Section: General Surgery

Original Research Article

A PROSPECTIVE RANDOMIZED COMPARATIVE STUDY OF DESARDA TIS-SUE REPAIR VERSUS LICHTENSTEIN MESH HERNIOPLASTY IN THE MAN-AGEMENT OF PRIMARY INGUINAL HERNIA

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ABSTRACT

Background: Lichtenstein tension-free mesh hernioplasty remains the standard procedure for primary inguinal hernia repair; however, mesh-related complications and cost have prompted renewed interest in non-mesh techniques such as the Desarda repair. This study compared the clinical outcomes of Desarda tissue repair with Lichtenstein mesh hernioplasty in patients with primary inguinal hernia.

Materials and Methods: A prospective randomized comparative study was conducted on 50 patients with clinically diagnosed primary inguinal hernia admitted to the Department of General Surgery, Government Medical College and Government General Hospital, Ongole. Patients were equally allocated to undergo either Desarda tissue repair (n = 25) or Lichtenstein mesh hernioplasty (n = 25). Outcome measures included demographic characteristics, operative time, postoperative pain assessed using the Visual Analogue Scale (VAS), postoperative complications, duration of hospital stay, time to return to normal daily activities, and recurrence.

Results: The mean age was comparable between the Desarda (46.00 ± 12.54 years) and Lichtenstein (45.44 ± 12.67 years) groups ($p > 0.05$). Right-sided inguinal hernia was the most common presentation (54%). The mean operative time was significantly shorter in the Desarda group (55.2 ± 1.41 minutes) than in the Lichtenstein group (67.72 ± 1.27 minutes) ($p < 0.05$). Early discharge within three postoperative days was achieved in 84% of patients undergoing Desarda repair compared with 72% in the Lichtenstein group. Postoperative pain was comparable on postoperative day 1 but was significantly lower in the Desarda group on postoperative days 3 and 5 ($p < 0.001$). Patients who underwent Desarda repair resumed normal daily activities significantly earlier than those undergoing Lichtenstein repair ($p < 0.001$). Seroma and hematoma were less frequent after Desarda repair, although the differences were not statistically significant. Wound infection occurred significantly less often following Desarda repair (8%) than after Lichtenstein repair (32%) ($p < 0.05$). No cases of testicular atrophy or hernia recurrence were observed in either group during the follow-up period.

Conclusion: Desarda tissue repair is a safe, effective, and economical alternative to Lichtenstein mesh hernioplasty for primary uncomplicated inguinal hernia. It offers significantly shorter operative time, reduced postoperative pain, earlier return to normal activities, and lower wound infection rates while maintaining comparable short-term safety and recurrence outcomes. The technique may be particularly advantageous in resource-limited healthcare settings where avoidance of prosthetic mesh is desirable.

Keywords: Primary inguinal hernia; Desarda repair; Lichtenstein hernioplasty; Tissue repair; Mesh repair; Postoperative pain; Operative time; Surgical outcomes; Wound infection; Recurrence.

INTRODUCTION

Inguinal hernia is defined as the protrusion of intra-abdominal or preperitoneal contents through a weakness or defect in the inguinal region. It is the most common abdominal wall hernia, accounting for approximately 75% of all hernias, with a lifetime risk of about 27% in men and 3% in women. Owing to its high prevalence and the potential for complications such as obstruction and strangulation, inguinal hernia remains one of the most important conditions encountered in general surgical practice.[1]

More than 20 million inguinal hernia repairs are performed worldwide each year, making it one of the most frequently performed general surgical procedures. In developing countries such as India, the burden is further increased by a large population engaged in manual labour, delayed presentation, and limited access to specialized surgical care. Consequently, an ideal repair technique should provide durable outcomes while remaining safe, affordable, and suitable for resource-constrained healthcare settings.[2]

The management of inguinal hernia has evolved considerably over the last century. Bassini's tissue repair, introduced in 1887, marked the beginning of modern hernia surgery and was later modified by techniques such as the Shouldice repair. Although these tissue-based repairs achieved acceptable outcomes, tension at the repair site was associated with postoperative pain, prolonged recovery, and higher recurrence rates.[3]

