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Evaluation of Lichtenstein and posterior wall darn techniques in inguinal hernia surgery: A prospective cohort study

İnguinal herni ameliyatlarinda Lichtenstein ve ağ örme tekniklerinin değerlendirilmesi: Prospektif kohort çalışma

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Abstract

Aim: Inguinal hernia repair is the most common surgical operation in the world. Although the inguinal hernia is as frequent as 75% of all hernias and 3.8% of the whole population, the best form of repair has not yet become clear. The purpose of the hernia repair is simple, easy to apply, safe operation which requires minimal dissection and sufficient exploration, early patient care, reduction of operation cost, loss of labor force, hospital stay and return to work, and minimizing recurrences. Our aim in this study is to compare Lichtenstein tension free technique and posterior wall darn repair (Moloney) techniques.

Methods: This study was designed as a prospective study and was performed in patients who underwent surgery for inguinal hernia in the General Surgery Clinic of Istanbul Training and Research Hospital. A total of 100 patients were divided into two groups (50 posterior wall darn repair, 50 Lichtenstein repair). All patients were hospitalized and their time to return to work was recorded. Patients were called to the controls and checked for recurrence. Criteria such as postoperative patient comfort, complications, active life start time and recurrence were evaluated. The groups were compared statistically.

Results: In our study, there was no significant difference between the two groups in terms of return to work, mobilization and recurrence ($p>0.05$). Lichtenstein technique was applied statistically in terms of hospitalization time, complication and duration of operation compared to the other groups ($p<0.05$).

Conclusion: We favor Lichtenstein technique in the treatment of inguinal hernia because of the short duration of operation, short hospitalization time and low complication rate compared with posterior wall darn technique, with similar recurrence rates in both groups.

Keywords: Inguinal hernia, Lichtenstein repair, Posterior wall darn repair

Öz

Amaç: İnguinal herni onarımı dünyada en yaygın yapılan genel cerrahi ameliyatıdır. İnguinal herniler, tüm herniler arasında %75 ve tüm toplumun %3,8'inde görülebilecek kadar sık olmasına karşın, en iyi onarım şekli henüz açıklık kazanmamıştır. Herni onarımında amaç basit, kolay uygulanabilir, minimal diseksiyon gerektiren ve yeterli eksplorasyon sağlayan güvenli bir teknikle erken dönemde hasta konforunu gözetmek, ameliyat masrafını, işgücü kaybını, hastanede kalış süresini ve işe dönüş süresini azaltmak ve nüksleri en aza indirmektir. Bu çalışmayı yapmaktaki amacımız; Lichtenstein tension free tekniği ile ağ örme onarımı (Moloney) tekniklerini karşılaştırmaktır.

Yöntemler: Bu çalışma prospektif bir araştırma olarak tasarlanıp İstanbul Eğitim ve Araştırma Hastanesi Genel Cerrahi Kliniğinde inguinal herni nedeniyle ameliyat edilen hastalarda yapıldı. Toplam 100 hasta iki gruba ayrıldı (50 ağ örme, 50 Lichtenstein). Tüm hastaların hastanede yatış süreleri, işe dönme süreleri kaydedildi. Hastalar kontrollere çağrılıp nüks açısından kontrol edildiler. Postoperatif hasta konforu, komplikasyonlar, aktif yaşantıya başlama süreleri ve nüks gibi kriterler değerlendirildi. Gruplar istatistiksel olarak kıyaslandı.

Bulgular: Çalışmamızda her iki grup arasında işe dönüş süreleri, mobilizasyon, nüks, açısından anlamlı bir fark saptanmadı ($p>0,05$). Lichtenstein tekniği uygulananlarda hastanede yatış süresi, komplikasyon, ameliyat süresi açısından diğer grubu göre istatistiksel olarak anlamlı bulundu ($p<0,05$).

Sonuç: Her iki grupta benzer nüks oranlarına sahip olmakla birlikte Lichtenstein tekniğinin, ağ örme tekniğine nazaran, ameliyat süresinin kısalığı, hastanede yatış süresinin kısalığı, düşük komplikasyon oranı nedeniyle inguinal herni tedavisinde Lichtenstein tekniğinin uygulanması taraftarıyız.

Anahtar kelimeler: İnguinal herni, Lichtenstein onarım, Ağ örme onarım

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Introduction

Despite the use of personal additions by many technical surgeons in the inguinal hernia repair, there are still different methods to reduce high recurrence rates and to increase patient quality of life. Among the many hernia repair techniques, although it is connected to the surgeon, there is no big difference and it is observed that surgeons play their personal habits and education in the technical selection. Although the inguinal hernias are frequently seen in the society, the best hernia repair technique has still not been gained clearly [1].

