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Original Research Article

A COMPARATIVE STUDY BETWEEN LICHTENSTEIN TENSION FREE MESH REPAIR AND MODIFIED BASSINI'S REPAIR OF INGUINAL HERNIAS IN A TERTIARY CARE CENTER

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ABSTRACT

Background
This study was conducted to compare the study between LMR (Lichtenstein Tension-Free Mesh Repair) and MBR (Modified Bassini's Repair) of inguinal hernias in a tertiary care center.

Methods
This was an 18-month hospital-based comparative randomized study conducted to study the clinical presentation, risk factors, and complications of surgical procedures at Basaveshwara Medical College and Hospital, Chitradurga. It was carried out with written informed consent from study participants and approval from the institutional ethics committee. The study involved 60 patients, 30 of whom were in group LMR (Lichtenstein's Tension-Free Mesh Repair) and 30 of whom were in group MBR (Modified Bassini's Repair).

Results
There was a significant and suggestive difference in pain scores on the 30th postoperative day, with the Lichtenstein group having more pain than the modified Bassini's group. The incidence of postoperative haemorrhages was nearly the same after both surgeries. Seromas occurred a little more frequently after Lichtenstein's repair than after Bassini's surgery,

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possibly because the former involved the use of a prosthesis. Post-operative wound infection was detected only after mesh repair and not after anatomical repair, with mesh (foreign body) once again being the cause. Individuals who underwent Lichtenstein's mesh hernioplasty experienced no recurrences, but individuals who had modified Bassini's surgery experienced two (6.6%) recurrences.

Conclusion

Lichtenstein's tension-free mesh hernioplasty was found to give superior results than Bassini's repair, with no significant increase in postoperative complications and a shorter hospital stay due to technical simplicity, a smaller dissection, and early ambulation with an acceptable post-operative rehabilitation. It was easier for trainee surgeons to learn than Bassini's repair. Nonetheless, Bassini's repair has the benefit of being reasonably priced and is still helpful in situations where using mesh for repair is prohibited, such as contaminated scenarios, and in situations where a strangulated inguinal hernia occurs. To avoid surgical difficulties in the correction of inguinal hernias, situations must be customised using a tailored strategy.

Keywords: Lichtenstein Tension-Free Mesh Repair, Modified Bassini's Repair, Inguinal Hernias.

INTRODUCTION

Hernias may be generally defined as an "abnormal protrusion of a viscus or part of a viscus through an abnormal opening in the walls of its containing cavity". "A protrusion of any viscus from its proper cavity is denominated a hernia. The protruded parts are generally contained in a bag by a membrane with which the cavity is naturally invested" – Sir Astley Cooper 1804. "A great surgeon performs operations by a single method; later, he makes a statistical summary of deaths and recoveries, and he concludes from these statistics that the mortality law for this operation is two out of five. Well, I say that this ratio means literally nothing scientifically and gives us no certainty in performing the next operation; for we do not know whether the next case will be among the recoveries or the deaths. What really should be done, instead of gathering facts empirically, is to study them more accurately, each with its own special determinism." - Claude Bernard.

These are the words describing the importance of research in surgery and surgical techniques. Every surgical technique needs to be studied and its merits and demerits assessed; so that patients in the future may undergo only the best procedures. Thus, research into newer techniques helps improve the morbidity and mortality associated with the older, standardized techniques. As surgeons, we need to reinvent ourselves every day so that the patient will gain maximum benefit from our efforts. In clinical practice, the most common general surgical operation is hernia repair. Even though this treatment is performed often, very few have perfect outcomes, and surgeons are still challenged by problems such as post-operative discomfort, nerve damage, infection, and recurrence.

