



Comparative Short-Term Outcomes of Lichtenstein Hernioplasty and Modified Bassini's Repair in Primary Inguinal Hernia: A Prospective Observational Study

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Abstract

Background: Inguinal hernia repair is one of the most commonly performed general surgical procedures. Although Lichtenstein hernioplasty is widely accepted as a tension-free mesh repair, Modified Bassini's repair remains relevant in selected patients and resource-limited settings. This study compared the short-term outcomes of Modified Bassini's repair and Lichtenstein hernioplasty in patients undergoing primary inguinal hernia surgery.

Methods: This prospective observational comparative study included 140 patients with primary inguinal hernia, divided equally into Modified Bassini's repair and Lichtenstein hernioplasty groups. Demographic profile, clinical characteristics, operative duration, postoperative pain using Visual Analogue Scale, surgical site infection, seroma, hematoma, overall complications, hospital stay, return to normal activity, patient satisfaction, and predictors of postoperative complications were analyzed.

Results: Modified Bassini's repair had significantly shorter operative duration than Lichtenstein hernioplasty (43.82 ± 7.64 minutes vs 54.74 ± 8.15 minutes; $p < 0.001$). However, Lichtenstein hernioplasty showed significantly lower postoperative pain scores at 12, 24, and 48 hours ($p < 0.001$). Hematoma formation and overall postoperative complications were significantly higher in the Modified Bassini's repair group ($p < 0.05$). Hospital stay was shorter after Lichtenstein hernioplasty (4.38 ± 1.11 days vs 5.86 ± 1.42 days; $p < 0.001$), and return to normal activity was earlier (15.26 ± 4.37 days vs 20.42 ± 5.18 days; $p < 0.001$). On multivariate analysis, age >40 years, BMI >25 kg/m², smoking, diabetes mellitus, operative duration >50 minutes, and Modified Bassini's repair were independent predictors of postoperative complications.

Conclusion: Lichtenstein hernioplasty was associated with better short-term postoperative outcomes, including lower pain scores, fewer overall complications, shorter hospital stay, earlier return to activity, and better satisfaction, whereas Modified Bassini's repair had a shorter operative duration. The findings support Lichtenstein hernioplasty as a preferable technique for primary inguinal hernia repair, while considering patient factors and resource availability.

Keywords: Inguinal hernia, Lichtenstein hernioplasty, Modified Bassini's repair, postoperative complications, surgical site infection

Introduction

Inguinal hernia is one of the most common conditions encountered in general surgical practice and contributes substantially to the global operative workload. Population-based evidence suggests a considerable worldwide burden, with a pooled prevalence of approximately 7.7%, and a markedly higher occurrence among males than females [1]. The lifetime risk of developing an inguinal hernia has been reported to be about 27% in men and 3% in women, making it a clinically and socioeconomically important surgical disease [2]. More than 20 million groin hernia repairs are performed annually worldwide, and the major goals of treatment are durable repair, low recurrence, minimal postoperative pain, early mobilization, and reduced overall morbidity [3].

The surgical management of inguinal hernia has evolved from traditional tissue-based repairs to modern tension-free mesh techniques. Classical tissue repairs, including Bassini's and modified Bassini's repair, aim to reconstruct the posterior wall of the inguinal canal by approximating the conjoint tendon to the inguinal ligament [4]. Although these procedures avoid prosthetic material and may still be used in selected patients or resource-limited settings, they are

performed under tissue tension, which may contribute to postoperative pain and recurrence. The Lichtenstein tension-free hernioplasty introduced the concept of reinforcing the inguinal floor with prosthetic mesh without suture-line tension, allowing repair with less distortion of normal anatomy and faster functional recovery [4].

Current evidence and international guidelines generally support mesh-based repair for adult inguinal hernia because of its lower recurrence risk compared with non-mesh techniques [3, 5]. A Cochrane review comparing mesh and non-mesh repair for inguinal and femoral hernias concluded that mesh repair probably reduces hernia recurrence and has become a commonly adopted approach in routine surgical practice [6]. The updated HerniaSurge guidelines further emphasize evidence-based selection of operative technique, with attention not only to recurrence but also to chronic pain, wound complications, patient recovery, surgeon expertise, cost, and feasibility [7]. Therefore, short-term outcomes such as postoperative pain, surgical site infection, seroma, hematoma, hospital stay, return to normal activity, and patient satisfaction remain clinically relevant measures when comparing open hernia repair techniques.

