

# Comparison of Lichtenstein repair and new mesh implant technique in the treatment of indirect inguinal hernia



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**Abstract**

**Objective:** Inguinal hernia surgery is one of the most commonly used surgical procedures in the world. The aim of this study was to compare the recurrence and postoperative complications between a new mesh implant technique in the floor of the inguinal canal with limited tissue repair on it and Lichtenstein technique for inguinal hernia repair.

**Methods:** In this cross-sectional study, patients were studied by Lichtenstein technique and a new technique of insertion of mesh at the foam of the inguinal canal with a limited tissue repair on it. Data were collected by interview and we assessed the recurrence rate, urinary retention and post-operative pain. Data were analyzed using SPSS software version 24. Chi-square test and *t* test were used for quantitative data and *P* value less than 0.05 was considered significant.

**Results:** The mean age of patients was 49.28 ± 15.84. The mean age and sex ratio between the two groups were similar. Recurrence was seen in 11 (1.83%) of all patients and the difference between the two groups was not significant. Of all patients, 28 (4.7%) had urinary retention after surgery and the difference between the two groups was significant (*p*=0.01). Of all patients, 91 (15.2%) had pain after three weeks and 29 (4.8%) had pain after six months.

**Conclusion:** The results showed that the new method had less complications concerning post-operative pain and urinary retention in comparison with the Lichtenstein method as an acceptable method for inguinal hernia repair in future.

**Keywords:** Relapse, Complications, Lichtenstein technique, Inguinal hernia, Repair

## Introduction

Hernia is one of the most common diseases during the practice of a surgeon. The most common type of it is right inguinal hernia (1). Inguinal hernia is referred to the abdominal viscera ejection, especially the small intestine to the inguinal canal, which occurs more than 90% in men and 10% in women. It is most prevalent in men before the age of one and after the age of forty (2,3). The predisposing factors for inguinal hernias are not completely clear and a number of hypothetical causes include chronic cough, congenital lung disease, congenital constipation, benign prostatic enlargement, family history of hernia, collagen vascular disease, pre-cutaneous collagen disease, previous Right Lower Quadrant (RLQ) incision, heavy load lifting, and physical activity is involved in the development of hernia (4,5). Common symptoms of a hernia include a bulging of the groin or scrotum that may occur suddenly or over a few days, weeks or months, and discomfort in the groin or scrotum that may aggravate the pain during sitting and getting up (but most hernias are generally painless)

(2,3). Except some special conditions, inguinal hernia needs to be repaired surgically, considering it as the best treatment plan. Some of the most important complications of hernia repair include hematoma or seroma, surgical site infection, recurrence, neuralgia, hydrocele, urinary retention, testicular atrophy, ejaculation problems, and ischemic orchitis (1). There are many methods for repairing inguinal hernia, however, none of these methods have been introduced as the preferred method so far and although many years have passed since the invention of these methods, still the surgical methods are selected based on the diagnosis, experience and skills of the surgeon. Common methods of inguinal hernia repair are generally divided into two groups: anterior repair and posterior repair. Recently, laparoscopic repair techniques have also been increasingly used. In the group of anterior access procedures, floor repair can be done with or without mesh. Lichtenstein is the most commonly used anterior technique which utilize mesh and is preferred by surgeons with different experiences and it is more desirable to



other techniques (6-8). Based on the available evidence, using various artificial meshes in different methods of repairing inguinal hernia compared to pure tissue repair as well as applying surgical suture methods may reduce the incidence of recurrence and adverse outcomes (4,5). The aim of this study was to comparison of Lichtenstein Repair and new mesh implant technique in the Treatment of Indirect Inguinal Hernia.

## Methods

This descriptive cross-sectional study was performed on 600 patients (aged 18 to 85 years old) undergoing inguinal hernia repair in Ardabil hospitals. In this study, 300 patients underwent Lichtenstein technique and 300 patients underwent a new mesh implantation technique on the floor of the inguinal canal with limited tissue repair on it. Inclusion criteria included: 1) willingness to participate in the study, 2) having unilateral inguinal hernias with no history of elective or non-emergency hernia surgery on the side prior herniorrhaphy or hernioplasty on that side and surgery has done, and at least six months have passed since the completion of the surgery. Exclusion criteria included: 1) lack of proper cooperation of patients in collecting information, 2) having chronic connective tissue disease or collagen vascular disorders, 3) chronic obstructive pulmonary disease (COPD), and 4) chronic cough. Required data were obtained through a checklist containing demographic and clinical information. The Lichtenstein technique used in these patients was the standard procedure with a non-absorbable mesh that fixed on the floor of the inguinal canal that done by three expert surgeon but with similar technique and similarity in type of mesh and fixation sutures. The new technique was done by a surgeon with above protocol. Post-operative pain was divided into two groups, three weeks after surgery (for evaluating the short-term post-operative pain) and six months after surgery (for evaluating the long-term post-operative pain). To assess pain, it was divided into three groups: mild pain (tolerable pain that does not need analgesia and does not have an effect on the quality of life), moderate pain (there is a need for an analgesic drug to tolerate pain), and severe pain (resistance to analgesic drugs requiring surgery or nerve block or other invasive procedures). The assessment of relapse rate was done by a surgeon and confirmed by ultrasonography. Data were analyzed using SPSS software version 24. Chi-square test and *t* test were used for quantitative data and *P* value less than 0.05 was considered significant.