Numerous anatomists and surgeons have put in a lot of effort over the past 200 years to define the anatomy of the inguinal region, comprehend the biomechanics underlying the aetiology of hernias, and develop a suitable procedure that is straightforward to carry out and has a low rate of recurrence and postoperative complications. Over the past few decades,

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hernia repair has changed, moving from anatomical repairs to mesh hernioplasties to laparoscopic repair. Furthermore, the fact that hernia procedures are now being done as day surgery shows that hernia treatment has improved. Developments in the fields of pain management and anaesthesia have aided in this progression. The hunt for an almost ideal method of treating inguinal hernias is still ongoing.

Inguinal hernia remains unconquered and poses a lot of challenges for all surgeons practicing hernia repairs. Despite various constraints faced, which include higher costs, in our hospital, set in a rural area, we are trying to do the laparoscopic repair. Nonetheless, since Lichtenstein's mesh repair and Modified Bassini's method of anatomical restoration are carried out more frequently in our institution, it was thought reasonable to compare them in the current study.

AIMS AND OBJECTIVES

- To study the clinical presentations in inguinal hernia.
- To study the risk factors predisposing to inguinal hernia.
- To study the complications following these two repairs with regard to pain, haematoma, seroma, wound infection and post-operative stay in the hospital
- To compare the recurrence rate for the above two techniques and to determine the suitable technique between the two repairs.

MATERIALS & METHODS

This was an 18-month (1st March 2021 to 31st August 2022) hospital-based comparative randomized study conducted to study the clinical presentation, risk factors, and complications of surgical procedures at Basaveshwara Medical College and Hospital, Chitradurga. It was carried out with written informed consent from study participants and approval from the institutional ethics committee. The study involved 60 patients, 30 of whom were in group LMR (Lichtenstein's Tension Free Mesh Repair) and 30 of whom were in group MBR (Modified Bassini's Repair).

Inclusion Criteria

All male patients coming to the surgical outpatient department at Basaveshwara Medical College and Hospital, Chitradurga, with complaints of swelling and/or pain in the inguinoscrotal region were diagnosed to have an inguinal hernia.

Exclusion Criteria

- Patients of the female sex.
- Patients with abdominal hernias, whether femoral or otherwise.
- Youngsters who exhibit an inguinal hernia that is congenital.
- Individuals with bilateral and recurrent inguinal hernias.
- Individuals with complex inguinal hernias who were hospitalised.
- Individuals receiving anticoagulant treatment and those with coagulopathy.

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Statistical Methods

Data was entered in MS Excel and analysed using SPSS software. The results were presented as tables.

RESULTS

Socio-Demographic Parameters		MBR	LMR	P-Value
Age group	< 30 years	6 (20%)	9 (30%)	0.499
	31 to 40 years	5 (16.7%)	5 (16.7%)	
	41 to 50 years	6 (20%)	6 (20%)	
	51 to 60 years	11 (36.7%)	5 (16.7%)	
	61 to 70 years	2 (6.7%)	4 (13.3%)	
	>70 years	0	1 (3.3%)	
Occupation	Business	5 (16.7%)	4 (13.3%)	0.565
	Coolie/ Labour	4 (13.3%)	7 (23.3%)	
	Driver	4 (13.3%)	1 (3.3%)	
	Executive	1 (3.3%)	3 (10%)	
	Farmer	9 (30%)	7 (23.3%)	
	Student	2 (6.7%)	4 (13.3%)	
	Teacher	3 (10%)	1 (3.3%)	
Predisposing factors	Smoking	11 (36.7%)	17 (56.7%)	0.195
	Obesity	6 (20%)	4 (13.3%)	0.731
	Chronic cough	1 (3.3%)	3 (10%)	0.612
	Chronic constipation	0	2 (6.7%)	0.492
	BOO	0	4 (13.3%)	0.112

Table 1: Association of Socio-Demographic Parameters in Study Groups

The various demographic parameters in the two study groups were based on the technique of inguinal hernia repair. We conducted MBR (Modified Bassini's Repair) in 50% of patients and LMR (Lichtenstein's Mesh Repair) in 50% of patients. We found no significant difference between the two study groups concerning age, occupation, and predisposing factors when the chi-square test was applied ($p > 0.05$).