Despite the widespread acceptance of Lichtenstein hernioplasty, modified Bassini's repair continues to be performed in many centres, particularly where mesh use may be limited by patient preference, cost considerations, local practice patterns, or clinical judgment. Previous comparative studies have reported better early ambulation and postoperative course with Lichtenstein repair when compared with modified Bassini's repair, although operative duration and wound-related outcomes may vary across settings^[8]. Hence, locally generated comparative data are important to guide surgical decision-making. The present study was undertaken to compare the short-term postoperative outcomes of modified Bassini's repair and Lichtenstein hernioplasty in patients undergoing elective repair for primary uncomplicated inguinal hernia.

Materials and Methods

Study design and setting

This prospective observational comparative study was conducted in the Department of General Surgery at a tertiary care teaching institute. The study was carried out over an 18-month period from 2024 to 2026. The study was designed to compare perioperative and short-term postoperative outcomes between Modified Bassini's repair and Lichtenstein hernioplasty in patients undergoing surgery for primary uncomplicated inguinal hernia.

Study population

Patients diagnosed clinically with primary uncomplicated inguinal hernia and planned for elective open surgical repair were screened for eligibility during the study period. Eligible patients who fulfilled the selection criteria and provided written informed consent were enrolled consecutively. A total of 140 patients were included in the final analysis, with 70 patients undergoing Modified Bassini's repair and 70 patients undergoing Lichtenstein hernioplasty. The choice of surgical technique was based on surgical decision-making and feasibility; no random allocation was performed.

Sample size

The sample size was calculated using the formula for comparison of two proportions at a 95% confidence level and 80% power. Based on the expected difference in postoperative outcomes between the two procedures, the minimum required sample size was estimated to be 70 patients in each group. Therefore, a total sample size of 140 patients was considered adequate for the study.

Eligibility criteria

Adult patients who were medically fit for surgery, diagnosed with primary uncomplicated inguinal hernia, and scheduled for elective open repair by either Modified Bassini's repair or Lichtenstein hernioplasty were included. Patients with congenital inguinal hernia, recurrent hernia, bilateral hernia, obstructed or strangulated hernia, pregnancy, bleeding disorders, coagulopathy, ongoing anticoagulant therapy, or refusal to provide written informed consent were excluded.

Preoperative assessment

All enrolled patients underwent detailed preoperative

evaluation, including history taking, general physical examination, and local examination of the inguinal region.

Hernia characteristics, including type and side of hernia, were documented. Baseline investigations included complete blood count, blood sugar estimation, renal function tests, coagulation profile, and other investigations required for anesthetic fitness. All patients underwent routine pre-anesthetic assessment. Patients were kept nil per oral as per institutional protocol. Intravenous cefotaxime 1 g was administered 30–60 minutes before skin incision as prophylactic antibiotic coverage. All procedures were performed under spinal anesthesia with standard intraoperative monitoring.

Operative technique

All surgeries were performed under strict aseptic precautions by experienced surgeons. A classical inguinal incision was made approximately 2 cm above and parallel to the medial three-fifths of the inguinal ligament. The incision was deepened through the subcutaneous tissue and Scarpa's fascia to expose the external oblique aponeurosis. Hemostasis was secured throughout the procedure.

In the Modified Bassini's repair group, the external oblique aponeurosis was opened in the line of its fibers and the spermatic cord was mobilized. The hernia sac was identified and dissected carefully. In indirect hernias, the sac was isolated, ligated at the neck, and excised. In direct hernias, the sac was reduced after adequate dissection. The posterior wall of the inguinal canal was reconstructed by approximating the conjoint tendon to the inguinal ligament using interrupted non-absorbable sutures. The spermatic cord was repositioned, and the external oblique aponeurosis was closed over it.

