

A prospective comparative study of Desarda repair vs Lichtenstein Meshplasty in patients of uncomplicated inguinal hernia

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Abstract

Background: Inguinal hernia repair is among the most commonly performed surgical procedures worldwide. Although Lichtenstein tension-free mesh hernioplasty remains the standard technique, mesh-related complications, chronic groin pain, and increased treatment costs have prompted interest in tissue-based alternatives such as the Desarda repair. This study compared the clinical outcomes of Desarda repair and Lichtenstein meshplasty in patients with uncomplicated primary inguinal hernia.

Methods: A prospective randomised controlled study was conducted in the Department of Surgery, Indira Gandhi Government Medical College, Nagpur, from October 2023 to August 2025. One hundred adult patients with primary reducible inguinal hernia were randomly allocated to undergo either Desarda repair (n=50) or Lichtenstein mesh repair (n=50). Baseline characteristics, operative duration, postoperative pain, hospital stay, analgesic requirement, return to normal activities, complications, chronic groin pain, recurrence, and treatment costs were assessed. Patients were followed for 12 months. Statistical analysis was performed using SPSS version 27.0, with $p < 0.05$ considered significant.

Results: Demographic and the clinical characteristics of the participants were comparable between the groups. Mean operative time was significantly longer in the Desarda group (62 ± 7 vs. 52 ± 6 minutes; $p < 0.001$). Pain scores on postoperative day-1 were higher in Desarda repair (5.2 ± 1.3 vs. 3.3 ± 1.1 ; $p < 0.001$), but pain on day 7 was significantly lower (2.1 ± 0.9 vs. 4.0 ± 0.8 ; $p < 0.001$). Analgesic requirement was lower and for shorter duration in the Desarda group (3 ± 1 vs. 5 ± 2 days; $p < 0.01$). Return to daily activities was earlier (10 ± 3 vs. 15 ± 4 days; $p < 0.001$). Chronic groin pain was significantly lesser following Desarda repair (4% vs. 16%; $p = 0.04$). Recurrence and postoperative complications were similar between groups. Treatment costs were significantly lower with Desarda repair ($\text{₹}8,500 \pm 700$ vs. $\text{₹}13,500 \pm 900$; $p < 0.001$).

Conclusion: Desarda repair is a safe and effective non-mesh alternative to Lichtenstein hernioplasty. Despite a longer operative time, it offers reduced chronic pain, faster functional recovery, and lower treatment costs without increasing recurrence or postoperative complications.

Keywords: Inguinal Hernia; Desarda Repair; Lichtenstein Mesh Repair; Chronic Groin Pain; Hernia Recurrence; Cost-Effectiveness.

1. Introduction

Inguinal hernias form a significant part of the regularly performed elective surgeries globally (1). Approximately 20 million hernia repairs are performed annually (2). Lifetime prevalence reaches up to 27% in men and 3% in women (2). Though, hernia incidence increases with age (1), the risk factors also show an increasing trend with age. Factors like

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chronic cough, constipation, and heavy labor raise the intra-abdominal pressure that accelerates the hernia development (3). Patho-physiologically, tissue vulnerability is supposed to originate from the structural weaknesses of the posterior wall and weakness that may develop secondary to altered mechanisms for collagen metabolism (3).

There has been a significant evolution of the surgical management of hernias that has transitioned during the early days, comprising of high-tension anatomical tissue based reconstructions to the utilisation of tension-free mesh repair interventions (1). Lichtenstein tension-free mesh hernioplasty still remains the gold standard technique as it is highly reproducible and has very low recurrence rates (4). Though mesh placement is accompanied by risk of chronic pain, foreign body sensations, mesh infections, and increased healthcare costs, it still remains the most popular intervention for hernia repair (4). This poses a financial burden, particularly in low-resource settings at the regional level (5).