Clinical Parameters		MBR	LMR	P-Value
Mode of presentation	Pain	5 (16.7%)	7 (23.3%)	0.747
	Swelling	16 (53.3%)	16 (53.3%)	
	Pain+ Swelling	9 (30%)	7 (23.3%)	
Laterality	Right side	20 (66.7%)	23 (76.7%)	0.567
	Left side	10 (33.3%)	7 (23.3%)	
Type of inguinal hernia	Direct inguinal hernia	10 (33.3%)	9 (30%)	1
	Indirect inguinal hernia	20 (66.7%)	21 (70%)	

Table 2: Association of Clinical Parameters in Study Groups

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The various clinical parameters in the two study groups were based on the technique of inguinal hernia repair. For half of the patients, we performed LMR (Lichtenstein's Mesh Repair) and MBR (Modified Bassini's Repair). We found no significant difference between the two study groups with respect to the mode of presentation, laterality, and type of inguinal hernia when the chi-square test was applied ($p > 0.05$).

NRS Pain Score	MBR	LMR	P-Value
POD 0	4.97±0.85	5.17±1.3	0.474
POD 1	3.07±1.11	3.53±1.33	0.146
POD 7	1.52±0.871	1.70±1.32	0.534
POD 30	0.18±0.39	0.57±0.774	**0.02**
Total	**30 (100%)**	**30 (100%)**	**-**

Table 3: Comparison of Post-Operative Pain Scores in Study Groups

A numerical rating scale, which is a suitable instrument to use in the clinical assessment of pain, was the pain scale employed in this investigation. On a pain scale of 0 to 10, 0 represented no pain, 1-3 represented mild pain, 4-7 represented moderate pain, and 8–10 represented severe pain. It was discovered that, as of POD 30, the LMR group's discomfort was noticeably greater. In our investigation, there was only one incidence of severe pain (NRS score of 8) on POD 0, indicating nerve damage (LMR group). When an independent sample t-test was used and one patient in the MBR group was lost for follow-up, pain on POD 30 was substantially (p-value <0.05) higher in the LMR group than in the MBR group.

Complications	MBR	LMR	P-Value
Seroma	3 (10%)	7 (23.3%)	0.299
Hematoma	2 (6.7%)	1 (3.3%)	1
Infection	0	1 (3.3%)	1

Comparison of Complications in Study Groups

Recurrence	MBR	LMR	P-Value
Yes	2 (6.6%)	0	0.492
No	28 (93.3%)	30 (100%)	
Total	30 (100%)	30 (100%)	-

Incidence of Recurrence According to Repair Technique

Table 4

The association between postoperative complications and the technique of hernia repair. We found no statistically significant difference in the complications rate in the two groups when the chi-square test was applied ($p > 0.05$).

The association between postoperative recurrence and the technique of hernia repair. We found no statistically significant difference in the recurrence rate between the two groups when the chi-square test was applied ($p > 0.05$).

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DISCUSSION

The most frequent surgical abdominal issue in adults is an inguinal hernia.[1] Due to the procedure's repeatability and the observed decrease in recurrences, Lichtenstein repair has emerged as the gold standard for the treatment of inguinal hernias in the last ten years.[2] With very few exceptions, it is the gold standard procedure for treating inguinal hernias of all sizes and forms. The incidence of chronic groyne pain has increased dramatically from around 3% to nearly 19% after the use of prosthetic mesh in hernia repair, according to an editorial published in the Annals of Surgery in 2001. Despite being widely used, this method falls short of ideal hernia repair because it is not tissue-based and can have complications like chronic inguinal pain.[3] This outcome is frequently attributed to nerve entrapment within the mesh. Hemostoma, seroma, ischemic orchitis, testicular atrophy, mesh infection, and sinus development are a few other consequences of mesh repair.[4] Future infertility is a major concern for young patients, particularly those having mesh surgery for indirect hernias.

