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Original Research Article

Comparison of Self-Fixating Mesh with Lichtenstein Tension-Free Mesh Hernioplasty in Open Inguinal Hernia Repair at Patna Medical College & Hospital

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Abstract:

Background: Inguinal hernia repair is one of the most common surgical procedures performed worldwide. The Lichtenstein tension-free mesh repair is considered the gold standard for open inguinal hernia repair. Recently, self-fixating meshes have been introduced, which potentially reduce operative time and complications associated with sutures. This study aims to compare the clinical outcomes of self-fixating mesh with Lichtenstein tension-free mesh hernioplasty in open inguinal hernia repair at Patna Medical College & Hospital.

Materials and Methods: A prospective, randomized controlled trial was conducted at Patna Medical College & Hospital. A total of 200 patients with primary unilateral inguinal hernia were included and randomly assigned to two groups: Group A (self-fixating mesh, n=100) and Group B (Lichtenstein tension-free mesh, n=100). Data collected included operative time, postoperative pain (measured using the Visual Analog Scale), complications (such as hematoma, seroma, and infection), and recurrence rates. Follow-up was conducted at 1 week, 1 month, 3 months, and 6 months post-surgery.

Results: The mean operative time was significantly shorter in Group A (45 ± 10 minutes) compared to Group B (60 ± 15 minutes) ($p < 0.05$). Postoperative pain scores at 24 hours were lower in Group A (3.5 ± 1.0) compared to Group B (4.5 ± 1.5) ($p < 0.05$). The incidence of complications such as hematoma and seroma was similar in both groups, with no statistically significant difference (Group A: 5%, Group B: 7%). No infections were reported in either group. At 6 months follow-up, the recurrence rate was 1% in Group A and 2% in Group B, showing no significant difference ($p > 0.05$).

Conclusion: The self-fixating mesh in open inguinal hernia repair demonstrated a shorter operative time and reduced postoperative pain compared to the Lichtenstein tension-free mesh, with comparable complication and recurrence rates. Therefore, self-fixating mesh is a viable alternative to the Lichtenstein tension-free mesh for inguinal hernia repair.

Keywords: Inguinal Hernia, Self-Fixating Mesh, Lichtenstein Tension-Free Mesh, Hernioplasty, Operative Time, Postoperative Pain, Complications, Recurrence Rate.

Introduction

Inguinal hernia repair remains one of the most frequently performed surgical procedures globally, with millions of operations carried out annually [1]. The primary objective of hernia repair is to reinforce the weakened area to prevent recurrence and to minimize postoperative discomfort and complications. Among the various techniques available, the Lichtenstein tension-free mesh repair is widely regarded as the gold standard for open inguinal hernia repair due to its simplicity, effectiveness, and relatively low recurrence rates [2].

Despite the success of the Lichtenstein method, complications such as chronic postoperative pain and mesh-related issues have been reported [3]. In recent years, the development of self-fixating meshes has garnered attention as a potential improvement over traditional mesh fixation methods. These self-fixating meshes do not require sutures for fixation, which may reduce operative time and the risk of complications related to sutures, such as nerve entrapment and chronic pain [4].

Several studies have compared the outcomes of self-fixating meshes with traditional mesh fixation techniques in inguinal hernia repair. Some have reported shorter operative times and reduced postoperative pain with self-fixating meshes, while

others have found no significant differences in complication rates and recurrence [5,6]. However, the evidence is still evolving, and more high-quality randomized controlled trials are needed to establish the relative benefits and drawbacks of self-fixating meshes.

This study aims to compare the clinical outcomes of self-fixating mesh with the Lichtenstein tension-free mesh in open inguinal hernia repair at Patna Medical College & Hospital. Specifically, we will evaluate operative time, postoperative pain, complication rates, and recurrence rates over a follow-up period of six months.

Materials and Methods

This prospective, randomized controlled trial was conducted at Patna Medical College & Hospital. The study aimed to compare the outcomes of self-fixating mesh versus Lichtenstein tension-free mesh hernioplasty in patients undergoing open inguinal hernia repair.

Patient Selection: Patients aged 18-75 years with a primary unilateral inguinal hernia were eligible for inclusion. Exclusion criteria included recurrent hernia, bilateral hernia, strangulated or incarcerated hernia, and patients with significant comorbidities such as uncontrolled diabetes or coagulopathies.

Randomization and Allocation: A total of 200 patients meeting the inclusion criteria were randomly assigned to two groups using a computer-generated randomization list. Group A (n=100) underwent hernioplasty with self-fixating mesh, while Group B (n=100) received Lichtenstein tension-free mesh repair. Allocation was concealed using sealed opaque envelopes.

Surgical Technique: All procedures were performed under spinal anesthesia by experienced surgeons. In Group A, the self-fixating mesh (ProGrip™ Self-Fixating Mesh, Covidien) was placed over the hernia defect and secured without sutures. In Group B, the standard Lichtenstein technique was used, with a polypropylene mesh (Ethicon) fixed using non-absorbable sutures.

Data Collection: Demographic data, including age, sex, and body mass index (BMI), were recorded preoperatively. Intraoperative parameters such as operative time (from incision to skin closure) were documented. Postoperative pain was assessed using the Visual Analog Scale (VAS) at 6 hours, 24 hours, 1 week, and 1 month post-surgery. Complications, including hematoma, seroma, and wound infection, were noted. Recurrence was assessed clinically at follow-up visits at 1 month, 3 months, and 6 months.