The introduction of Lichtenstein tension-free mesh hernioplasty represented a major advancement in hernia surgery. By reinforcing the posterior wall with polypropylene mesh, this technique significantly reduced recurrence and became the standard open repair worldwide. Current European Hernia Society guidelines recommend mesh-based repair, particularly the Lichtenstein technique, because of its reproducibility and favourable long-term outcomes.[4]

Despite these advantages, prosthetic mesh implantation is associated with several well-recognized complications. Chronic postoperative groin pain, foreign body sensation, seroma formation, mesh infection, migration, adhesions, mesh shrinkage, and fistula formation have all been reported. Mesh-induced fibrosis may also affect spermatic cord structures, resulting in orchialgia, dysejaculation, impaired fertility, and, rarely, obstructive azoospermia. Furthermore, the additional cost of prosthetic mesh and its limited availability in low-resource settings remain important considerations, particularly in developing countries.[5,6]

These limitations have renewed interest in physiological tissue-based repairs that avoid prosthetic implantation while maintaining durable surgical outcomes. In 2001, Desarda introduced a novel non-mesh repair that utilizes an undetached strip of the external oblique aponeurosis to reinforce the posterior wall of the inguinal canal. Unlike conventional tissue repairs, the Desarda technique provides dynamic support during contraction of the abdominal muscles without creating tension, thereby preserving the physiological function of the inguinal canal. The procedure is technically straightforward, avoids foreign-body implantation, requires no specialized equipment, and is particularly attractive in resource-limited settings.[7]

Several comparative studies have demonstrated that Desarda repair provides recurrence rates comparable to Lichtenstein mesh repair while offering advantages such as shorter operative time, reduced postoperative pain, fewer mesh-related complications, earlier return to normal activities, and lower overall treatment costs. Nevertheless, evidence from different populations continues to evolve, and further prospective comparative studies are required to validate these findings, particularly in the Indian population.[8]

Considering the high prevalence of inguinal hernia, the economic implications of mesh implantation, and the increasing concern regarding mesh-related morbidity, a direct comparison between Desarda tissue repair and Lichtenstein mesh hernioplasty is clinically relevant. The present prospective randomized comparative study was therefore undertaken to evaluate and compare the two techniques with respect to operative duration, postoperative pain, complications, hospital stay, return to normal daily activities, and short-term recurrence in patients with primary inguinal hernia.

MATERIALS AND METHODS

Study Population

The study population comprised all patients admitted with clinically diagnosed inguinal hernia in the Department of General Surgery, Government Medical College and Government General Hospital, Ongole, Andhra Pradesh. Only patients who fulfilled the predefined eligibility criteria and provided written informed consent were enrolled.

Study Design

This investigation was an institutional-based, prospective, interventional, two-arm randomized controlled trial conducted in a tertiary care teaching hospital. Eligible patients were randomly allocated into two treatment arms to compare the outcomes of mesh repair (Lichtenstein technique) and non-mesh tissue repair (Desarda technique) for primary inguinal hernia.

Sample Size and Sample Size Calculation

A total sample size of 50 patients was determined based on comparison of two independent proportions using the standard formula for randomized comparative surgical trials:

Sample Size Calculation Using Cochran's Formula

For estimating the required sample size in comparative clinical studies where the outcome is expressed as a proportion (e.g., complication rate, recurrence, or early recovery), Cochran's formula is commonly used:

Where:

- = Initial sample size
- = Z-value at 95% confidence level = 1.96
- = Estimated proportion of outcome in the population
- = Acceptable margin of error

Based on previous studies comparing Lichtenstein mesh repair and Desarda repair (Desarda 2001; Mitura et al. 2018)[9,10], postoperative complication or delayed recovery rate in inguinal hernia surgery is approximately 20%.

So, A precision of 16% (0.10) was considered acceptable in institutional surgical outcome studies with limited patient flow.

