

## COMPARISON OF LICHTENSTEIN AND DESARDA REPAIRS IN INGUINAL HERNIAS IN TERMS OF POSTOPERATIVE CHRONIC PAIN AND RECURRENS; A PROSPECTIVE RANDOMIZED TRIAL

KASIK FITIKLARINDA LICHTENSTEIN VE DESARDA ONARIMLARININ POSTOPERATİF KRONİK AĞRI VE NÜKS YÖNÜNDEN KARŞILAŞTIRILMASI: PROSPEKTİF RANDOMİZE BİR ÇALIŞMA

Ersin TURAN<sup>1</sup>, Kemal ARSLAN<sup>1</sup>, Bülent ERENOĞLU<sup>2</sup>, Ramazan Saygın KERİMOĞLU<sup>1</sup>, Süleyman Said KÖKÇAM<sup>3</sup>, Hande KÖKSAL<sup>1</sup>, Osman DOĞRU<sup>1</sup>

<sup>1</sup> Konya Şehir Hastanesi, Genel Cerrahi Kliniği, Konya, TÜRKİYE

<sup>2</sup> Özel Farabi Hastanesi, Genel Cerrahi Kliniği, Konya, TÜRKİYE

<sup>3</sup> Meram Devlet Hastanesi, Genel Cerrahi Kliniği, Konya, TÜRKİYE

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### Öz

#### Amaç

Hasta konforu inguinal herni cerrahisinde başarıyı belirleyen temel unsurlardandır. Mesh kullanımı nüks sorununu ciddi şekilde çözmüş olsa da yeni bir sorun olarak kronik ağrı problemini doğurmuştur. Desarda tekniği eksternal oblik kas aponevrozunu kullanan bir yöntemdir ve fizyolojiye uygulunun yanında düşük nüks oranları ile popülerlik kazanmıştır. Çalışmanın amacı Desarda ve Lichtenstein tekniklerinin nüks, kronik ağrı ve hasta konforu açısından karşılaştırılmasıdır.

#### Gereç ve Yöntem

Ekim 2010 ve Şubat 2014 tarihleri arasında Konya Eğitim ve Araştırma Hastanesi Genel Cerrahi Kliniği'ne kasık fıtığı şikayeti ile müracaat eden hastalar çalışmaya dahil edildi. Hastalar kapalı zarf usulü ile randomize edilerek 2 gruba ayrıldı. İlk gruba Desarda prosedürü (D), ikinci gruba Lichtenstein prosedürü (L) uygulandı. Her 2 teknik de orijinal tarif edildiği şekli

ile uygulandı. Kronik ağrının değerlendirilmesinde kullanılan anketler hastalara ameliyat öncesi, ameliyat sonrası 1. ve 3. yılda uygulandı.

#### Bulgular

Desarda grubunda 80, Lichtenstein grubunda 82 olmak üzere toplamda 162 hasta değerlendirmeye alındı. Ortalama takip süresi 122 (96-145) aydı. Her 2 gruptan da 2 'şer hastada nüks gözlemlendi. Ameliyat öncesi ağrı değerlendirilmesinde gruplar arasında fark yoktu. Yine ameliyat sonrası 1. ve 3. yılda ağrı şiddet, sıklık ve hareket kısıtlılığında gruplar arasında anlamlı fark yoktu. Ortalama ameliyat süreleri sırasıyla 44.5±3.7 dk. ve 56.7±2.97 dk. olmak üzere D grubunda daha kısaydı. Fark istatistiksel olarak anlamlıydı (p<0.001). Gruplar arasında komplikasyonlar açısından anlamlı fark yoktu.

#### Sonuç

Desarda tekniği; dünya genelinde en sık uygulanan ve yama kullanılarak gerçekleştirilen Lichtenstein tekniği ile aynı seviyede nüks, kronik ağrı ve komplikas-

**Sorumlu yazar ve iletişim adresi /Corresponding author and contact address:** E.T. / opdrsinturan@gmail.com

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**ORCID IDs of the authors:** E.T: 0000-0002-6413-6949; K.A: 0000-0002-3880-8318;

B.E: 0000-0002-3167-4310; R.S.K: 0000-0003-3149-9636; S.S.K: 0000-0002-9787-1851;

H.K: 0000-0002-9668-7913; O.D: 0000-0002-8761-3904

yon oranı ile güvenle uygulanabilir. Dahası onarımın fizyolojiye uygun olması, yabancı cisim içermemesi, kolay öğrenilip uygulanması ve maliyet avantajı olması da yöntemin ek avantajlarıdır.