Even so, Bassini's repair provides benefits in low-resource and polluted field scenarios, even if it is rarely used. Moreover, several studies rank Lichtenstein's and Bassini's repairs equally in terms of overall operation success and postoperative problems.

A comparative randomized study of Lichtenstein’s tension-free mesh repair versus Modified Bassini’s repair in the management of groin hernias was done to compare clinical outcome and postoperative course including complication rates and recurrence rate.

Age Distribution

Regarding the age at which inguinal hernias occur, Bholla Singh Sidhu et al. (1996)[5] and MM Harjai et al. (2007)[6] found the following: the outcomes were compared to the findings of the current investigation.

According to the Bholla Singh research, the prevalence was highest in the age category of 31 to 40 years old, with 40% of participants being older than 50. In the research by MM Harjai et al., the age group of 41 to 50 years old accounted for the highest percentage of cases (21%). According to our analysis, the age group of 51 to 60 years had the highest percentage of instances (26.7%), and the age group of 30 years came in second with 25%.

Sex Distribution

According to a research by Ira Rutkow, 10% of occurrences of inguinal hernias occurred in females and 90% occurred in men. (Rutkow, Ira M., 1998).[7] According to a research by Faish, 5% of occurrences of inguinal hernias occurred in women and 95% in men. Faish, T. et al. (2000)[8] According to a research by John W. Murphy, 8.7% of inguinal hernias occurred in women and 91.3% in men. Murphy, John W. (2001)[9] However, no instances of inguinal hernias in females were observed in our investigation. This might be because the sample size was too small and the research period was too short.

Mode of Presentation

In the present study, the majority, i.e., 53.3%, presented with swelling only, 26.7% of patients presented with pain along with swelling, and 20% had pain in the inguinal region, which was of the mild dragging type. This history of pain came to light only through direct questioning.

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Sixty-six percent of participants in a study by Alan Hair reported discomfort in addition to edoema. (Alan Hair et al., 2001)[10] The fact that pain is a subjective experience that differs from person to person and that everyone has a varied pain threshold level might be the cause of the discrepancy in the rates of pain presentations between the two studies.

Type of Hernia

The direct and indirect hernia numbers and percentages from the two earlier investigations as well as the current study are displayed in the table below.

According to studies conducted by Palanivelu (C. Palanivelu et al., 2000),[11] Robb (Robb H. Rutledge, 1988),[12] and us, the percentage of indirect hernias was 68.3%, 63%, and 76%, respectively. In our study, the percentage of direct hernias was 31.7%, compared to 24% in the Palanivelu study and 37% in Robb's study. The current study's findings are consistent with those of earlier investigations.

Location of Hernia

Because the right testis descends later than the left in the embryo, as is to be expected, and because the right side has a larger frequency of patent processes in the vaginalis, the right side has more hernias. The results of the two earlier investigations are contrasted with the current study's findings in the table that follows.

Predisposing Factors

18% of inguinal hernia patients in the Alan Hair et al. research had a history of straining. 16.7% of the patients in this research exhibited straining causes, such as hard manual work, bladder outlet blockage, chronic cough, and chronic constipation. The current study's findings are consistent with those of earlier investigations.

Pain

A numerical rating scale, which is a suitable instrument to use in the clinical assessment of pain, was the pain scale employed in this investigation. On a pain scale of 0 to 10, 0 represented no pain, 1-3 represented mild pain, 4-7 represented moderate pain, and 8–10 represented severe pain.

In our investigation, pain on PODs 0 through 7 was not statistically significant. However, in the LMR group, discomfort on POD 30 was significant (p-value 0.02). In our investigation, there was only one incidence of severe pain (NRS score of 8) on POD 0, indicating nerve damage (LMR group). When an independent sample t-test was used, pain on POD 30 was substantially (p-value <0.05) higher in the LMR group than in the MBR group, and one patient in the MBR group was lost for follow-up.

