

# Desarda's Tissue Repair Versus Lichtenstein Tension-Free Mesh Repair In The Treatment Of Primary Inguinal Hernia: A Cross-Sectional Observational Single-Institutional Study

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**Abstract:** Inguinal hernias, which affect around 27% of men and 3% of women during their lifetime, constitute one of the most frequently treated surgical conditions [1]. Hernias arise when tissue, usually intestinal, bulges through a vulnerable area in the abdominal muscles, resulting in discomfort, pain, and potential complications if left untreated [2]. Surgical intervention remains the definitive treatment, with various techniques available, which can be broadly categorized into tissue repair and mesh-based repair methods [3].

## INTRODUCTION

Inguinal hernias are divided into three main categories by the European Hernia Society (EHS): direct, indirect, and femoral hernias [4]. Indirect hernias, which are frequently caused by congenital conditions, pass through the deep inguinal ring, whereas direct hernias arise from a weakening in the transversalis fascia, usually in the Hesselbach triangle. Femoral hernias, although less common, occur below the inguinal ligament and are more frequently seen in females. This classification not only aids in the diagnosis but also influences surgical approach and technique selection.

Two prominent surgical techniques for inguinal hernia repair are DR and LT. Desarda's technique, developed by Indian surgeon Dr. Desarda MP, emphasizes the utilization of the patient's own tissue, avoiding synthetic materials. This technique entails the reinforcement of the fascia transversalis, with the objective of restoring the abdominal wall's anatomy and strength, potentially minimizing the likelihood of foreign body reactions and chronic pain associated with synthetic mesh [5,6].

In contrast, LT, introduced in 1989, has gained widespread acceptance due to its simplicity and effectiveness. Using a polypropylene mesh, this tension-free mesh technique supports the weakened abdominal wall, allowing for immediate load-bearing and demonstrating lower recurrence rates compared to traditional methods. LT is often associated with shorter operative times and faster recovery periods, making it a preferred choice in many surgical centers [7].

Despite the established benefits of both techniques, ongoing debate surrounds their comparative effectiveness, particularly regarding postoperative pain, complication rates, recovery time, and recurrence rates. According to some research, using mesh may increase the risk of persistent pain and complications including infection, whereas tissue repair methods like DR may offer a more physiologic approach with fewer long-term sequelae [8].

The aim of this cross-sectional observational study is to assess and compare the results of DR versus LT in the treatment of primary inguinal hernias, categorized according to EHS classification. By analyzing factors such as operative time, postoperative pain, complication rates, and recurrence, this research aims to add to the ongoing discourse over an optimal operative method for inguinal hernia repair, ultimately guiding clinical practice and improving patient outcomes.

We anticipate that this study will shed light on the merits and disadvantages of each procedure, giving surgeons with vital information when deciding which method to employ based on individual patient circumstances and hernia classification.

## MATERIALS & METHODS

### Study Design

This cross-sectional observational study was conducted over a one-year period from February 2023 to January 2024 at the department of general surgery, general medicine and obstetrics and gynaecology of our hospital. This study aimed to assess the results of DR and LT in individuals with primary inguinal hernias.

### **Ethical Considerations**

This study followed ethical guidelines and received approval from our hospital's institutional review board. Prior to enrollment, informed consent was provided by all participants, attesting to their complete understanding of the purpose of the study as well as any potential risks. Participants were free to opt out from the study at any point without impacting their medical care. Confidentiality was maintained throughout the study by anonymizing data and securely storing records.

### **Study Criteria**

This study comprised adult patients aged 18 or older being diagnosed with primary inguinal hernias, classified as either direct or indirect according to the EHS criteria, who were candidates for elective surgical intervention due to symptomatic hernias. Eligible participants were required to provide informed consent for participation. Exclusion criteria encompassed individuals with a history of prior repair of inguinal hernia on the affected side, recurrent hernias, or those presenting with complicated hernias such as incarcerated or strangulated cases. Patients with significant comorbidities that could adversely affect surgical outcomes, such as severe cardiopulmonary disease or immunocompromised status, were also excluded, along with pregnant or breastfeeding women and those with known allergies to materials used in either surgical technique. Furthermore, individuals with uncontrolled medical conditions, like uncontrolled diabetes, that could complicate the surgery or healing process were not eligible for inclusion in the study.

### **Participants**

A total of 70 participants who underwent inguinal hernia repair were included in the study: Group A, which underwent DR, and Group B, which received LT. Prior to enrolment, informed consent was acquired from each participant, ensuring ethical compliance for the duration of the study.

### **Data Collection**

Data collection was performed systematically at various time points throughout the study to evaluate the outcomes of both surgical techniques. Preoperative data were gathered prior to surgery, which consisted demographic data such as gender and age, as well as clinical details regarding the type (direct or indirect) and site (left or right) of the hernia. This baseline information was essential for characterizing the study population and ensuring comparability between the two groups.