Inguinal hernias are seen in approximately 3-8% of the population [1]. It was the most common cause of intestinal obstruction before low awareness of patients about severity of condition and high recurrence of repair techniques [2]. In males, 75-85% of the hernias are observed. Inguinal hernias constitute 80-83% of all hernias (50% indirect inguinal, 25% direct inguinal, 5% femoral). In both sexes, the most frequently observed inguinal hernia is indirect hernia. Femoral hernia is commonly seen in women [1,2]. The importance of the posterior wall of the inguinal canal was noticed in the etiology and repair of inguinal hernia. In the formation of hernias, transverse muscle was determined to play an important role in the transverse fascia. The aim of the repair is to re-fix the fascia in such a way that it does not cause transverse tension [2,3].

Patients often apply swelling (coughing, straining and sneezing) and pain complaints in the groin area. Hernia is usually determined by patients and can push the swelling back with their hands. Sometimes the swelling caused by the hernia cannot be pushed into the abdomen. Inguinal hernias can be congenital or acquired. Congenital ones have a potential hernia sac. This pouch is part of the abdominal membrane that is laying the entire abdomen inside. The relaxation that occurs in this row is manifested as a hernia after years or after birth. Among the acquired causes of inguinal hernia, we can count any incidents that increase intra-abdominal pressure, undergone surgeries, obesity, tumors, fluid collection in the abdomen, heavy lifting, and prostate diseases. Inguinal hernias are seen more frequently in males. In men, we can show that testicles are out of the abdomen, unlike the ovaries in women, and that the path followed at any time is caused by weakening and causing it to happen. Same principles may be applied to other hernia, e.g., internal hernia [4,5].

The only treatment of inguinal hernias is surgery. The herniated tissue is supported by repairing various methods. The common pubic bond between the public is not a treatment method. On the contrary, this bond weakens the inguinal canal with pressure. Surgical methods can be performed under local or general anesthesia, and the laparoscopic method is done only under general anesthesia. Inguinal hernias are diseases that must be treated surgically. Classical surgical procedures, if performed under local anesthesia, the patient can be discharged that night. After laparoscopic surgery, the patient also returns to work early as he feels little pain because of the small part of the incision. There are no big differences between the two methods. There is a possibility of recurrence of the disease after inguinal hernia surgeries. This is usually due to the ability of the surgeon, such as the accuracy of the method applied to the patient [5,6].

Common recurrence problem and testicular complications in conventional anterior hernia repairs have led surgeons to find different methods. The methods, such as Bassini, Shouldice, Halsted, McVay, have left their place in the methods of using prosthetic Mesh, such as "free Tension" Lichtenstein, Nyhus, Plug mesh and laparoscopic hernia repair. Initially, the mesh was used for incisional hernia repairs. But over time, it has been used frequently in inguinal hernias. Today, more than 80% of hernia surgeries performed in the United States are repaired with mesh [3,5,6].

In this study, we aimed to compare the mesh (Lichtenstein) technique and posterior wall darn (Moloney) technique for the repair of inguinal hernia.

Materials and methods

A prospective cohort study is designed. The sample size has been identified as 96 to show 50% difference with 10% α-error in confidence interval of 95% to present 20,000 patients. Four patients are added to reduce the margin of error, and a total of 100 patients were scheduled for the study. One-hundred consecutive inguinal hernia patients who underwent surgery at the Istanbul Education and Research Hospital, general surgery clinic were selected, and recorded a prospective database. Recurrent inguinal hernias were excluded from the study. Two groups were created for comparison from the patients in the study. Fifty patients in the first group underwent posterior wall darn repair (PWD). In second group, remaining 50 patients underwent hernia repair with Lichtenstein Tension Free (LTF) technique. Polypropylene patch used for LTF technique. No: 1 Propilen suture was used in hernia operations with PWD technique. Postoperative follow-up dates of the patients were day 1, 7 and 30. All patients were called every 6 months, and those who didn't come were followed by telephone.

Recorded parameters of the patients were surgery times, anesthesia types, early mobilization times, hospital stay periods, turn-around times, postoperative early complications and recurrence.

Statistical analysis

Statistics were performed with Statistics Package for Social Sciences (IBM SPSS statistics version 23, IBM Corporation, USA). Normally distributed descriptive continuous variables which were expressed as mean±standard deviation (SD), median, frequencies and ranges. T-test was used for comparison of descriptive variables with normal distribution and Mann-Whitney U without normal distribution. The Chi-square test was used to assess an association between qualitative variables. Differences were considered statistically significant if the p value was equal to or less than 0.05.