In the Lichtenstein hernioplasty group, the inguinal canal was exposed similarly. The spermatic cord was mobilized and the hernia sac was managed according to the type of hernia. A suitably sized polypropylene mesh was placed over the posterior wall of the inguinal canal to adequately cover the defect. The mesh was fixed inferiorly to the inguinal ligament and superiorly to the conjoint tendon using polypropylene sutures. A slit was made in the mesh to accommodate the spermatic cord, and the lateral tails of the mesh were overlapped to reconstruct the internal ring. The external oblique aponeurosis, subcutaneous tissue, and skin were closed in layers.

Postoperative care

After surgery, patients were shifted to the postoperative recovery area and monitored for vital parameters and immediate postoperative complications. Standard postoperative care was provided uniformly in both groups. Intravenous cefotaxime 1 g twice daily was continued for 48 hours postoperatively as per institutional infection prevention protocol. Analgesics were administered according to patient requirement and institutional practice. Early ambulation was encouraged in all patients. Wound care was maintained under sterile precautions, and dressing inspection was performed regularly.

Outcome assessment

The outcomes assessed included operative duration, postoperative pain, surgical site infection, seroma formation,

hematoma formation, urinary retention, overall postoperative complications, duration of hospital stay, time taken to resume normal daily activities, patient satisfaction, and recurrence during follow-up. Postoperative pain was assessed using the Visual Analogue Scale at 12, 24, and 48 hours after surgery. Surgical site infection and other wound-related complications were assessed clinically during the postoperative period and follow-up visits.

Follow-up

Patients were discharged after satisfactory clinical recovery and once considered medically fit. Duration of hospital stay was recorded for each patient. Follow-up visits were scheduled on postoperative days 7, 14, and 30. Suture removal was performed on the seventh postoperative day. At each follow-up visit, patients were examined for wound healing, pain, seroma, hematoma, surgical site infection, urinary retention, return to routine activity, and clinical evidence of recurrence.

Data collection

Data were collected using a predesigned structured proforma. The proforma included demographic variables, clinical characteristics, comorbidities, hernia type and side, operative findings, operative duration, postoperative pain scores, postoperative complications, hospital stay, follow-up findings, return to normal activity, satisfaction, and recurrence. Data were recorded prospectively during preoperative evaluation, surgery, postoperative monitoring, and scheduled follow-up visits.

Statistical analysis

Data were compiled, coded, and entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences, version 25.0. Continuous variables were expressed as mean and standard deviation, while categorical variables were expressed as frequency and percentage. Intergroup comparison of continuous variables was performed using the independent Student's t-test. Categorical variables were compared using the Chi-square test or Fisher's exact test, as appropriate. Multivariate logistic regression analysis was performed to identify independent predictors of postoperative complications. A p-value of less than 0.05 was considered statistically significant.

Ethical considerations

The study was conducted after approval from the Institutional Ethics Committee of the tertiary care teaching institute. Written informed consent was obtained from all participants before enrollment. The purpose, procedure, potential benefits, and possible risks of the study were explained to all participants. Confidentiality of patient information was maintained throughout the study, and participation was voluntary.

Results

A total of 140 patients were included, with 70 patients in each surgical group. Baseline and clinical characteristics are shown in Table 1.

Table 1: Baseline demographic, clinical, and comorbidity profile

Variable	Modified Bassini's repair (n = 70)	Lichtenstein hernioplasty (n = 70)	Test value	p-value
Age, years	26.81 ± 2.44	47.04 ± 10.10	t = 16.38	<0.001*
BMI, kg/m ²	25.41 ± 4.87	26.57 ± 5.44	t = 1.34	0.184
Smoking, yes	23 (32.9)	25 (35.7)	$\chi^2 = 0.03$	0.859
Alcohol, yes	24 (34.3)	16 (22.9)	$\chi^2 = 1.72$	0.190
Direct hernia	29 (41.4)	34 (48.6)	$\chi^2 = 1.18$	0.277
Indirect hernia	41 (58.6)	36 (51.4)		
Right-sided hernia	43 (61.4)	47 (67.1)	$\chi^2 = 0.59$	0.442
Left-sided hernia	27 (38.6)	23 (32.9)		
Duration of symptoms, months	7.22 ± 3.48	7.96 ± 3.72	t = 1.22	0.224
Diabetes mellitus	11 (15.7)	15 (21.4)	$\chi^2 = 1.06$	0.303
Hypertension	12 (17.1)	15 (21.4)	$\chi^2 = 0.69$	0.406
Chronic cough	6 (8.6)	9 (12.9)	$\chi^2 = 0.64$	0.424
BPH	8 (11.4)	12 (17.1)	$\chi^2 = 0.91$	0.340
Constipation	5 (7.1)	8 (11.4)	$\chi^2 = 0.98$	0.322

Values are mean ± SD or n (%). *Statistically significant.