The technique that came into vogue for addressing these limitations was the Desarda technique. It offers a non-mesh, tissue-based repair (5). It utilizes an undetected strip of the external oblique aponeurosis to provide dynamic, physiological reinforcement to the posterior wall (5). Comparative trials report conflicting outcomes regarding operative times, postoperative complications, and recovery metrics between these two repairs (5,6). Clear consensus is still lacking, and prospective data from localised tertiary care centers remain scarce. Therefore, this study evaluates and compares the clinical profile, short-term complications, and long-term outcomes of Desarda tissue repair versus Lichtenstein mesh hernioplasty in patients with uncomplicated inguinal hernias.

The present study is a tertiary care hospital-based prospective comparative study in patients of uncomplicated inguinal hernia to look for the outcomes of Desarda repair vs Lichtenstein's meshplasty and was conducted with the following aims and objectives:

- To study the clinical profile of patients undergoing inguinal hernia repair surgery, either Lichtenstein repair or Desarda repair.
- To study and compare the short-term and long-term complications associated with these two operative techniques.
- To study and compare the outcomes of both the operative techniques.

2. Material and Methods

2.1. Study Design and Setting

This prospective randomized controlled trial was conducted from October 2023 to August 2025 in the Postgraduate Department of Surgery at Indira Gandhi Government Medical College (IGGMC), Nagpur, a public tertiary healthcare referral teaching hospital in Central India. The study protocol achieved approval from the Institutional Human Ethics Committee. Administrative clearance was secured from the Medical Superintendent and the Heads of the Departments of General Surgery, Pathology, and Anaesthesiology.

2.2. Patient Selection

A non-probability consecutive sampling technique was utilized to recruit patients presenting with groin swellings. A total sample size of 100 patients meeting the eligibility parameters was enrolled over the study period. Written informed consent was obtained from all participants before study initiation.

2.3. Inclusion Criteria

- Patients aged over 18 years.
- Diagnosis of primary, reducible inguinal or inguinoscrotal hernias.
- Provision of voluntary informed consent.

2.4. Exclusion Criteria

- Patients aged under 18 years.
- Pregnant women.
- Recurrent or complicated inguinal hernias.
- Severe uncontrolled hypertension, uncontrolled diabetes mellitus, or chronic cough.
- Intraoperative discovery of a divided, thin, or structurally weak external oblique aponeurosis (EOA).

2.5. Randomisation and Allocation

A draw of lottery method was used to assign the participants to the treatment arms. Identical, opaque and sealed envelopes containing "D" (Desarda repair) or "L" (Lichtenstein mesh repair) cards were selected by the patients randomly. In cases with bilateral inguinal hernias, the allocation to the respective groups, independent envelopes were used to distribute the sides for example, the right groin, while the contralateral side automatically received the alternate surgical technique.

2.6. Perioperative Protocol

All patients were fasting for 8-hours preoperatively. Surgical site preparation like hair clipping was done on the morning of the surgical procedure. A single prophylactic dose of 1 g Ceftriaxone was administered intravenously, 30 minutes prior to giving the skin incision. Operative procedures were performed under spinal anaesthesia.

2.7. Standardised Surgical Technique: Herniotomy

An anterior skin incision of 7–10 cm was given along the groin crease. It extended from the pubic tubercle, starting 2 cm superior and medial to it and extending parallel to the inguinal ligament laterally. Following dissection through subcutaneous tissue layers, the EOA was exposed and incised along the line of its fibers from the superficial inguinal ring to a point 2 cm lateral to the deep inguinal ring. The ilioinguinal and iliohypogastric nerves were systematically identified and preserved.

After mobilising the spermatic cord at pubic tubercle, it was isolated from the inguinal ligament, and was stripped of the fibers of the cremasteric muscle. The hernial sac was dissected free from cord structures up to the deep inguinal ring, twisted, transfixed, and ligated using 2-0 polyglactin 910 (Vicryl) sutures. The excess sac tissue was excised 1 cm distal to the ligature, and the stump was returned to the peritoneal cavity. Operative time was measured in minutes from the initiation of the specific posterior wall repair to the completion of final skin closure.