## Results

The mean age of the patients was  $49.28 \pm 15.84$  years and 90.3% were male and the rest were female. The mean age of patients with the new method and Lichtenstein method was  $50.17 \pm 15.35$  and  $48.39 \pm 16.02$  years, respectively. We did not observe a statistical significant difference between groups. Of all patients, 10 cases (1.7%) had relapse in which 6 cases (60%) were in the Lichtenstein group and four cases (40%) were in the new method group. The difference between the two groups was not statistically significant (Table 1). But the mean age of patients with recurrence was  $46.71 \pm 10.91$  years in Lichtenstein group and it was  $52.40 \pm 17.02$  years in the new method group, which was statistically significant ( $P=0.03$ ). Of all patients, 4.7% had urinary retention, which was 6.3% in the Lichtenstein group and 3% in the new technique group and the difference was not significant. Of all patients, 91 (15.2%) had pain after three weeks. The chronic post-operative pain after six months was seen in 29 cases (4.8%) (Table 2).

Of all patients with pain in three weeks after surgery, 71 (78%) were in mild type group and the rest were in the moderate type group. Of all patients with pain in six weeks after surgery, 25 patients (86.2%) were in mild type group and the rest were in moderate type group (Table 3).

## Discussion

Choosing an inguinal hernia repair procedure depends on the low recurrence rate, lower complications and high quality of life after surgery.

In our study the relapse rate for the two methods was approximately similar, but Elsebae et al

showed that three patients had recurrence after Bassini operation and there was no recurrent hernia after mesh herniorrhaphy (0% versus 11.1%,  $P < 0.001$ ) (9).

In a study conducted by Mohebbi et al in Tehran, the recurrence rate was 3.3% for Lichtenstein and 3.13% for tissue repair technique. This difference was not statistically significant (10).

Darwish et al in a study showed that mesh repair is applicable in patients with incarcerated inguinal hernias with low morbidity rate (11).

Studies have shown that the recurrence rate using the Lichtenstein technique varies from less than 1% among experienced surgeons to 2.1% among less experienced surgeons in the United States (12,13). In this study, the

**Table 1.** Frequency of gender and relapse rate in the two groups

Characteristics	New implantation technique		Lichtenstein technique		Total		P value	
	No.	%	No.	%	No.	%		
Sex	Male	272	90.7	268	89.3	540	90	0.58
	Female	28	9.3	32	10.7	60	10	
Relapse rate	Male	5	1.8	5	1.9	10	1.85	0.3
	Female	0	0	1	3.2	1	1.7	

**Table 2.** Frequency of urinary retention and pain three weeks and six months after surgery in the two groups

Characteristics		New implantation technique		Lichtenstein technique		Total		P value
		No.	%	No.	%	No.	%	
Urinary retention	Yes	9	3	19	6.3	28	4.7	0.01
	No	291	97	281	93.7	572	95.3	
Pain 3 weeks after surgery	No	261	87	248	82.7	509	84.8	0.32
	Yes	39	10.3	52	13.3	91	15.2	
Pain 6 weeks after surgery	No	289	96.3	282	94	571	95.2	0.35
	Yes	11	3.3	18	5	29	4.8	

**Table 3.** Frequency of pain severity in the two groups three and six months after surgery

Characteristics		New implantation technique		Lichtenstein technique		Total	
		No.	%	No.	%	No.	%
Pain 3 weeks after surgery	Mild	31	43.7	40	56.3	71	78
	Moderate	8	40	12	60	20	22
Pain 6 weeks after surgery	Mild	10	40	15	60	25	86.2
	Moderate	1	25	3	75	4	13.8

relapse rate was 1.6% (2% for Liechtenstein group and 1.3% for the new technique). Both studies showed lower rates of recurrence in women in comparison to other similar studies. This may be due to appropriate screening of female patients in terms of femoral hernia and the need for preoperative imaging. The mean age of relapse was 49.08 years (52.4 years in the new method and 46.71 years in the Liechtenstein method). Studies show that the rate of relapse increases with age (13). Urinary retention in inguinal hernia surgery is a common complication that has been reported in different techniques from 0.3% to 22% (14,15). A study in the Johns Hopkins Surgical Department between 2012 and 2015 showed that urinary retention in the laparoscopic group was 12% and in the open surgical group was 10.6% (16). In the present study, 4.7% of patients had urinary retention, which was lower than similar studies, which may be due to limited intravenous fluid intake of patients and earlier initiation of oral feeding. On the other hand, spinal anesthesia and avoidance of general anesthesia may contribute it. In the present study, the significant difference in urinary retention between the two groups ( $p=0.01$ ) can be associated with less postoperative pain and a relative reduction in surgery time due to the easier of the new technique. In this study, 91 (15.2%) of all patients had pain three weeks after surgery, that of them 86.2% were mild and 13.8% were moderate. Six months after surgery, 4.8% of patients still complained of pain at the surgical site. Post-operative pains in the new technique had a significant lower rate in moderate pain after 3 weeks and in mild and moderate pain after 6 months. In a study conducted at Victoria Hospital between 2011 and 2013 for chronic pain after 6 months of surgery, 39.4% of patients had chronic postoperative pain. Findings revealed that 30.5% of patients had mild pain, 7.9% had moderate pain and 1% had severe pain, which were higher than the present study (17). The study conducted by Khoshnevis et al showed that 34.3% of patients had pain in the Bassini

group with mesh and 10% in the McVay group, indicating a statistically significant difference between the two groups (18).

### Conclusion

The present study showed that the common complications of the new method was less than Lichtenstein technique and we could use this new technique as an acceptable and appropriate technique in inguinal hernioplasty in future.

### Authors' contribution

SM helped in preparing the draft, collecting data and writing the manuscript. IF helped in clinical examination, data collection, supervising the thesis, and following-up patients during surgery. KI helped in manuscript writing, study design, sampling, data collection and statistical analysis.

### Ethical issues

This study was approved by the ethics committee of Ardabil University of Medical Sciences and it was registered by code number: IR.ARUMS.REC.1398.003.

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