- Group A: 25 patients – Lichtenstein mesh repair
- Group B: 25 patients – Desarda tissue repair

The sample size was calculated using Cochran's formula for proportions, assuming a postoperative complication rate of 20% based on previous comparative hernia repair studies, with 95% confidence level and 10% precision. The calculated minimum sample size was 24 patients. Considering feasibility, patient availability, and similarity with institutional surgical trials in government medical colleges, a total sample size of 50 patients was selected and randomly allocated into two equal groups of 25 patients each undergoing Lichtenstein mesh repair and Desarda tissue repair respectively.

Inclusion Criteria

Adult patients aged 21–70 years with clinically demonstrable inguinal hernia confirmed by appropriate imaging were included.

Only patients willing to undergo elective surgery and provide written informed consent were enrolled.

Exclusion Criteria

- Recurrent inguinal hernia
- Obstructed or irreducible inguinal hernia
- Connective tissue disorders
- Patients unfit for elective surgery due to severe systemic illness
- < 20 years and > 70 years age Patients

Study Setting

Department of General Surgery, Government Medical College and Government General Hospital, Ongole, Andhra Pradesh.

Study Period

The study was conducted over 18 months after obtaining approval from the Institutional Scientific and Ethical Committee in accordance with ICMR ethical guidelines.

Study Methods

This prospective simple randomized study included patients admitted for elective inguinal hernia repair who satisfied the inclusion criteria. On admission, a detailed history was obtained followed by general physical examination, local examination of the hernia, and systemic evaluation. Routine investigations included complete blood counts, renal function tests, blood glucose levels, and imaging studies such as ultrasonography or CT scan when indicated.

Patients were randomly allocated into two equal groups. Group A underwent Lichtenstein tension-free mesh hernioplasty, and Group B underwent Desarda non-mesh tissue repair. All procedures were performed under standard anaesthetic protocols with perioperative care as per institutional guidelines.

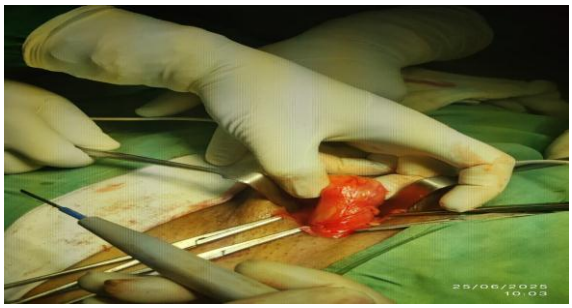
Postoperative evaluation included assessment for complications such as seroma, surgical site infection, hematoma, duration of hospital stay, recurrence, and time to return to normal activities.

Postoperative pain was assessed using the Visual Analogue Scale (VAS) at predefined intervals (postoperative day 1, day 3, and day 5). Pain scores were recorded on a 10 scale ranging from 0 (no pain) to 10 (worst imaginable pain).

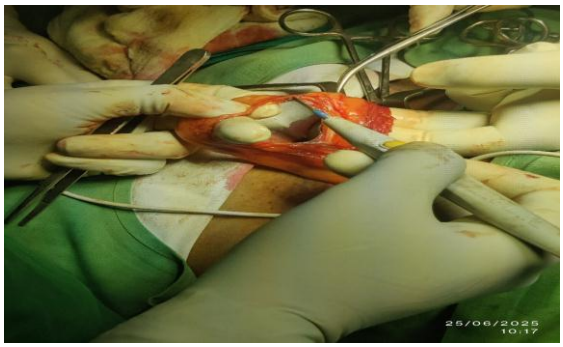
Statistical Analysis

Clinical data were analysed using SPSS software. Descriptive statistics were applied for baseline characteristics. Continuous variables were compared using the unpaired t-test, while categorical variables were analysed using Chi-square test or Fisher's exact test. A p-value <0.05 was considered statistically significant. Results were presented in tables and graphs in accordance with standard methodology used in prospective comparative hernia repair studies.