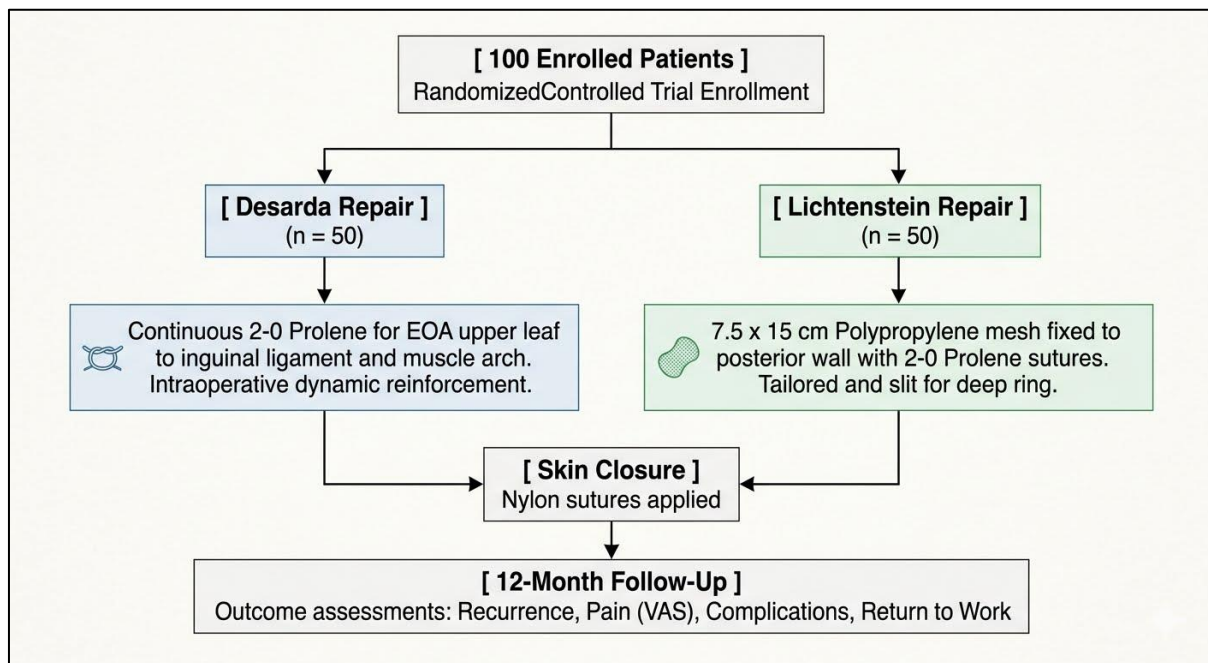


Figure 1 Study flow diagram

2.8. Interventional Arm

2.8.1. Desarda Tissue-Based Repair

In the surgical procedure for the Desarda repair, EOA was attached to the superior leaf of the inguinal ligament connecting it from the pubic tubercle to the deep ring using continuous 2-0 polypropylene (Prolene) sutures. In this patch, the anterior rectus sheath was also incorporated. The last stitch was made to narrow the internal inguinal ring without compromising the cord vascularity. This was followed by a longitudinal splitting incision that was made in the

upper EOA leaf creating a usable tissue strip of 1.5–2 cm width, which also extended medially upto the rectus sheath and laterally extended for 1–2 cm lateral to the deep ring.

The free superior border of the new strip was then sutured to the internal oblique muscle arch using continuous 2-0 polypropylene. “Dynamic structural reinforcement” was verified by testing the cough reflex intraoperatively. The spermatic cord was then placed over this newly constructed posterior wall, and the inferior EOA leaf was closed over the cord using continuous 2-0 polypropylene sutures. Skin closure was done using nylon sutures.

2.8.2. *Lichtenstein Tension-Free Mesh Repair*

After completing the herniotomy, the spermatic cord was laterally retracted, exposing the inguinal floor. A standard-sized (7.5 × 15 cm) monofilament mesh made of polypropylene was tailored to fit in with the anatomy. It was sutured to the posterior wall using 2-0 polypropylene, using the anchoring master suture that was secured 1 cm medial to the pubic tubercle. A longitudinal slit was then created in the lateral aspect of the mesh to accommodate the cord structures.