When an inguinal hernia is repaired with mesh, a lot less tissue tension is needed to seal the abdominal wall defect than when sutures are used, such as in Bassini's approach. As a result of this decreased tension, it would be predicted that mesh repairs would cause less discomfort. Clinical investigations have been conducted that refute these statements. The ability to conduct a non-mesh repair with a smaller incision size may be the most crucial aspect in obtaining any meaningful reported changes in discomfort.

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According to a prior research by Callesen T et al.[13] there was no discernible difference in discomfort after modified Bassini's repair or Lichtenstein's mesh hernioplasty (36% and 28%). As a result, regardless of the kind of repair, one-third of patients experienced moderate to severe discomfort after one week and around 10% after four weeks.

There are several potential sources of post-operative pain risk. The patient's age and the presence of inguinal discomfort prior to surgery are patient-related variables. The kind of repair is one of the surgical considerations. Numerous studies that have examined pain in relation to patient age have demonstrated that pain is negatively correlated with patient age, meaning that younger patients suffer greater pain than older ones.[14] In a related research, age was the sole independent predictor of pain score, according to H. Lau and F. Lee[15] Long-term chronic and persistent types of pain were not taken into account in this study when assessing pain fundamental to the method of follow-up.

Haematoma

During an inguinal repair, bleeding from an artery or vein may occur at any anatomical level, leading to the creation of a hemomatoma. In our investigation, a haemorrhage occurred in 3.3% and 6.7% of patients receiving modified Bassini's repair and Lichtenstein's mesh repair, respectively. There was hardly any change. In Bholla Singh Sidhu et al. research, 4% of patients experienced a haemorrhage. The modified Bassini's repair in our investigation has a little higher rate than in that study, but it is not statistically significant.

Seroma

Exudates, including solutes, water, and plasma proteins like fibrin and neutrophils, are represented by seroma. The trauma caused by a scalpel, scissors, cautery, and foreign bodies is called seroma. In the current study, seroma occurred in 10.% of patients who had undergone modified Bassini's repair and 23.3% of patients who had received Lichtenstein's mesh hernioplasty. Here, the p-value was determined to be higher than 0.05, indicating insignificance. According to a research by T. Faish et al. (2000), 2% of patients who had mesh plug hernioplasty had seromas. The different definitions of seroma between the two studies might account for the variations in the proportion. Every patient that had oozing from the incision site was included in our investigation. Only patients requiring drainage were included in the other research.

Infection

As with many surgical procedures, infection is a feared consequence that might arise, and inguinal hernia surgery is no exception. Surgery for inguinal hernias caused by infections has a greater recurrence incidence because the tissues are damaged along with the repairs. The study found that 3.33% of cases had received Lichtenstein's mesh hernioplasty, and no patients who had modified Bassini's repair experienced wound infection following surgery. The p-value was negligible. The incidence of wound infection in a research by Bholla Singh Sidhu et al. was 6%. Furthermore, since deep infections are concerning, it's critical to distinguish between superficial and deep infections.

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Testicular Complications

Ischemic orchitis and testicular atrophy, which appear 24 to 72 hours after surgery and can last up to 6 weeks, are two problems related to the testis. Nineteen incidences of testicular atrophy were identified in a review of 52,582 patients treated at the Shouldice clinic for primary inguinal hernias. This issue has been suggested to be caused by severe venous congestion. There were no such difficulties noted in our investigation. The sample size could have been too small.

Recurrence

The recurrence rate is the final test of every hernia repair. Numerous studies have been conducted to estimate the recurrence rate for various procedures. Following a review of the literature, Bendavid R. (1998),[16] reported the recurrence and re-recurrence rates in various procedures.