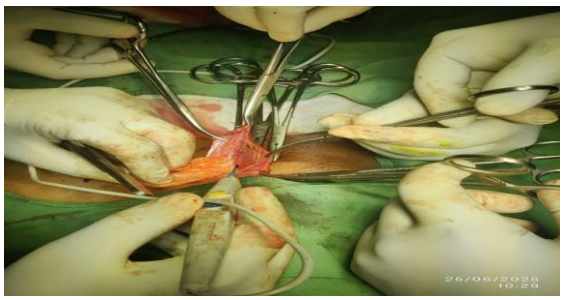
Figure 1: Intraoperative photos



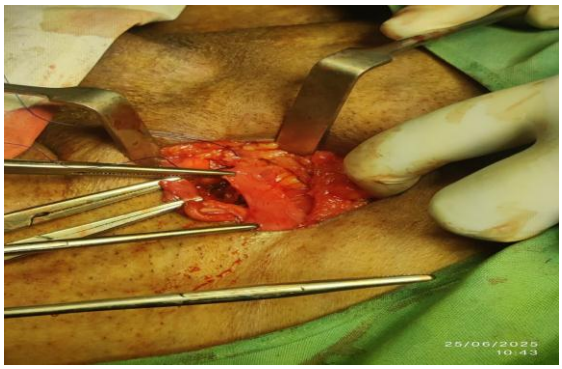
Dissection of Hernia sac and cord structures



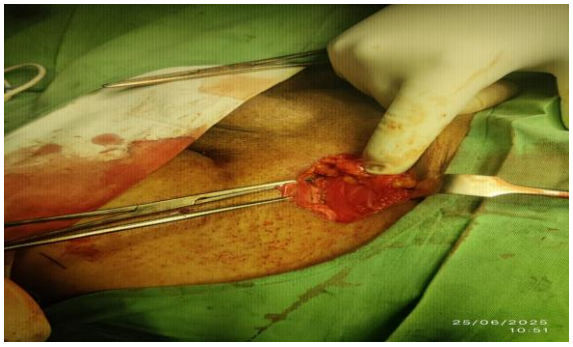
Separation of cord structures from the hernia sac



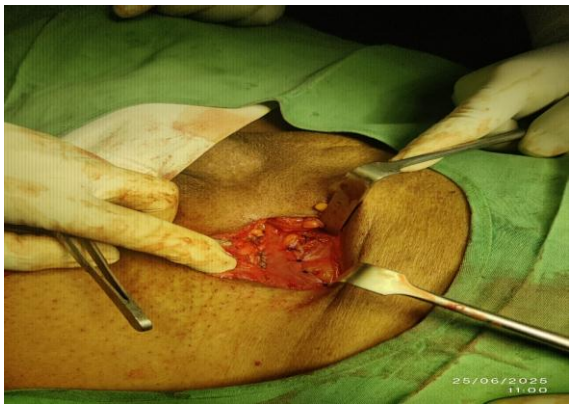
Ligation and excision of the hernia sac



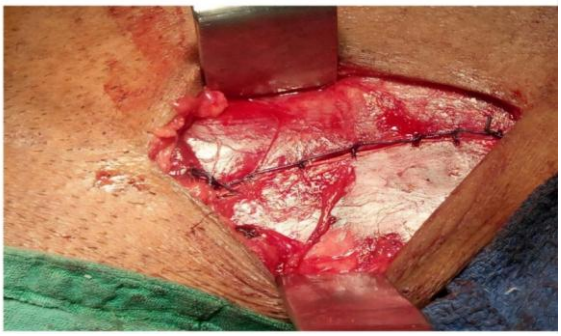
Dividing external oblique aponeurosis to make a strip from the upper leaf



Strip of the external oblique - lower border sutured to the Inguinal Ligament



Strip of the External oblique - upper border sutured to the Conjoint tendon or internal oblique



External Oblique closure

RESULTS

The mean age was comparable between the two groups, with no statistically significant difference ($p > 0.05$), indicating similar baseline demographic characteristics.

Table 1: Demographic Distribution According to Surgical Group

Age Group (years)	**Desarda n (%)**	**Lichtenstein n (%)**	**Total n (%)**
21–30	4 (16.0)	4 (16.0)	8 (16.0)
31–40	5 (20.0)	6 (24.0)	11 (22.0)
41–50	4 (16.0)	4 (16.0)	8 (16.0)
51–60	12 (48.0)	11 (44.0)	23 (46.0)
Total	**25 (100)**	**25 (100)**	**50 (100)**
Mean age (years) ±SD	46±12.54	45.44±12.67	45.72±12.48
Side			
Right	13 (52.0)	14 (56.0)	27 (54.0)
Left	12 (48.0)	11 (44.0)	23 (46.0)

Most patients belonged to the 51–60-year age group, with a similar age distribution in both surgical groups. Right-sided inguinal hernia was slightly more common than left-sided hernia in both groups.