The inferior border of the mesh was sutured to the inguinal ligament in a continuous fashion, while the superior edge was anchored to the internal oblique aponeurosis or muscle using interrupted 2-0 polypropylene sutures. The two lateral tails of the mesh were crossed behind the cord to reconstruct the deep ring. The EOA was closed over the cord using continuous 2-0 polyglactin 910 sutures, and the skin was closed using nylon (Ethilon) sutures.

2.8.3. *Data Collection and Follow-Up*

A semi-structured proforma was utilised to collect patient data. Baseline information and the clinical assessments as well as the intraoperative metrics, were securely recorded. The patients were systematically followed up in the outpatient department for up to 12 months post-surgery to monitor wound healing, pain profiles, early complications, and long-term hernia recurrence.

2.8.4. *Statistical Analysis*

Statistical analysis was performed using SPSS software (version 27.0). Primary data patterns were organised using Microsoft Excel spreadsheets. Categorical variables are expressed as absolute frequencies and percentages. Continuous variables are reported as mean and standard deviation. Missing values were handled using complete case analysis, and a p-value <0.05 was considered statistically significant.

3. **Results**

The study enrolled 100 patients with uncomplicated inguinal hernia. They were equally allocated to either Desarda repair or Lichtenstein meshplasty groups. Baseline demographic and clinical characteristics were comparable between the two groups. Postoperative parameters including operative time, pain scores, hospital stay, return to normal activities, analgesic requirement, complications, recurrence, chronic pain, and treatment cost were evaluated. The findings demonstrated significant differences between the two techniques in terms of postoperative recovery, chronic pain, and cost, while recurrence rates and most postoperative complications remained comparable.

Table 1 depicts the baseline socio-demographic and clinical characteristics of the study participants undergoing Desarda (Group D) and Lichtenstein (Group L) repair. The majority of patients belonged to the 51–60 years age group (29%), followed by 41–50 years (25%) and 31–40 years (19%). Participants aged more than 60 years constituted 16% of the study population, while only 11% were between 18 and 30 years of age. The study population was predominantly male (98%), with only 2% females.

It was observed that nearly 46% of the patients indulged in heavy physical work, 30% had moderate activity, and 24% had a sedentary lifestyle. Right-sided inguinal hernia was the most common presentation (62%), followed by left-sided hernia (34%), while bilateral hernias accounted for only 4% of cases. Indirect inguinal hernia was more prevalent (62%) than direct inguinal hernia (38%).

Table 1 Baseline socio-demographic and clinical characteristics of the study participants (n=50)

Characteristics	Group D	Group L	Total	Percentage
Age Group				
18-30	6	5	11	11%
31-40	10	9	19	19%
41-50	12	13	25	25%
51-60	14	15	29	29%
>60	8	8	16	16%
Gender				
Male	48	50	95	98%
Female	1	1	2	2%
Occupation				
Heavy	22	24	46	46%
Moderate	16	14	30	30%
Sedentary	12	12	24	24%
Side involved				
Right	30	32	62	62%
Left	18	16	34	34%
Bilateral	2	2	4	4%
Type of Hernia				
Direct	18	20	38	38%
Indirect	32	30	62	62%
Duration of Symptoms				
<6 months	18	16	34	34%
6-12 months	20	22	42	42%
>12 months	12	12	24	24%
Co-morbidities				
DM	8	9	17	17%
HTN	10	11	21	21%
COPD	6	7	13	13%
None	26	23	49	49%

About 42% of patients presented within 6–12 months of symptom onset, while 34% presented within 6 months and 24% after >12 months. Co-morbidities included hypertension (21%), diabetes mellitus (17%), and “chronic obstructive pulmonary disease (COPD)” in 13%, whereas nearly half (49%) had no associated co-morbidity.