In the current investigation, the modified Bassini's group saw a 6.6% recurrence rate, whereas the Lichtenstein's mesh hernioplasty group experienced none. However, the p-value was not noteworthy. Recurrent hernias were not included in the research.

Janu, Sellers, and Mangiante (1997)[17] compared mesh and non-mesh restorations over a 10-year period, finding that the mesh group experienced a 3.5% recurrence while the mesh group experienced a 0.3% recurrence. With n = 879, the p-value was negligible ($p < 0.01$). The study found that, although there was no variation in the other early post-operative problems, the outcomes after mesh hernioplasty were better than those after non-mesh repairs.

16 recurrences (2.04%) out of 714 patients in a four-year study by Csontos et al. (2005)[18] occurred after Lichtenstein's mesh repair. The positive outcomes show that Lichtenstein's mesh repair outperforms Bassini's.

Numerous studies have demonstrated that traditional tissue restoration is on par with mesh hernioplasty. This might be because of the prejudice the surgeon's competence established. This is not the case with mesh hernioplasty, which yields consistently favourable outcomes regardless of the level of competence of the surgeon.

Mesh repair has been demonstrated to be superior to pure tissue approximation repairs in a study conducted by Amid P. K. (2005).[19]

With a recurrence rate of less than 1%, Lichtenstein's mesh repair is the most often done inguinal hernia procedure, according to a research by Nathan J. D. and Pappas T. N. (2004).[20]

According to Forte A. Gallinaro L. S. et al.[21] mesh repair for inguinal hernias performs better than traditional Bassini's repair. Mesh repair provides the best outcomes in terms of economy, enabling early patient mobility, as well as for the surgical point (simplicity of the procedure, repeatability, less invasiveness, low incidence of recurrence, low frequency of postoperative problems).

Due to the small sample size and short research time, the p-value in this study is not significant; nonetheless, non-statistically, Lichtenstein's mesh hernioplasty has shown better outcomes (0% recurrence) than modified Bassini's repair (6.6% recurrence).

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The maximum follow-up period in this trial was eighteen months; however, patients were monitored for varying periods of time. The following observation by F. Andrew Mosfesis et al. (1996) highlights how insufficient the follow-up is.[22]

"Despite the extensive use of mesh in the last 15 years, I still am not sure that we know what the effect of a piece of mesh implanted for periods of 30, 40, or 50 years will be in substantial populations numbering in thousands regarding the recurrence rate of hernia repair. These figures are at best factitious. As such, we are looking at a long-term recurrence of around 15% and it seems absurd to talk about figures of 1% and 2%. The truth of the matter is that apparently, most patients who have recurrences go to another surgeon to have them repaired."

These findings demonstrate that the technique of repair and the surgeon's experience have a major role in the outcome of hernia surgery. If patients are properly selected and treated using a strategy customised for each patient, the cumulative recurrence rate can be much below 0.1%.

CONCLUSION

This study employed a numerical rating scale as its pain measure. There was a significant and suggestive difference in pain scores on the 30th postoperative day, with the Lichtenstein group having more pain than the Modified Bassini's group. The incidence of postoperative haemorrhage was nearly the same after both surgeries. Seromas occurred a little more frequently after Lichtenstein's repair than after Bassini's surgery, possibly because the former involved the use of a prosthesis. Post-operative wound infection was detected only after mesh repair and not after anatomical repair, with mesh (foreign body) once again being the cause. Over the course of the trial, there were 2 (6.6%) recurrences in patients who had received modified Bassini's repair and no recurrences in patients who had undergone Lichtenstein's mesh hernioplasty. Lichtenstein's mesh hernioplasty outperforms modified Bassini's repair in terms of recurrence and relative ease of execution, even if the current comparative analysis does not clearly identify any advantages of one repair over the other. A bigger research sample and a longer follow-up study may be required before any additional conclusions can be drawn, though, as the current study's sample size and follow-up duration are very small.

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