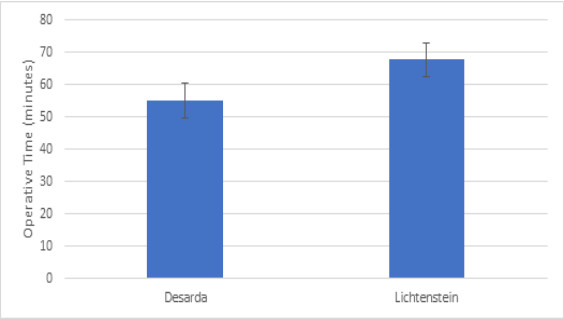


Figure 2: Mean Operative Time According to Surgical Group

Desarda repair required significantly less operative time than Lichtenstein mesh repair ($p < 0.05$).

Table 2: Duration of Hospital Stay

Hospital Stay	Desarda n (%)	Lichtenstein n (%)	Total n (%)
≤3 Days	21 (84.0)	18 (72.0)	39 (78.0)
>3 Days	4 (16.0)	7 (28.0)	11 (22.0)
Total	**25 (100)**	**25 (100)**	**50 (100)**

A greater proportion of patients undergoing Desarda repair were discharged within three postoperative days.

Table 3: Postoperative Day-1 Pain Score

VAS Score	Desarda n (%)	Lichtenstein n (%)	Total n (%)
2	3 (12.0)	0 (0.0)	3 (6.0)
4	16 (64.0)	3 (12.0)	19 (38.0)
6	6 (24.0)	13 (52.0)	19 (38.0)
8	0 (0.0)	9 (36.0)	9 (18.0)

$\chi^2 = 1.05$; $p = 0.30$

Pain scores were lower in the Desarda group, although the difference was not statistically significant.

Table 4: Postoperative Day-3 Pain Score

VAS Score	Desarda n (%)	Lichtenstein n (%)	Total n (%)
1	7 (28.0)	0 (0.0)	7 (14.0)
2	18 (72.0)	6 (24.0)	24 (48.0)
4	0 (0.0)	15 (60.0)	15 (30.0)
6	0 (0.0)	4 (16.0)	4 (8.0)

$\chi^2 = 32.0$; $p < 0.001$

Desarda repair resulted in significantly lower pain scores on postoperative day 3.

Table 5: Postoperative Day-5 Pain Score

VAS Score	Desarda n (%)	Lichtenstein n (%)	Total n (%)
1	25 (100)	0 (0.0)	25 (50.0)
2	0 (0.0)	21 (84.0)	21 (42.0)
4	0 (0.0)	4 (16.0)	4 (8.0)

$\chi^2 = 50.0$; $p < 0.001$ All patients in the Desarda group achieved minimal pain by postoperative day 5, demonstrating superior pain relief.

Table 6: Time to Return to Normal Daily Activities

Duration	Desarda n (%)	Lichtenstein n (%)	Total n (%)
1–7 Days	15 (60.0)	5 (20.0)	20 (40.0)
8–15 Days	10 (40.0)	7 (28.0)	17 (34.0)
16–30 Days	0 (0.0)	13 (52.0)	13 (26.0)

$\chi^2 = 18.52$; $p < 0.001$

Patients who underwent Desarda repair resumed normal daily activities significantly earlier.