Table 2 Distribution according to surgical outcomes (n=100)

Post operative characteristics	Desarda	Lichtenstein	P value
Mean operative time (min) Mean $\pm$ SD			
	62 $\pm$ 7	52 $\pm$ 6	<0.001
Post operative pain score			
Day 1	5.2 $\pm$ 1.3	3.3 $\pm$ 1.1	<0.001
Day 7	2.1 $\pm$ 0.9	4.0 $\pm$ 0.8	<0.001
Duration of Hospital stay (Days)			
	2.0 $\pm$ 0.5	2.0 $\pm$ 0.4	1.00
Time to return to Activity (Days)			
	10 $\pm$ 3	15 $\pm$ 4	<0.001
Duration of Analgesic Requirement			
	3 $\pm$ 1	5 $\pm$ 2	<0.01
Post operative complications			
Seroma	4	3	0.14
Hematoma	2	2	0.30
Infection	1	1	0.17
Chronic Pain			
Present	2	8	0.04
Absent	48	42	
Recurrence			
Yes	1	1	0.56
No	49	49	
Mean Cost			
	8,500 $\pm$ 700	13,500 $\pm$ 900	<0.001

Table 2 compares the postoperative outcomes between patients undergoing Desarda repair and those undergoing Lichtenstein mesh repair. The mean operative time was significantly longer in the Desarda group (62 $\pm$ 7 minutes) compared to the Lichtenstein group (52 $\pm$ 6 minutes) ($p < 0.001$).

Postoperative pain assessment revealed significantly higher pain scores in the Desarda group on postoperative day 1 (5.2 $\pm$ 1.3 vs. 3.3 $\pm$ 1.1; $p < 0.001$). However, by postoperative day 7, pain scores were significantly lower in the Desarda group (2.1 $\pm$ 0.9) than in the Lichtenstein group (4.0 $\pm$ 0.8) ($p < 0.001$). The duration of hospital stay was identical in both groups (2.0 days), showing no statistically significant difference ($p = 1.00$).

Return to normal activities was significantly earlier (10 $\pm$ 3 days) among the patients who underwent Desarda repair as compared to Lichtenstein repair (15 $\pm$ 4 days) ($p < 0.001$). Similarly, the duration of analgesic requirement was significantly shorter in the Desarda group (3 $\pm$ 1 days) compared with the Lichtenstein group (5 $\pm$ 2 days) ($p < 0.01$).

Postoperative complications such as seroma formation, hematoma, and surgical site infection were infrequent and were not statistically significant between the groups. Chronic groin pain was significantly less common following Desarda repair, occurring in only 2 patients as compared to 8 patients in the Lichtenstein group ($p = 0.04$). Hernia recurrence was observed in one patient in each group, with no significant difference between the techniques ($p = 0.56$).

The mean treatment cost was substantially lower in the Desarda group ($\text{₹}8,500 \pm 700$) than in the Lichtenstein group ($\text{₹}13,500 \pm 900$), and this difference was statistically significant ($p < 0.001$).

4. Discussion

Inguinal hernia repair is the most frequently performed surgery worldwide, with the Lichtenstein tension-free mesh repair being considered the conventional standard technique. However, concerns regarding mesh-related complications, chronic groin pain, and cost have stimulated interest in tissue-based alternatives such as the Desarda repair. The present study compared the postoperative outcomes of Desarda and Lichtenstein repair in patients with primary inguinal hernia and demonstrated that both techniques achieved comparable safety and recurrence rates, while differing significantly in terms of postoperative recovery, chronic pain, and economic burden.

The demographic profile of the study population revealed a predominance of males and a higher frequency of hernias among middle-aged and elderly individuals. These findings are consistent with the established epidemiology of inguinal hernia, which is attributed to age-related weakening of the abdominal wall and the influence of occupational activities involving increased intra-abdominal pressure. Similar demographic distributions have been reported by Youssef et al. and Gedam et al., who observed that inguinal hernias occur predominantly in men engaged in moderate to heavy physical work (8, 9).