**Anahtar Kelimeler:** Desarda onarımı, Hasta konforu; Kasık fıtığı, Kronik ağrı, Lichtenstein onarımı

## Abstract

### Objective

Patient comfort is an important factor affecting the outcome and success of inguinal hernia repairs. Mesh usage significantly decreases recurrence rate however, the problems due to mesh usage negatively affects the patient comfort. Desarda repair using the body's own tissues has gained importance because it is more physiological and has low recurrence rates. In this study, we aimed to compare Desarda and Lichtenstein repairs in terms of chronic pain and recurrence.

### Material and Method

Patients who were operated on at Konya Training and Research Hospital between October 2010 and February 2014 were included in the study. Randomization was done using the closed envelope method. Desarda repair was performed in the first group (D), and Lichtenstein repair was performed in the second group (L). Both techniques were applied

as originally described. 3 questionnaires were used in the assessment of chronic pain. All three questionnaires were filled before the operation, after first and third year from the operation.

### Results

162 people participated in the research. There were 80 people in the Desarda group and 82 in the Lichtenstein group. The median follow up time was 122 (96-145) months. There were 2 cases with recurrence in each groups. Preoperative pain levels were similar. The pain incidence, severity and limited activity were similar in the first and third years. The mean operation time was significantly lower in D group than L group (44.5±3.7 min and 56.7±2.97 min respectively). Complication rates were similar in both groups.

### Conclusion

Desarda technique can safely used for hernia repair with its similar recurrence, complications and chronic pain rates with the most commonly used Lichtenstein technique. Moreover, it is advantageous with physiological closure of myopectineal orifice, being easy to perform, not containing foreign material and being cost-effective.

**Keywords:** Chronic pain, Desarda repair, Inguinal hernia, Lichtenstein repair, Patient comfort

## Introduction

Inguinal hernia surgeries are one of the most common surgeries around the world. Recurrence, which was a big problem after inguinal hernia surgeries in the past, lost its importance after the use of the patch. Therefore, surgeries using a patch are considered the gold Standard today (1-3). In addition to this success of surgeries performed with patches, unfortunately, the problem of chronic pain that negatively affects patient comfort has emerged.

Although it is reported to be less common with the use of light mesh, chronic inguinal pain can be seen in up to 1/3 of the patients after hernia repair with mesh (4, 5). In 2001, Desarda brought a new perspective to the balance of relapse and chronic pain by explaining the results of the method he described. In this new method described by Desarda, he used the aponeurosis of the external oblique muscle instead of a synthetic patch. Thus, he avoided the negative

effects of the synthetic patch and stated in his article a very low recurrence rate of 0.25% (6).

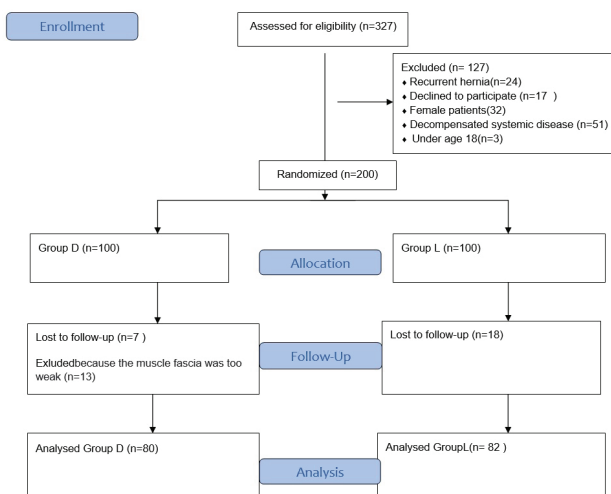
The common result of studies in the literature comparing Desarda and Lichtenstein procedure, the most commonly performed patch surgery, is the lack of randomized prospective studies with longer follow-up.

Our aim in this study is to compare the results of recurrence and chronic pain of Desarda and Lichtenstein techniques.

### Material and Method

Patients who were operated on at Konya Training and Research Hospital between October 2010 and February 2014 were included in the study. Randomization was done using the closed envelope method. All patients were given detailed information about both surgical methods. Desarda repair was