Postoperative assessments were conducted at key intervals to monitor recovery and complications. On POD 0, pain scores were recorded using VAS. Subsequent evaluations occurred on POD 3 and POD 7, during which pain scores were reassessed, and any early complications were documented. From the date of surgery until the six-month follow-up, a comprehensive evaluation was performed, including pain scores, wound assessments using the Southampton wound score (SWS), documentation of return to routine daily activities, and an assessment for any recurrence of the hernia. Additionally, the duration of hospitalization was noted from the date of surgery until discharge, allowing for a thorough comparison of outcomes between DR group and LT group.

### **Statistical Analysis**

Data were analyzed using SPSS version 21.0 (IBM Corp., Armonk, NY) to determine the significance of differences between the two groups, Group A (DR) and Group B (LT). The study employed descriptive statistics, such as frequencies for categorical variables and standard deviations and means for continuous variables, to provide a summary of the demographic and clinical characteristics. Independent t-tests were utilized for continuous variables, such as pain scores and length of hospital stay, in order to compare groups, while chi-square tests were used for categorical variables, such as gender and type of hernia. Significant variations in the results between the two surgical procedures were indicated by a p-value of <0.05, which was deemed significant statistically. The analysis aimed to provide insights into the effectiveness and safety of each repair method in the context of primary inguinal hernias.

### **Operative Procedure**

Patients of both the groups had identical preoperative evaluation, skin preparation and administration of antibiotics (Injection ceftriaxone 1gm given intravenously, half hour prior to surgery). The initial steps of the DR and LT procedures for inguinal hernia repair are identical; they involve dissecting the subcutaneous tissue, making a transverse incision in the inguinal region, and separating the external oblique fibers to reveal the hernial sac. However, they differ in their approach to repairing the inguinal canal's posterior wall.

The DR diverges from the LT in that it uses the external oblique aponeurosis (EOA) and cremasteric fascia for repair, whereas the LT employs a mesh (polypropylene or polyester) to reinforce the posterior

wall. This fundamental difference in material used for repair marks the primary point of departure between the two procedures. In both techniques subcutaneous tissue is closed with absorbable sutures, and the skin is closed using either simple sutures or skin staples.

Postoperative care includes monitoring the patient in the recovery area, providing guidance on pain management and activity limitations, and scheduling follow-up visits to evaluate healing. DR leverages the patient's own tissue, potentially lowering the risk of complications associated with synthetic mesh repairs.

A representative image of DR where upper leaf of EOA is sutured with reflecting part of the inguinal ligament (figure 1), creating a strip of EOA and then suturing with conjoint tendon (figure 2), suturing the newly created upper leaf of EOA with lower leaf of EOA (figure 3).

A representative image of polypropylene mesh used in LT (figure 4).



Figure 1: Upper leaf of EOA sutured with reflecting part of Inguinal ligament (indicated by black arrow)