Table 7: Incidence of Complications

Seroma	Desarda n (%)	Lichtenstein n (%)	Total n (%)
Yes	1 (4.0)	3 (12.0)	4 (8.0)

No	24 (96.0)	22 (88.0)	46 (92.0)
$\chi^2 = 1.09$; p = 0.29			
Wound Infection			
Yes	1 (4.0)	1 (4.0)	2 (4.0)
No	24 (96.0)	24 (96.0)	48 (96.0)
$\chi^2 = 4.0$; p = 0.90			
Hematoma			
Yes	1 (4.0)	2 (8.0)	3 (6.0)
No	24 (96.0)	23 (92.0)	47 (94.0)
$\chi^2 = 0.35$; p = 0.55			

Seroma was less common after Desarda repair, although the difference was not statistically significant. Both surgical techniques demonstrated an equally low incidence of postoperative wound infection. Postoperative hematoma was uncommon in both groups, with no statistically significant difference.

No patient developed postoperative testicular atrophy in either group. No recurrence was observed during the follow-up period, indicating comparable short-term efficacy of both procedures.

DISCUSSION

The present study demonstrated that patients undergoing Desarda tissue repair and Lichtenstein mesh hernioplasty had comparable baseline characteristics, with no significant difference in age distribution between the two groups. Most patients belonged to the fifth and sixth decades of life, which is consistent with the observations of Neogi et al,[11] Sahay et al,[12] and B.S. Gedam et al,[13] who also reported that inguinal hernia predominantly affects middle-aged adults due to progressive weakening of the abdominal wall and age-related connective tissue changes.

Right-sided inguinal hernia was more common (54%) in the present study. This finding agrees with the reports of Rajshekhar Patil et al,[14] Neogi et al,[11] B.S. Gedam et al,[13] and Basweshwari Enkemure et al,[15] all of whom observed a predominance of right-sided hernias, probably because of delayed descent of the right testis and persistence of the processus vaginalis.

The mean operative time was significantly shorter with Desarda repair than with Lichtenstein repair. Similar findings have been reported by Basweshwari Enkemure et al,[15] and Neogi et al,[11] who attributed the shorter duration to the absence of mesh placement and fewer operative steps. In contrast, B.S. Gedam et al,[13] found no significant difference, suggesting that operative time also depends on surgeon experience and institutional practice.

Patients undergoing Desarda repair experienced lower postoperative pain scores, particularly on postoperative days 3 and 5, with earlier return to normal activities. Comparable results were reported by Neogi et al,[11] Mitura et al,[10] Sahay et al,[12] Youssef et al., Z. Abbas et al,[16] and Desarda et al,[9] who demonstrated reduced postoperative pain and faster functional recovery following tissue repair. These advantages are likely due to minimal tissue dissection, preservation of normal inguinal canal physiology, and avoidance of the inflammatory response associated with prosthetic mesh.

Although postoperative seroma, hematoma, and wound infection occurred less frequently after Desarda repair, the differences were not statistically significant. Similar trends have been described by Rajshekhar Patil et al,[15] Anil Kumar et al,[17] Sahay et al,[12] and Neogi et al,[11] who reported lower wound-related complications with Desarda repair, whereas B.S. Gedam et al,[13] found comparable complication rates between the two techniques. These findings suggest that avoidance of prosthetic mesh may reduce postoperative inflammatory complications while maintaining acceptable surgical outcomes.

Hospital stay was shorter in the Desarda group, with a greater proportion of patients discharged within three postoperative days. Similar observations were reported by Rajshekhar Patil et al,[14] Anil Kumar et al,[17] B.S. Gedam et al,[13] and Mitura et al,[10] who concluded that reduced postoperative pain and fewer wound complications contribute to earlier discharge after Desarda repair.

No cases of testicular atrophy or hernia recurrence were observed in either group during the follow-up period. These findings are consistent with those of Rajshekhar Patil et al,[14] Anil Kumar et al,[17] Neogi et al,[11] and B.S. Gedam et al,[13] who also reported negligible rates of testicular atrophy and comparable recurrence between Desarda and Lichtenstein repairs. However, as recurrence is a long-term outcome, extended follow-up is required before definitive conclusions regarding durability can be made.

Overall, the findings of the present study support the growing evidence that Desarda tissue repair is an effective, safe, and economical alternative to Lichtenstein mesh hernioplasty for primary uncomplicated inguinal hernia. It provides comparable short-term surgical outcomes while offering the advantages of shorter operative time, reduced postoperative pain, earlier recovery, and avoidance of mesh-related complications, making it particularly suitable for resource-limited healthcare settings.