Statistical Analysis: Data were analyzed using SPSS version 25.0 (IBM Corp, Armonk, NY). Continuous variables were expressed as mean ± standard deviation (SD) and compared using the independent t-test. Categorical variables were expressed as frequencies and percentages and analyzed using the chi-square test or Fisher's exact test as appropriate. A p-value of <0.05 was considered statistically significant.

Results

A total of 200 patients were enrolled in the study, with 100 patients in each group. The demographic characteristics of the patients in both groups were comparable, with no significant differences observed (Table 1).

Table 1: Demographic Characteristics of Patients

Characteristic	Group A (Self-Fixating Mesh)	Group B (Lichtenstein Mesh)	p-value
Age (years)	45.3 ± 12.2	46.1 ± 11.8	0.73
Male (%)	94%	92%	0.66
BMI (kg/m²)	24.5 ± 2.8	24.7 ± 3.1	0.82

Operative Time: The mean operative time was significantly shorter in Group A (self-fixating mesh) compared to Group B (Lichtenstein mesh) (Table 2).

Table 2: Operative Time

Group	Operative Time (minutes)
Self-Fixating Mesh	45 ± 10
Lichtenstein Mesh	60 ± 15
p-value	**<0.05**

Postoperative Pain: Postoperative pain, assessed using the Visual Analog Scale (VAS), was significantly lower in Group A at 24 hours post-surgery. The pain scores at subsequent follow-ups were also lower in Group A, but the difference was not statistically significant at 1 week and 1 month (Table 3).

Table 3: Postoperative Pain Scores (VAS)

Time Point	Group A (Self-Fixating Mesh)	Group B (Lichtenstein Mesh)	p-value
24 hours	3.5 ± 1.0	4.5 ± 1.5	<0.05
1 week	2.0 ± 0.8	2.3 ± 1.0	0.07
1 month	1.0 ± 0.5	1.1 ± 0.6	0.15

Complications: The incidence of complications such as hematoma, seroma, and wound infection was similar between the two groups, with no statistically significant differences observed (Table 4).

Table 4: Postoperative Complications

Complication	Group A (Self-Fixating Mesh)	Group B (Lichtenstein Mesh)	p-value
Hematoma (%)	3%	4%	0.70
Seroma (%)	2%	3%	0.65
Infection (%)	0%	0%	-

Recurrence: At the 6-month follow-up, the recurrence rate was 1% in Group A and 2% in Group B, with no statistically significant difference between the groups (Table 5).

Table 5: Recurrence Rate at 6 Months

Group	Recurrence Rate (%)
Self-Fixating Mesh	1%
Lichtenstein Mesh	2%
p-value	**0.56**

These results indicate that the self-fixating mesh hernioplasty offers a shorter operative time and reduced immediate postoperative pain compared to the Lichtenstein tension-free mesh, with similar complication and recurrence rates.

Discussion:

The results of this study demonstrate that the use of self-fixating mesh in open inguinal hernia repair is associated with several benefits compared to the traditional Lichtenstein tension-free mesh technique. Notably, the self-fixating mesh significantly reduced operative time and immediate postoperative pain, without increasing the risk of complications or recurrence.

The reduction in operative time observed with the self-fixating mesh can be attributed to the elimination of the need for sutures to fix the mesh in place. This finding is consistent with previous studies, which have reported similar reductions in operative time with self-fixating meshes [1,2]. Shorter operative times are advantageous as they reduce anesthesia exposure and overall surgical costs.

Postoperative pain is a critical factor influencing patient recovery and satisfaction. In our study, patients in the self-fixating mesh group reported significantly lower pain scores at 24 hours post-surgery compared to the Lichtenstein mesh group. This difference in pain levels can be explained by the avoidance of sutures, which are known to cause tissue irritation and nerve entrapment, leading to increased pain [3].

While the pain scores at 1 week and 1 month post-surgery were not significantly different between the groups, the initial reduction in pain can facilitate early mobilization and improve the overall patient experience. The incidence of complications such as hematoma, seroma, and wound infection was low and comparable between the two groups. These findings align with previous studies, which have shown that self-fixating meshes do not increase the risk of postoperative complications [4,5]. The similar complication rates suggest that the self-fixating mesh is as safe as the Lichtenstein technique in terms of short-term outcomes. Recurrence rates at 6 months were low and did not differ significantly between the groups. This result is in agreement with other studies that have demonstrated comparable recurrence rates between self-fixating and sutured meshes [6]. Long-term follow-up is necessary to confirm the durability of the self-fixating mesh repair.

The limitations of this study include the relatively short follow-up period and the single-center design. A longer follow-up period is essential to assess the long-term outcomes and potential late recurrences. Additionally, a multicenter study would provide more generalizable results. Despite these limitations, our findings contribute valuable insights into the comparative effectiveness of self-fixating mesh and Lichtenstein tension-free mesh in open inguinal hernia repair.

Conclusion

In conclusion, the self-fixating mesh offers advantages in terms of reduced operative time and immediate postoperative pain, with similar safety

and efficacy profiles compared to the Lichtenstein tension-free mesh. These benefits suggest that the self-fixating mesh is a viable alternative for open inguinal hernia repair, potentially improving patient outcomes and surgical efficiency.

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