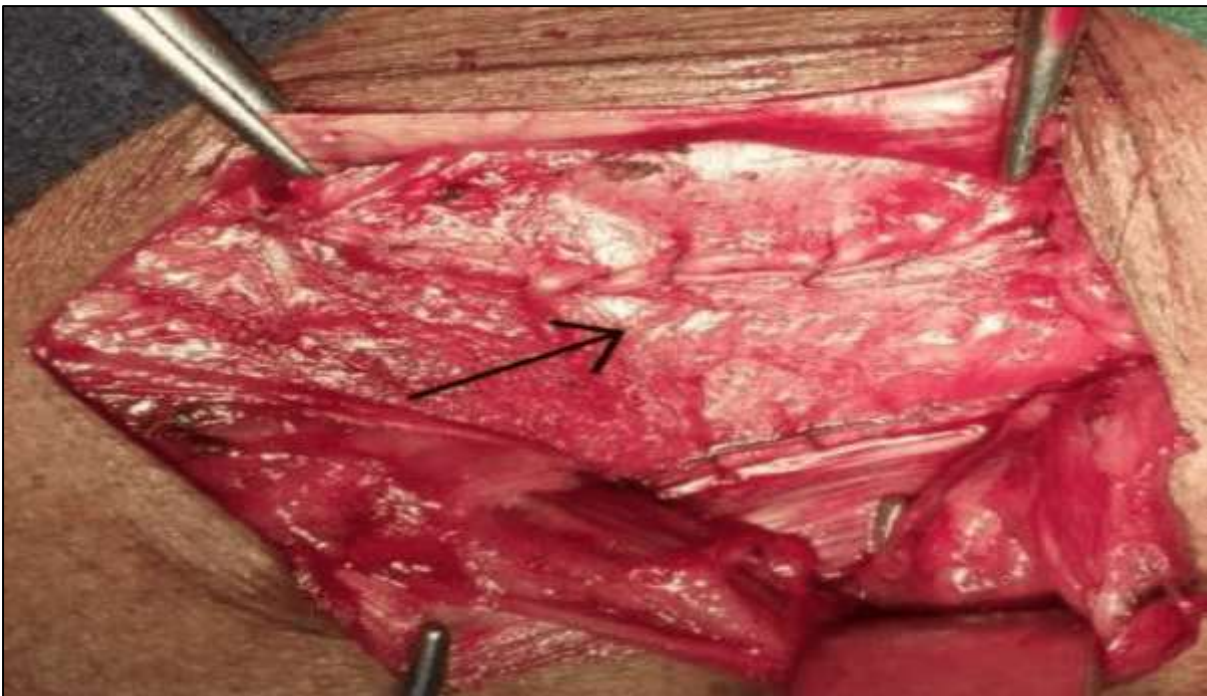


Figure 2: Strip of EOA created and sutured with conjoint tendon (marked with black arrow)



Figure 3: Newly formed Upper leaf of EOA sutured with lower leaf of EOA (marked with black arrow)



Figure 4: Polypropelene mesh used in Lichtenstein tension-free mesh repair (marked with black arrow)

## RESULTS

Patients in the LT group averaged 42.25 years of age, compared to 40.45 years in the DR group. A p-value of 0.657 indicates that the age difference between the two groups is insignificant statistically. The gender distribution is identical in both groups, with no significant difference in the proportion of males and females.

Patients with direct and indirect hernias were equivalent in both groups, with no discernible variation statistically, as indicated by the p-value 0.584 and 0.781 respectively. The distributions of right-sided and left-sided hernias were comparable in both groups, with p-value 0.462 and 0.591 respectively, indicating no statistical significance.

The above mentioned demographic details are given in Table 1.

Parameters	DR (n=35)	LT (n=35)	p-value
Age	40.45 ± 14.6	42.25 ± 15.7	0.657
Sex			1
Male	33 (94.3%)	33 (94.3%)	
Female	2 (5.7%)	2 (5.7%)	
Hernia			
Direct	6 (17.14%)	5 (14.28%)	0.584

Indirect	29 (82.86%)	30 (85.72%)	0.741
Side			
Left	14 (40%)	12 (34.3%)	0.462
Right	21(60%)	23 (65.7%)	0.591

Table 1: Demographic details of the patients

DR - Desarda tissue repair

LT - Lichtenstein tension-free mesh repair

Continuous variables mentioned as mean  $\pm$  Standard deviation

Categorical variables are mentioned as count (percentage)

The average operating time for the DR technique was 64.6 minutes, while for the LT technique, it was 68.4 minutes. The statistical analysis reveals that there is insignificant difference in operating times between the two surgical techniques, as indicated by the p-value of 0.328.

On POD 1, patients who underwent DR reported significantly higher levels of pain compared to those who had LT. Strong statistical significance is demonstrated by a p-value of <0.001.

There was no statistically significant difference in the pain levels between the two groups at POD 3 and POD 7.

No discernible difference in pain levels amongst the two groups six months after the surgery was seen, indicating that the long-term effects of both procedures on postoperative pain are comparable.

Individuals undergoing DR experienced a notably reduced length of hospital stay (3.3 days) in contrast to those undergoing the LT (4.2 days). This difference is significant statistically, as indicated by the p-value of <0.001.

The above mentioned parameters are given in Table 2.

Parameters	DR	LT	p-value
Operating Time	64.6 $\pm$ 8.7	68.4 $\pm$ 7.2	0.328
<b>Pain Score</b>			
POD 0	4.2 $\pm$ 0.95	3.2 $\pm$ 0.54	<0.001
POD 3	2.8 $\pm$ 0.45	2.9 $\pm$ 0.65	0.356
POD 7	2.2 $\pm$ 0.6	2.3 $\pm$ 0.4	0.432
6 MONTHS	0.6 $\pm$ 0.71	0.7 $\pm$ 0.76	0.775
Duration of hospital stay	3.3 $\pm$ 0.78	4.2 $\pm$ 0.68	<0.001

Table 2: Assessment of operative time, pain score using VAS and duration of hospital stay

DR - Desarda tissue repair

LT - Lichtenstein tension-free mesh repair

POD - Postoperative day

Variables mentioned as mean  $\pm$  standard deviation

On comparing the wound complications with help of SWS, The proportion of patients with Grade 0 wounds (no complications) and Grade 1 wounds (mild complications) on POD 1 is comparable amongst the two groups, with statistically insignificant difference (p-value 0.721 and 0.759 respectively). Likewise, there was statistically insignificant difference in the percentage of patients with Grade 0 and Grade 1 wounds at seven days following surgery (p-values of 0.653 and 0.687).

No patients in either group experienced even Grade 1 complications at the six-month mark.