performed in the first group (D), and Lichtenstein repair was performed in the second group (L). Both techniques were applied as originally described (6, 7). All surgeries were performed by the same 2 surgeons with experience in hernia. Demographic information of the patients, hernia types, the performed operation, the duration of the operation, postoperative complications, pain and comfort in preoperative, first and third years after the operation were recorded in special forms prepared for these patients. The study was planned for a total of 200 patients in two groups of 100 patients each. Female patients, bilateral hernias, recurrent hernias, femoral hernias, patients younger than 18 years of age, patients with concomitant systemic diseases (for example diabetes, cirrhosis, advanced heart failure), those with immune system disorders in terms of infection risk and those who could not be treated during follow-up were not included in the study. Patients whose external oblique muscle fascia was too weak to be repaired during surgery were subsequently excluded from the study. Finally, the number of patients included in the study for groups D and L was 80 and 82, respectively (Fig 1). The type of anesthesia to be applied to all patients was determined by the anesthesiologist, who did not know the surgical technique to be applied and who also took into account the patient's wishes and compliance. Necmettin Erbakan University Meram Medical Faculty Ethics Committee's approval, numbered 2013/117, was obtained for the study. All patients were informed with a detailed patient consent form before the surgery and their signed consent was obtained. The study adhered to the Declaration of Helsinki. Pain and comfort assessment was performed according to the Fig 1.



**Figure 1**  
Flow chart

### Chronic Pain and Patient Comfort

In the evaluation of chronic pain questionnaires were used (See Appendix). The first of the questionnaires (Questionnaire-a) is aimed at determining the incidence of chronic inguinal pain, the second (Questionnaire-b) the possible limitation of movement caused by the pain, and the third (Questionnaire-c) is aimed at determining the subjective severity of pain as mild, insignificant, moderate, severe. Survey study was used. Questionnaires were administered to the patients three times, in the preoperative period and in the first and third year postoperatively. In the evaluation of the questions to determine the incidence of chronic pain in questionnaire a, and questionnaire b, 2 points were given to the "Yes" answer and 1 point to the "No" answer. In questionnaire c, the answer was given 1 point for the "No pain" answer, 2 points for the "Insignificant pain" answer, 3 points for the "Moderate pain" answer, and 4 points for the "Severe pain" answer. Scores were used in the statistical evaluation.

### Statistical Analysis of Data

Data analysis was performed using IBM SPSS statistics version 22 software. In the statistical analysis, continuous variables were presented as mean  $\pm$  Standard deviation, and data that did not fit were presented as median (min-max). Categorical data were expressed as percentages (%). In the analysis of quantitative data, Student's t-Test was used for those with normal distribution, and Mann-Whitney U Test for those who did not. Chi-square test was used in the analysis of qualitative data. A  $p < 0.05$  level was considered significant in all analyses.

### Results

Information such as the age of the patients, body mass index (BMI), follow-up times, length of hospital stay, type of surgery and return to normal activities are shown in Table 1. No significant difference was observed in terms of these data.

The mean follow-up period of the study was 122 (96-145) months. The operation time was  $44.5 \pm 3.7$  minutes in the D group and  $56.7 \pm 2.97$  minutes in the L groups, and the difference was significant.

The distribution of hernia types belonging to both groups according to the modified Gilbert classification is shown in Table 2. No significant difference was observed in terms of these data. In total, 20 (13%) of 162 patients underwent general anesthesia, 142 (87%) underwent spinal anesthesia. Local anesthesia was not applied to the study patients. (Table 3).

Table 1

Age, body mass index (BMI), follow-up time, hospital stay, surgery and return to normal activities of the patients according to the groups

Groups	Age	BMI mean±SD	Following time median (at leastmost)	Length of stay in hospital, days	Return to normal activity, days	Operation time, min
Group D (n=80)	51,35±5.13	24,45±0.52	96-144(122)	1,18±0,38	6.3±1.03	44.5±3.7
Group L (n=82)	50,58±4.18	24,35±0.69	96-144(122)	1,22±0,33	6.6±1.12	56.7±2.97
P	> 0.05	> 0.05	> 0.05	> 0.05	> 0.05	< 0.001

Table 2

Examination of hernia types according to the Modified Gilbert classification

	Group D n( %)	Group L n%	Toplam n %
Type I	6 (7%)	7(9%)	14(8%)
Type II	23(29%)	24(30%)	48(30%)
Type III	19(24%)	19(23%)	39(23%)
Type IV	21(26%)	21(24%)	42(25%)
Type VI	11(14%)	11(14%)	23(14%)
Total	80(100%)	82(100%)	162(100%)

Table 3

Distribution of anesthesia types according to groups.

Items		Group D n(%)	Group L n(%)	Toplam n(%)
Applied Anesthesia	General Anesthesia	7 (9%)	13(17%)	20(13%)
	Spinal Anesthesia	73(91%)	69(83%)	142(87%)
Total		80(100%)	82(100%)	162(100%)

Table 4 shows the postoperative complications. The data of both groups are similar. All complications were resolved with simple medical interventions.