Results

All patients involved in the study were 30 women and 70 were men. Mean age was 54 (22-78) years. 68 patients had right inguinal hernia (female: 20, male: 48), 30 left inguinal hernia (female: 10, male: 20), 2 bilateral inguinal hernia (female: 0, male: 2). Right inguinal hernia was found significantly higher in males compared to females ($p<0.05$). Direct inguinal hernia (female: 20 in total 100 patients) 14 males: 6), 74 of indirect inguinal hernia (female: 12 males: 62), 6 patients were diagnosed

with direct + indirect inguinal hernia (female: 4, Male: 2). Indirect inguinal hernia was found higher in males ($p<0.05$) (Table 1).

Table 1: Characteristics of groups

Operation	n	Gender	
		Male	Female
LTF	50	30	20
PWD	50	40	10
Total	100	70	30

LTF: Lichtenstein tension free, PWD: posterior wall darn

An additional disease history (direct inguinal hernia: 10, indirect inguinal hernia: 4) was detected in 14 of 100 patients. Five of the patients had chronic obstructive pulmonary disease, three hypertension, two diabetes mellitus and four goiters. All comorbid patients were under medical treatment. As a result of the statistical evaluation, there was no significant difference between the types of hernia in terms of additional disease history ($p>0.05$). Twenty of the patients who operated with LTF technique (n=50) were female. Ten of the patients who operated with the PWD technique (n=50) were female.

The patients who repaired LTF were 44 indirect inguinal hernia, 12 direct inguinal hernia, and six were direct + indirect inguinal hernia. The average operating time in the LTF group was 25 minutes and 35 minutes in the PWD group. The statistical evaluation concluded that operation time of LTF method was significantly less than PWD ($p<0.05$).

Patients used in LTF technique could be mobilized in 2 hours after surgery, while the PWD has an average of 4. Statistically, there was no significant difference in the mobilization of both groups ($p>0.05$).

Average duration of hospitalization was 1 day in LTF and 2.5 days in PWD group. Both groups were compared in terms of average hospitalization; the hospitalization time was significantly shorter in LTF technique. The time for return to work in LTF technique was calculated as 14 days, and 12 days in PWD. There was no significant difference between the two groups in the statistical evaluation ($p>0.05$).

Table 2: Evaluation of complications between groups

Groups	n	Complications	p
LTF	50	4 (1 hematoma, 2 infection, 1 seroma)	0.002
PWD	50	10 (3 hematoma, 2 infection, 4 seroma, 1 paresthesia)	
Total	100	14	

LTF: Lichtenstein tension free, PWD: posterior wall darn

The PWD and LTF groups were compared to the number of complications after the surgery. The postoperative complications of LTF technique was found to be less than PWD group ($p<0.05$) (Table 2). One recurrence was observed in the LTF technique and two recurrences in the PWD technique. There was no significant difference in comparison of recurrence of both groups ($p>0.05$) (Table 3).

Table 3: Evaluation of recurrence between groups

Groups	n	Recurrence	p
LTF	50	1	0.980
PWD	50	2	
Total	100	3	

LTF: Lichtenstein tension free, PWD: posterior wall darn

Discussion

Although inguinal hernia is one of the most common surgeries in general surgery and many repair methods have been identified, efforts to search for new methods have not yet come to an end. The underlying factor in this quest is the desire to reduce the recurrence rate. In addition, in recent years, the challenges of applied technique, complication rate, length of stay in hospital and return to normal activity, and cost-effectiveness are also questioned. In such studies, it has been suggested that tension-free hernia repair with a synthetic patch is a superior alternative to open and laparoscopic techniques [7, 8].

Tension in the suture line occurs in conventional hernia repair techniques. The suture line tension can be reduced with the relaxation incision, but it cannot be eliminated. The primary etiologic factor of Herniorapy's failure is to bring the non-conflicting tissues against each other by stretching them. This is also contrary to the basic surgical principles. Sutures are caused by tearing or necrosis of nasally edged fascial repairs. Graft repair does not cause suture line tension, it permits repair of hernia without altering normal anatomy, and it reduces recurrence rate. Also technique is simple, fast, less painful and effective. Since it does not create tension, bilateral hernia repair is possible [9].

The success of the inguinal hernia operation of the transcendental love is assessed by the recurrence rate. In a study conducted by Kark et al. [10]; 1098 hernia repair was performed with LTF technique, and a recurrence of 0.1% was detected. Bellona et al. [11] performed 119 LFT repair technique and found a recurrence of 0.8%. Mc Gillicuddy [12] performed 717 hernia repair operation with LTF and Shouldice technique in 672 patients. In comparison of these techniques, 0.2% recurrence in LTF technique and 1% in Shouldice technique was detected. Soybir et al. [13] applied 116 tension-free hernia repair technique and no recurrence was detected. In a study conducted by Amid et al. [14] reported 4000 groin hernia, patients were followed for an average of 5 years, with a recurrence rate of 0.1%. In our study groups, one recurrence was observed in the LTF technique and two recurrences in the PWD technique. No statistically significant difference was found in the recurrence comparison between the techniques.