The baseline characteristics also demonstrate a comparable distribution of demographic and clinical variables between the Desarda and Lichtenstein groups, suggesting adequate matching and minimizing the likelihood of confounding factors influencing postoperative outcomes. The predominance of middle-aged and older males is consistent with the known epidemiology of inguinal hernia, which is more common among men and increases with advancing age. The higher proportion of individuals involved in heavy occupational work supports the role of increased intra-abdominal pressure and physical strain as important risk factors for inguinal hernia development. The predominance of right-sided and indirect hernias is also in agreement with established clinical patterns reported in the literature. Overall, the similarity of baseline characteristics indicates that subsequent differences in surgical outcomes are likely attributable to the operative technique rather than differences in patient profiles.

The findings indicate that both Desarda and Lichtenstein techniques are effective methods for inguinal hernia repair, with comparable rates of postoperative complications and recurrence. Although the Desarda procedure required a significantly longer operative time, it was associated with several clinically important advantages. Patients experienced lower pain levels during the later postoperative period, required analgesics for a shorter duration, and resumed normal activities earlier than those undergoing Lichtenstein repair.

The significantly lower incidence of chronic groin pain in the Desarda group may be attributed to the avoidance of synthetic mesh and reduced risk of mesh-related inflammatory reactions or nerve irritation. Furthermore, the substantially lower treatment cost associated with Desarda repair highlights its economic advantage, particularly in resource-limited healthcare settings.

In the present study, the mean operative time was significantly longer in the Desarda group than in the Lichtenstein group. This observation may be explained by the meticulous dissection and reconstruction of the posterior wall required during Desarda repair. Similar findings were reported by Gedam et al., who documented a longer operative duration for Desarda repair during the initial learning phase.⁸ Conversely, several investigators have noted that operative times become comparable as surgeons gain experience with the technique.⁹ Thus, operative duration may be influenced not only by the procedure itself but also by the surgeon's familiarity with the method.

Postoperative pain is a crucial determinant of patient satisfaction and recovery. Although patients undergoing Desarda repair reported higher pain scores on the first postoperative day, pain levels were significantly lower by the seventh postoperative day compared with the Lichtenstein group. This finding suggests that early postoperative discomfort may be related to tissue manipulation, whereas persistent pain in mesh-based repair may result from inflammatory responses, fibrosis, or nerve entrapment associated with prosthetic material. Similar trends have been reported in randomized trials and meta-analyses demonstrating lower long-term pain scores after Desarda repair (10, 11).

An important finding of this study was the significantly shorter duration of analgesic requirement and earlier return to normal activities among patients undergoing Desarda repair. Patients in the Desarda group resumed routine activities approximately five days earlier than those in the Lichtenstein group. Early functional recovery is a major determinant of quality of life and socioeconomic productivity. The absence of foreign material and preservation of normal tissue dynamics in Desarda repair may contribute to improved postoperative comfort and mobility. These observations are in

agreement with reports by Szopinski et al. and Rodriguez et al., who found faster convalescence and greater patient satisfaction following tissue-based repairs (12, 13).

Hospital stay was similar in both groups, indicating that the choice of operative technique did not substantially influence immediate postoperative discharge. Contemporary perioperative protocols, effective pain management, and early mobilization likely contributed to the comparable duration of hospitalization observed in both groups. Similar findings have been documented in several comparative studies evaluating mesh and non-mesh techniques (14-16).

The incidence of postoperative complications, including seroma, hematoma, and surgical site infection, was low and did not differ significantly between groups. These results support the safety profile of both procedures. Comparable complication rates have been reported by multiple randomised studies and systematic reviews evaluating Desarda and Lichtenstein repair (15, 16). The low frequency of complications observed in the present study may reflect careful patient selection, adherence to aseptic techniques, and standardized perioperative care (17).