Recurrence occurred in 2 patients (2.5%) from both groups, and no significant difference was observed in terms of these data. Preoperative pain values were similar in both groups. Table 5 shows the

evaluation of the questionnaire questions consisting of three groups of questions, the first of which is to determine the incidence of pain, the second to determine possible limitation of movement, and the third to determine the subjective severity of pain, before the operation, in the first and third years after the operation, to determine chronic pain and comfort. First of all, there was no difference according to

**Table 4** Postoperative complication rates.

	D (n=80) n (%)	L (n=82) n(%)	Toplam n(%)
Wound infection	0(0%)	1(1%)	1(0.5%)
Seroma	1(1%)	3(4%)	4(2.5%)
Hematoma	2(3%)	1(1%)	3(2%)
Scrotal edema	0(0%)	1(1%)	1(0.5%)
Cord edema	1(1%)	0(0%)	1(0.5%)
Total	4(5%)	6(7%)	10(6%)

**Table 5**

Evaluation of the questionnaire questions to determine the incidence of pain, limitation of movement due to pain, and severity of pain before and after surgery

Items	Group D	Group L	p
Preoperativeincidence	1.38±0.06	1.47±0.05	>0.05
Postoperativeincidence	1.42±0.07	1.31±0.05	>0.05
Preoperativelimitation of mobility	1.99±0.10	1.86±0.07	>0.05
Postoperativelimitation of mobility	2.03±0.07	2.00±0.07	>0.05
Preoperativepainintensity	2.39±0.13	2.33±0.15	>0.05
Postperativepainintensity	1.26±0.09	1.63±0.10	>0.05

the questionnaire questions asked whether there was pain before and after the surgery. Although the overall limitation decreased significantly in all groups in determining the activities that were restricted due to the pain asked after wards, this difference was not significant when the groups were analyzed separately. In the evaluation of the questions measuring the severity of pain, the severity of pain in both groups of patients showed a significant change from moderate to insignificant pain compared to preoperatively. Although the decrease in pain

## Discussion

Inguinal hernia surgeries are one of the most common surgeries around the world. While the problem of recurrence has been reduced with tension-free hernia repairs, patient comfort has become the most important parameter that determines the quality of surgery. In this study, we compared the Desarda procedure, which is described as a patchless and

physiology-friendly method, and the Lichtenstein procedure, which is the most frequently applied patch procedure worldwide, in terms of recurrence and patient comfort. Our study is the longest-term randomized, prospective study comparing these methods in the literature. According to our study, the Desarda procedure was as successful as the Lichtenstein procedure in terms of patient comfort and recurrence after 10 years of follow-up.

The recurrence rate of the Lichtenstein operation, which is the most frequently performed patch surgery worldwide, is around 1% in experienced hernia clinics. Ratios reaching up to 18% have been reported in the literature (8). N Gutlic et al. reported the recurrence rate as 2% in their article (9). Again, Faessen, J.L et al. Found the recurrence rate below 1% in their study (10). In the article in which Desarda published the results of the method named after him for the first time in 2001, he stated the recurrence rate of the Desarda procedure as 0.25% (6). Desarda did not report recurrence in his

article published in 2008(11). Mitura K et al. Found no recurrence in both groups in the early results of their study in which they encountered Desarda and Lichtenstein operations (12). Arslan K. et al. In their study, which stands out as being the first Desarda study conducted in Turkey, they determined the recurrence rate as 1.3% in the 22-month follow-up in the Desarda procedure (13). In our study, the recurrence rates of Desarda and Lichtenstein operations were similar and were around 2%. Current recurrence rates were consistent with the literature. In the literature, the average complication rate after inguinal hernia surgery ranges from 5% to 18% (14, 15). Woodfield J et al. in their study, they found the complication rate to be 16.8% after hernia surgery (16). Arslan K et al. in their study comparing preperitoneal repair and Lichtenstein procedures, they found the complication rates to be 27% and 20%, respectively (17). J. Szopinski et al., in their study comparing the Desarda and Lichtenstein procedures, found the complication rate to be 18% and 20%, respectively (18). In our study, when the patients were examined in terms of postoperative complications, hematoma was observed in 2 patients, cord edema in 1 patient, and seroma in 1 patient in the Desarda group. Seroma in 3 patients, hematoma in 1 patient, scrotal edema in 1 patient, and wound infection in 1 patient were observed in the Lichtenstein group. All complications were resolved with simple medical interventions. In our study, Desarda and Lichtenstein operations were similar in terms of complications. Complication rates were observed around 5-6% and they were more successful in terms of results compared to the literature.

Every surgeon knows very well that pain can occur in acute and chronic periods after inguinal hernia operations. However, the exact prevalence and underlying causes, the duration of the pain and the social consequences of this pain are not fully understood entities.