Lichtenstein used a mesh to reconstruct the inguinal floor and to eliminate tension in the suture line in "tension-free" hernia repair. Even general surgeons who did not specialize in the repair of inguinal hernias reported less than 1% recurrence rates when using Lichtenstein repair. In 1984, at the Lichtenstein Hernia Center, the technique was applied, which means that the inguinal floor was fully reinforced with a wide mesh. Her conclusion was not found in the results reported in 1989. However, a few recurrences were reported later. This technique has been widely accepted worldwide in the repair of primary and recurrent hernias [15,16]. In a 26304 case series published by Nielsen et al. [17] in 2001, use of Lichtenstein's mesh repair was reported to be 33% in 1998 and 62% in 2000.

In 1996 Voyles et al. [18] investigated the return time of cases operated for inguinal hernia in a 4688 case-based multi-center study. The cases were examined in three groups. In the first group, cases with anatomical repair (Bassini, Shouldice, net knit, etc.), in the second group with mesh repair (Lichtenstein, mesh plug etc.) and in the third group with laparoscopic inguinal hernia repair were investigated. The time to return to work was as follows: 1st group 27.3 days, 2nd group 16.4 days and 3rd

group 15.6 days. In our study, the return time of patients to work was found to be 14 days in patients who underwent non-mesh repair and 12 days in patients who underwent mesh repair. However, as a result of statistical evaluation, no significant difference was found between the two groups.

Eryılmaz et al. [19] found chronic pain in the study of 5.3% after hernia repair, 6% after polypropylene mesh repair and 4% after Bassini repair with posterior wall darn method. In a study conducted by Koukourou et al. [20]; a total of 100 patients, 54 patients underwent mesh suture repairs, remaining underwent non-mesh repair, no significant difference was found between postoperative pain scores and analgesic requirements, early and late complications and return to normal activity, and recurrence rate was reported to be 4% in both groups.

Posterior wall darn technique provides support for the weak areas of the inguinal canal. Over time, the weaves are filled with fibrous tissue and become a natural graft. With the passage of time, the back wall of the inguinal canal becomes more solid. The material used maintains its strength for a long time. Because it is resistant to infection and elasticity it prevents recurrence. This technique is a good surgical technique that can always be applied safely in inguinal hernia repair. Because the inguinal region anatomy, repair can be made without tension. Therefore there is no tension and tear in the tissues with this technique. In the post-operative period, the patients feel less pain and live comfortably. Today's economic evaluations are taken into account in the success of surgery. It is considered that the method applied to the active work life of the patient is successful if it takes place in the short postoperative period [21,22]. In our study, pain and tension in the groin during the postoperative period, difficulty in walking were not observed in both groups. We refer to this as non-steroidal anti-inflammatory treatment after surgery. These results are easy to apply in both techniques and are an indication that the method improves the postoperative comfort of the patient and is less expensive than laparoscopic methods. One of the important advantages of both techniques is that it can be applied to bilateral inguinal hernias. Simultaneous surgery of the bilateral hernia creates less psychological stress for the patient; the patient is less likely to work for less and is cheaper. Bilateral inguinal hernias are suggested because of the absence of tension on the tissues and the lower recurrence rate [21,22]. In our study, no problems were encountered in postoperative follow-up of the patients.

Many centers in the world are applying LTF repair with local anesthesia. The results are quite pleasant. With this method, patients can be discharged to their homes the same day. In our study, a total of 93 patients underwent local anesthesia and seven patients under general anesthesia. Patients who did not have any problems in the postoperative follow-ups of these patients and who were operated with LTF technique were found to have an average of 2.5 days on the postoperative day, and 2.5 times on the PWD technique. They were discharged to their homes in a day. In addition, LTF technique was applied in a shorter period and statistically significant [23,24].

Some limitations are available in our study. Studied number of patients to evaluate the recurrence rate of such common diseases may be accounted as main limitation. We found aforementioned parameters different between LTF and PWD. Our study design was a non-randomized one; this will lessen the strength of our study. New prospective randomized controlled studies are needed to reveal this issue more promptly.

In conclusion, many surgeries around the world have done research on what they do; The LTF technique is a simple, reliable and effective method for hernia treatment. This technique is advantageous when compared with other conventional methods, with postoperative comfort, early return to normal daily activity, low recurrence, low cost, early return to work, low complication rate. It is also an important advantage that it can be applied with local anesthesia. In this way, patients can be discharged to their homes on the day of operation. LTF is also an important advantage for hernia repair because it is a safe method that can be used safely in recurrent hernias. We have found that our study is close to almost the same advantages except recurrent hernias. As a result of this study; although we have similar advantages in both groups, we favor the application of LTF technique in inguinal hernia primarily because of the short operation time, short hospitalization time, and low complication rate compared to the PWD technique.

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