Chronic groin pain remains one of the most challenging complications following inguinal hernia surgery because of its impact on daily activities and long-term quality of life. In the present study, chronic pain was significantly less common after Desarda repair than after Lichtenstein repair. This finding is clinically important and supports the hypothesis that avoidance of synthetic mesh reduces the risk of chronic inflammatory reactions and nerve irritation. Several recent systematic reviews have similarly demonstrated lower rates of chronic postoperative pain among patients undergoing Desarda repair (11,16,17) Given the growing emphasis on patient-reported outcomes, this advantage may influence surgical decision-making, particularly in younger and physically active individuals.

Recurrence remains the ultimate indicator of durability following hernia repair. Both groups in the present study demonstrated an identical recurrence rate of 2%, with no statistically significant difference. This finding suggests that Desarda repair provides anatomical reinforcement comparable to that achieved by mesh repair when performed appropriately. Similar recurrence rates have been reported in recent comparative studies and meta-analyses, supporting the long-term efficacy of Desarda repair (10, 17, 18)

Economic considerations are increasingly relevant in modern surgical practice. The present study demonstrated a substantially lower treatment cost for Desarda repair. The absence of prosthetic mesh significantly reduces procedural expenditure, making the technique particularly attractive in low-resource settings and healthcare systems with limited financial support. Cost-effectiveness analyses from developing countries have similarly concluded that Desarda repair offers a viable and affordable alternative without compromising clinical outcomes (18-20)

Overall, the findings of the present study support the growing body of evidence indicating that Desarda repair is a safe, effective, and economical alternative to Lichtenstein mesh repair. While operative time may be slightly longer, the benefits of reduced chronic pain, faster recovery, and lower cost make it an attractive option for selected patients.

Limitations

The study has certain limitations that should be acknowledged. First, the sample size was relatively small, which may limit the statistical power for detecting differences in uncommon outcomes such as recurrence. Second, the study was conducted at a single center, potentially affecting the generalizability of the findings. Third, the duration of follow-up may not have been sufficient to evaluate very late recurrences or chronic mesh-related complications. Finally, surgeon experience and learning-curve effects may have influenced operative time and certain postoperative outcomes.

5. Conclusion

Both Desarda and Lichtenstein techniques are effective methods for primary inguinal hernia repair with comparable recurrence and complication rates. Although Desarda repair required a longer operative time, it was associated with lower chronic pain, shorter analgesic use, earlier return to daily activities, and significantly reduced treatment costs. These findings suggest that Desarda repair is a valuable tissue-based alternative to mesh repair, particularly in resource-constrained settings and in patients where avoidance of prosthetic material is desirable.

Recommendations

- Desarda repair should be considered a viable alternative to Lichtenstein repair in patients with uncomplicated primary inguinal hernia.

- Surgeons should receive adequate training in Desarda technique to overcome the learning curve and optimize outcomes.
- Cost-conscious healthcare systems may consider wider adoption of Desarda repair due to its economic advantages.
- Shared decision-making should incorporate patient preferences regarding mesh implantation and long-term pain outcomes.

Implications for Future Research

Future multicenter randomised controlled trials with larger sample sizes and extended follow-up periods are required to validate these findings. Studies evaluating patient-reported quality-of-life outcomes, long-term recurrence rates, and detailed cost-effectiveness analyses would further clarify the role of Desarda repair in contemporary hernia surgery. Research comparing Desarda repair with newer minimally invasive and robotic techniques may also provide valuable insights.

Key Messages

- Desarda repair demonstrated significantly lower chronic pain compared with Lichtenstein repair.
- Patients undergoing Desarda repair returned to normal activities earlier and required analgesics for a shorter duration.
- Postoperative complications and recurrence rates were comparable between the two techniques.
- Desarda repair was substantially more cost-effective because it avoided the use of prosthetic mesh.
- Desarda repair represents a safe and effective tissue-based alternative for primary inguinal hernia repair.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

None of the authors have any conflicts of interest.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

Author Contributions

NJ and YN designed the study and developed the study protocol. KC and AA helped with the data collection and analysis of the results. YN wrote the initial manuscript draft which was revised by NJ and all the authors read and approved the final manuscript,

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