Modified Bassini's repair had a shorter operative duration, whereas

Lichtenstein hernioplasty had lower postoperative pain scores (Table 2).

Table 2: Operative duration and postoperative pain

Parameter	Modified Bassini's repair (n = 70)	Lichtenstein hernioplasty (n = 70)	Test value	p-value
Duration of surgery, minutes	43.82 ± 7.64	54.74 ± 8.15	t = 8.14	<0.001*
VAS at 12 hours	6.42 ± 0.94	5.21 ± 0.86	t = 7.94	<0.001*
VAS at 24 hours	4.87 ± 0.83	3.71 ± 0.79	t = 8.42	<0.001*
VAS at 48 hours	3.42 ± 0.72	2.48 ± 0.64	t = 8.18	<0.001*
Intragroup pain trend	F = 186.74	F = 201.36	—	<0.001*

Values are mean ± SD. VAS: Visual Analogue Scale. *Statistically significant.

Postoperative complications are summarized in Table 3.

Table 3: Postoperative complications

Complication	Modified Bassini's repair (n = 70)	Lichtenstein hernioplasty (n = 70)	Test value	p-value
Surgical site infection	20 (28.6)	11 (15.7)	$\chi^2 = 3.37$	0.066
Seroma	12 (17.1)	15 (21.4)	$\chi^2 = 0.42$	0.518
Hematoma	17 (24.3)	8 (11.4)	$\chi^2 = 3.98$	0.046*
Overall complications	32 (45.7)	19 (27.1)	$\chi^2 = 5.18$	0.023*

Values are n (%). *Statistically significant.

Recovery outcomes were better in the Lichtenstein group (Table 4).

Table 4: Postoperative recovery and satisfaction

Outcome	Modified Bassini's repair (n = 70)	Lichtenstein hernioplasty (n = 70)	Test value	p-value
Hospital stays, days	5.86 ± 1.42	4.38 ± 1.11	t = 6.91	<0.001*
Return to normal activity, days	20.42 ± 5.18	15.26 ± 4.37	t = 6.38	<0.001*
Neutral satisfaction	62 (88.6)	46 (65.7)	$\chi^2 = 9.14$	0.010*
Satisfied	4 (5.7)	15 (21.4)		
Very satisfied	4 (5.7)	9 (12.9)		

Values are mean ± SD or n (%). *Statistically significant.

Factors associated with postoperative complications are shown in Table 5.

Table 5: Association of clinical variables with postoperative complications

Variable	With complications (n = 51)	Without complications (n = 89)	Test value	p-value
Age, years	42.18 ± 10.74	33.92 ± 9.86	t = 4.52	<0.001*
BMI, kg/m ²	28.36 ± 5.12	24.62 ± 4.48	t = 4.48	<0.001*
Smoking	25 (49.0)	23 (25.8)	$\chi^2 = 7.76$	0.005*
Diabetes mellitus	17 (33.3)	9 (10.1)	$\chi^2 = 11.78$	0.001*
Hypertension	15 (29.4)	12 (13.5)	$\chi^2 = 5.55$	0.018*
Surgery duration, minutes	56.48 ± 8.82	45.16 ± 7.54	t = 8.13	<0.001*
Hospital stays, days	6.38 ± 1.46	4.39 ± 1.08	t = 8.27	<0.001*

Values are mean ± SD or n (%). *Statistically significant.

Independent predictors of postoperative complications are shown in Table 6.