This pain is mainly caused by the stimulation of afferent nerves as a result of the activation of skin and subcutaneous receptors. Nerve damage in the acute and chronic periods is a risk factor for chronic pain. Reducing tension in hernia repairs provides significantly lower pain rates in patients. It is clear that tension-free techniques have lower pain rates than tensioned techniques, and preperitoneal approaches have lower pain rates than anterior approaches (19-22). In a comparative study in which postoperative pain was evaluated over a two-month period, Zieren et al. found that patients who were repaired with the laparoscopic and tension-free plug method had significantly less postoperative pain

and need for analgesics compared to the patients who underwent Shouldice repair (23). Jensen EK et al. reported in their study that chronic inguinal pain was seen around 2-8% after hernia surgery using a patch (24). Sivarajah V. et al. reported that the rate of chronic inguinal pain reached 12% in patients who underwent the Lichtenstein method (25). Desarda did not mention patient comfort in their studies. However, Mitura K et al. compared Desarda and Lichtenstein procedures in terms of chronic pain and found no significant difference (12). Again, J. Szopinski et al. When the Desarda and Lichtenstein procedures were compared in terms of chronic pain, there was no statistical difference, although less chronic pain was observed in the Desarda procedure (18).

In our study, according to the results of the questionnaire applied to the patients at the end of the first and third years, the results of the Desarda and Lichtenstein operations were similar. Although the Desarda operation seemed to be slightly more successful in terms of pain incidence, severity of pain and limitation of movement due to pain.

Desarda did not mention it in his own articles, but during our study, we noticed that the external oblique muscle aponeurosis was too weak to be repaired in 13 patients, and we excluded these patients by performing the Lichtenstein operation. We think that surgeons who will apply the method should pay attention to this point.

## Conclusion

Our study shows that after 10 years of follow-up, the Desarda procedure is as comfortable and safe as the Lichtenstein procedure. Moreover, it is advantageous with physiological closure of myopectineal orifice, being easy to perform, not containing foreign material and being cost-effective.

## Conflict of Interest Statement

The authors have no conflicts of interest to declare.

## Ethical Approval

Necmettin Erbakan University Meram Medical Faculty Ethics Committee's approval, dated 27.03.2013 and numbered 2013/117, was obtained for the study. The study adhered to the Declaration of Helsinki.

## Consent to Participate and Publish

All patients were informed with a detailed patient consent form before the surgery and written informed consent to participate and publish was obtained from all individual participants included in the study.

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## Availability of Data and Materials

All data can be shared upon request.

## Authors Contributions

ET: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Validation; Visualization; Writing-original draft.

KA: Supervision.

BE: Formal analysis; Investigation; Visualization.

RSK: Formal analysis; Investigation; Visualization.

SSK: Formal analysis; Investigation; Visualization.

HK: Supervision.

OD: Supervision, Writing-review & editing.

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## APPENDIX

### Questionnaire A

#### Question

1. In the last month before the operation, did you feel pain in the area of your inguinal hernia?
  - I) Yes
  - II) No
  - 5) Shopping?
    - I) Yes
    - II) No
    - III) Don'tknow
    - IV) Did not apply
2. If you have had pain in your groin in the past month, have you been tested or treated?
  - I) Yes
  - II) No
  - 6) Driving?
    - I) Yes
    - II) No
    - III) Don'tknow
    - IV) Did not apply
3. If you have had pain in your groin in the last month, is it related to your work or daily activities?
  - I) Yes
  - II) No
  - 7) Travel by train or bus?
    - I) Yes
    - II) No
    - III) Don'tknow
    - IV) Did not apply

### Questionnaire B

#### Question

Identify the following activities that are restricted due to pain in the groin.

- 1) Don't get up from the low chair?
  - I) Yes
  - II) No
  - III) Don'tknow
  - IV) Did not apply
  - 8) Daily sports activities?
    - I) Yes
    - II) No
    - III) Don'tknow
    - IV) Did not apply
- 2) 30 min. sitting for longer than?
  - I) Yes
  - II) No
  - III) Don'tknow
  - IV) Did not apply
- 3) 30 min. standing for longer than?
  - I) Yes
  - II) No
  - III) Don'tknow
  - IV) Did not apply
- 4) Stair climbing?
  - I) Yes
  - II) No
  - III) Don'tknow
  - IV) Did not apply

### Questionnaire C

How strong is typical pain?

- 1) At rest?
  - a) No pain
  - b) Insignificant pain
  - c) Moderatepain
  - d) Severe pain
- 2) During physical activity?
  - a) No pain
  - b) Insignificant pain
  - c) Moderate pain
  - d) Severe pain