Table 8: Comparison of with Previous Studies

Mean age in years ± SD	**Desarda**	**Lichtenstein**	**Observation**
Present study	46.00 ± 12.54	45.44 ± 12.67	No significant difference between groups
Neogi et al.[11]	45.1	44.9	Comparable age distribution
Sahay et al.[12]	53.62 ± 15.26	50.51 ± 15.95	No significant difference
B.S. Gedam et al.[13]	Fifth–sixth decade	Fifth–sixth decade	Peak incidence in middle-aged adults
Operative Time in minutes			
Present study	55.2 ± 1.41 min	67.72 ± 1.27 min	Desarda significantly shorter
Basweshwari Enkemure et al.[15]	51.33 ± 7.87 min	57.33 ± 10.96 min	Desarda shorter (p=0.018)
Neogi et al.[11]	Shorter	Longer	Significant advantage with Desarda
B.S. Gedam et al.[13]	72.60 ± 13.89 min	73.89 ± 12.63 min	No significant difference
Hospital Stay in days			
Present study	84% discharged ≤3 days	72% discharged ≤3 days	Earlier discharge after Desarda
Rajshekhar Patil et al.[14]	<4 days	>4 days	Significant reduction with Desarda
Anil Kumar et al.[17]	POD 4	POD 5	Earlier discharge
Mitura et al.[10]	Shorter	Longer	Faster recovery after Desarda
Return to Normal Activities			
Present study	60% within 1–7 days	20% within 1–7 days	Earlier return with Desarda
B.S. Gedam et al.[13]	Earlier	Delayed	Significant
Basweshwari Enkemure et al.[13]	2.50 ± 0.51 days	3.77 ± 0.82 days	Significant
Abbas et al.[16]	Earlier	Delayed	Comparable findings

The age distribution in the present study is comparable with previous studies, confirming that inguinal hernia predominantly affects middle-aged individuals. Our findings agree with most published studies showing that Desarda repair requires less operative time. The present study supports previous reports demonstrating shorter hospital stay following Desarda repair. Desarda repair facilitates significantly earlier functional recovery than Lichtenstein mesh repair.

CONCLUSION

The present study demonstrates that both Desarda tissue repair and Lichtenstein mesh hernioplasty are safe and effective surgical techniques for the management of primary inguinal hernia, with no recurrence observed during the follow-up period. However, Desarda repair was associated with a significantly shorter operative time, lower postoperative pain scores, earlier return to normal daily activities, and a trend toward shorter hospital stay, indicating faster postoperative recovery.

Although both techniques showed low rates of postoperative complications, the mesh repair group demonstrated a greater tendency toward wound-related complications, reflecting the potential morbidity associated with prosthetic implantation. By avoiding the use of synthetic mesh, Desarda repair eliminates mesh-related complications while providing comparable short-term surgical outcomes.

Overall, Desarda tissue repair is a simple, safe, cost-effective, and physiologically sound alternative to Lichtenstein mesh hernioplasty for primary uncomplicated inguinal hernia. It is particularly well suited to resource-limited healthcare settings where affordability, avoidance of prosthetic materials, and early functional recovery are important considerations. Nevertheless, larger multicentric studies with longer follow-up are recommended to confirm its long-term durability and recurrence outcomes.

Recommendations

Desarda repair can be considered a preferred option in uncomplicated primary inguinal hernia, especially in younger patients and low-resource settings. Lichtenstein mesh repair should be reserved for selected cases such as large or recurrent hernias requiring additional reinforcement. Surgeons should be adequately trained in Desarda technique to ensure optimal outcomes. Further large-scale multicentric studies with long-term follow-up are recommended for validation.

Limitations

The study included a small sample size and was conducted at a single center, limiting generalizability. Short follow-up duration prevented assessment of long-term recurrence and chronic complications. Only primary uncomplicated hernias were studied, restricting applicability to complex cases. Subjective pain assessment and lack of evaluation of factors such as cost and quality of life may influence interpretation of results.

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