difference was highly statistically significant. This came in agreement with **McNally *et al.*** [(7)] who showed that one hundred seventy-six consecutive patients who underwent inguinal hernia repair by six different surgeons were analyzed. One hundred and four patients had an open repair and 72 patients underwent laparoscopic repair. The mean operative time was significantly longer in the laparoscopic group (20.2 minutes, $p < 0.001$). The mean time to return to duty was significantly shorter in the laparoscopic group (2.3 days, $p = 0.008$).

Operating times of surgical techniques varies between surgeons and also vary considerably between centres. It is reduced with experience and comparison between laparoscopic and open surgery is subject to bias due to pre-existing familiarity with open techniques [(8)]. It is less important to the patient than a successful operation; the time taken to perform the surgery can have cost implications[(9)]. National Institute for clinical excellence stated that the laparoscopic surgery was associated with a statistically significant increase in operation time compared with open methods of hernia repair[(10)]. Meta-analysis of 16 randomized control trials of transabdominal pre-peritoneal repair (TAPP) demonstrated an overall increase of 13.33 minutes compared with open repair. Meta-analysis of eight randomized control trial of totally extra peritoneal (TEP) repair demonstrated an overall increase of 7.89 minutes compared with open repair.

CONCLUSION

Laparoscopic surgical techniques for inguinal hernia repair (TAPP and TEP) can be carried out with a

very low rate of predominantly harmless complications and with an acceptable duration of operation. A further reduction of complications can only be achieved through continuing training, accretion of knowledge and improvement of the surgical techniques.

Both techniques are considered safe as all postoperative complications are well tolerated by patients and there was no need for a second operative intervention. Patients treated by laparoscopic repair (TAPP and TEP) suffered less acute postoperative pain compared with the open repairs as expressed by lower pain scores. Laparoscopic repairs (TAPP and TEP) are associated with shorter hospital stay and rapid return to normal activity.

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Conflict of interest: Nil.

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