While patients who underwent DR returned to routine activities sooner than those who had the LT, the difference between the two groups was statistically insignificant (p-value 0.327). This indicates that both techniques allow for a relatively similar recovery time in terms of returning to daily activities.

The absence of recurrences in both groups indicates that both surgical techniques are effective in preventing hernia recurrence in the short term.

The above mentioned parameters are given in Table 3.

Parameters	DR (n=35)	LT (n=35)	p-value
Surgical Wound			

POD 1			
Grade 0	22 (62.9%)	24 (68.6%)	0.721
Grade 1	13 (31.9%)	11 (31.4%)	0.759
POD 7			
Grade 0	24 (68.6%)	26 (74.3%)	0.653
Grade 1	11 (31.4%)	9 (25.7%)	0.687
6 months			
Grade 0	35 (100%)	35 (100%)	1
Grade 1	Nil	Nil	
Return to routine daily activities	3.9 ± 0.4	4.8 ± 0.53	0.327
Recurrence (6 month follow-up)	Nil	Nil	

Table 3: Surgical wound assessment using SWS, Return to routine daily activities and recurrence

DR - Desarda tissue repair

LT - Lichtenstein tension-free mesh repair

SWS - Southampton Wound score

POD - Postoperative day

Categorical variables are mentioned as count (percentage)

Continuous variables mentioned as mean ± standard deviation

## DISCUSSION

The DR for inguinal hernia repair offers several advantages over traditional mesh-based methods, such as the LT. One of the primary benefits is the avoidance of synthetic mesh, reducing the risk of mesh-related complications like foreign body reactions, infections and chronic pain.

This study compared the outcomes of DR and LT for primary inguinal hernias. The results demonstrated that both techniques are effective; however, distinct differences were noted in certain parameters, particularly in pain management and hospital stay duration.

The significantly higher pain scores observed in the DR group on postoperative day 0 align with previous literature suggesting that tissue-based repairs may result in more immediate postoperative discomfort compared to mesh repairs, which tend to facilitate a tension-free closure. However, this pain difference appeared to diminish by postoperative days 3 and 7, reflecting a trend noted in other studies where the initial postoperative discomfort from tissue repairs subsided as healing progressed [9].

In a research conducted by Gedam et al., the average duration of surgery in the DR group was found to be comparable to that of the LT group. The findings suggest that the DR method does not significantly increase the operative time compared to the more widely used LT, demonstrating that both techniques require similar durations for completion [10]. This highlights that the absence of a synthetic mesh in the Desarda technique does not lead to prolonged surgical time, making it a viable alternative in terms of efficiency.

The SWS results show no significant differences in wound complications between the DR and LT techniques at various postoperative intervals (POD 1, POD 7, and 6 months). Both techniques demonstrated similar rates of Grade 0 (no complications) and Grade 1 (mild complications) wounds shortly after surgery, with both groups achieving excellent outcomes at the six-month follow-up, as evidenced by a 100% rate of Grade 0 wounds, which is consistent with the study conducted by Moghe D et al [11].

Duration of hospitalization was notably shorter for the DR group, consistent with findings from a randomized multicenter controlled trial by Ahmed et al, which indicated that tissue repair techniques can result in quicker recovery times due to reduced foreign body response compared to mesh techniques. This may suggest that, despite initial discomfort, DR may offer advantages in terms of faster discharge and quicker return to routine activities, as indicated by the marginally earlier return to daily functions in the DR group [12].

The absence of recurrence in both groups at six months postoperatively is encouraging and supports findings from Zulu et al [13]. This reinforces the notion that both DR and LT techniques can be reliable options for hernia repair, allowing surgeons to tailor their approach based on patient-specific factors and preferences.

### Limitations and Future Directions

This study has certain limitations, despite the encouraging results. Owing to the small sample size, the findings' generalizability may be limited. The success of the DR relies on the strength of the EOA, and in patients with a thinned-out or weakened EOA, the tissue may not provide sufficient reinforcement. Moreover, the technique may not be suitable for all hernia types, particularly large, recurrent, or complex hernias, as the absence of synthetic mesh may not provide adequate structural support, resulting in an increased likelihood of recurrence. Additionally, the follow-up period of six months may not be sufficient to capture late complications or recurrences that could occur over a longer time frame. To validate these findings and look into the long-term effects of both surgical techniques, additional research with larger cohorts and longer follow-up periods is necessary.

### CONCLUSIONS

In conclusion, this study reinforces the potential advantages of DR over LT, particularly regarding reduced hospital stay and minimized risks of mesh-related complications. While both techniques are effective for hernia repair, the DR method may be a superior option for certain patients, especially those at higher risk for complications associated with synthetic mesh. By prioritizing the use of native tissue, DR not only addresses hernias effectively but also promotes a safer and potentially more satisfactory recovery experience.

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