Table 6: Multivariate logistic regression for predictors of postoperative complications

Predictor	Adjusted odds ratio	95% CI	p-value
Age >40 years	2.84	1.31–6.18	0.008*
BMI >25 kg/m ²	2.57	1.19–5.54	0.016*
Smoking	2.16	1.04–4.49	0.039*
Diabetes mellitus	3.12	1.35–7.22	0.008*
Hypertension	1.78	0.82–3.86	0.142
Surgery duration >50 minutes	3.46	1.61–7.43	0.002*
Modified Bassini's repair	2.73	1.29–5.76	0.009*

CI: confidence interval. *Statistically significant.

Discussion

Inguinal hernia repair is a common general surgical procedure, and the choice of technique depends on safety, postoperative pain, complications, recovery, cost, and recurrence risk. Current guidelines generally support mesh-based tension-free repair for adult inguinal hernia because of better overall outcomes and lower recurrence compared with traditional tissue repair [3, 7]. In the present study, Modified Bassini's repair had a significantly shorter operative duration than Lichtenstein hernioplasty. This may be because Bassini's repair does not require mesh preparation, placement, and fixation. However, shorter operative time was not associated with better postoperative recovery.

Lichtenstein hernioplasty showed significantly lower pain scores at 12, 24, and 48 hours. This finding may be explained by the tension-free nature of mesh repair, which reinforces the posterior wall of the inguinal canal without excessive tissue approximation. In contrast, Modified Bassini's repair involves tissue suturing under tension,

which may contribute to greater early postoperative pain. Similar findings were reported by Prior et al. and Harjai et al., who observed better postoperative comfort and early ambulation following Lichtenstein repair [8, 9]. Postoperative hematoma and overall complications were significantly higher in the Modified Bassini's repair group. Surgical site infection was numerically higher in the Modified Bassini's group, but the difference was not statistically significant. Seroma formation was also comparable between the two groups, suggesting that mesh placement did not increase early wound-related complications in the present study. These findings are consistent with previous evidence showing that Lichtenstein mesh repair is safe when performed under proper aseptic precautions and standard perioperative care [4, 6]. The Cochrane review by Lockhart et al. reported that mesh repair reduces recurrence compared with non-mesh repair, although wound-related outcomes may vary depending on patient profile and surgical technique [6].

Recovery outcomes were better in the Lichtenstein group. Patients undergoing Lichtenstein hernioplasty had a shorter hospital stay and returned to normal activity earlier than those undergoing Modified Bassini's repair. Naveen and Srinath also reported better postoperative ambulation after Lichtenstein mesh repair, while Malik et al. observed lower postoperative pain and recurrence with mesh repair compared with Bassini repair ^[10, 11]. Patient satisfaction was higher in the Lichtenstein group. This may be related to lower pain, fewer overall complications, shorter hospitalization, and earlier return to routine activity. Thus, although Lichtenstein hernioplasty required a longer operative time, it provided better short-term functional recovery.

In the present study, age greater than 40 years, BMI greater than 25 kg/m², smoking, diabetes mellitus, operative duration greater than 50 minutes, and Modified Bassini's repair were independent predictors of postoperative complications. These findings highlight the importance of preoperative risk assessment and optimization. Weyhe et al. identified age, diabetes, smoking, and patient-related factors as important contributors to complications after inguinal hernia repair ^[12]. Hellspong et al. also reported diabetes as a significant risk factor for postoperative complications following groin hernia surgery ^[13]. The present study has some limitations. It was an observational study and not a randomized controlled trial; therefore, selection bias cannot be excluded. The two groups also showed a significant difference in age, which may have influenced postoperative outcomes. In addition, the follow-up period was limited to 30 days, so long-term recurrence, chronic groin pain, and mesh-related complications could not be assessed.

Conclusion

Lichtenstein hernioplasty demonstrated better short-term postoperative outcomes than Modified Bassini's repair in patients with primary uncomplicated inguinal hernia, with significantly lower postoperative pain, fewer overall complications, shorter hospital stay, earlier return to normal activity, and better patient satisfaction. Although Modified Bassini's repair had the advantage of shorter operative duration, the overall recovery profile favored Lichtenstein tension-free mesh repair. Therefore, Lichtenstein hernioplasty may be considered the preferred technique for most adult patients undergoing elective primary inguinal hernia repair, while Modified Bassini's repair may remain useful in selected cases where mesh repair is not feasible or preferred.

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Conflicts of interest

There are no conflicts of interest.

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