# **Original Research Article**

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# Lichtenstein mesh hernioplasty: the extreme refinement in hernia surgery

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#### **ABSTRACT**

**Background:** Inguinal hernia repair is the most commonly performed operation, owing to a significant lifetime incidence and variety of successful treatment modalities. The Lichtenstein tension-free repair has become the dominant method of inguinal hernia repair. The advantages of this repair were its association with less pain, rapid postoperative recovery, early return to normal activity and very low recurrence rate. We evaluated the treatment outcome of the tension free repair of inguinal hernias by the Lichtenstein mesh repair using polypropylene mesh.

**Methods:** 200 patients treated for inguinal hernia with Lichtenstein mesh hernioplasty between May 2015 to April 2016 were reviewed. Data recorded included age, sex, symptoms, site of hernia, unilateral or bilateral hernia, postoperative complications, and recurrence in follow up period of one year.

**Results:** 55% patients had indirect and 41% had direct inguinal hernia while 4% had pantaloon hernia. Seroma occurred in 2% patients and hematoma in 6%. Superficial surgical site infection was seen in 3% patients. Transient testicular swelling was noticed in 7% patients.

**Conclusions:** Lichtenstein tension-free mesh hernioplasty is simple, safe, effective and economical and has good patient satisfaction and low recurrence rate.

**Keywords:** Inguinal hernia, Lichtenstein, Mesh repair, Recurrence, Tension-free

### INTRODUCTION

Approximately 75% of abdominal wall hernias occur in the groin. The lifetime risk of inguinal hernia is 27% in men and 3% in women. Of inguinal hernia repairs, 90% are performed in men and 10% in women. Inguinal hernia repair is the most commonly performed operation in the United States, owing to a significant lifetime incidence and variety of successful treatment modalities.<sup>1</sup>

The Lichtenstein tension-free repair has become the dominant method of inguinal hernia repair. Recognizing that tension in a repair is the principal cause of recurrence, current practices in hernia management use a synthetic mesh prosthesis to bridge the defect, a concept

popularized by Lichtenstein.<sup>2</sup> The advantages of this repair were its association with less pain, rapid postoperative recovery, early return to normal activity and very low recurrence rate. Tension-free mesh repair is nevertheless associated with complications such as foreign body reaction, infection, fistula formation, migration, shrinkage, and recurrence. Other complications include skin anaesthesia, bruising and haematoma formation, seroma formation, orchitis and testicular atrophy<sup>3</sup>

In the Lichtenstein repair, a piece of prosthetic nonabsorbable polypropylene mesh is fashioned to fit the canal<sup>2</sup>. The properties of polypropylene mesh that make it more acceptable than other types of mesh include readily inserted into any size without fragmentation, used in the groin without discomfort by the patient, less affected by infection, having high tensile strength, resistant to most chemicals.<sup>4</sup>

This prospective study tries to evaluate the treatment outcome of the tension free repair of inguinal hernias by the Lichtenstein mesh repair, and to determine the acceptability, practicality, effectiveness, and safety of inguinal hernia repair using polypropylene mesh.

#### **METHODS**

It was a prospective study conducted in department of General Surgery of Victoria hospital, a tertiary care centre attached to Bangalore Medical College and Research Institute. The data was collected in a predesigned proforma of 200 patients who underwent Lichtenstein hernioplasty between May 2015 to April 2016.

The study included all adult patients age 18 years and above diagnosed at or referred to the outpatient clinics, with reducible inguinal hernia with duration more than 2 months patients who were and operated electively for inguinal hernia. Exclusion criteria were age <18 years, irreducible hernia, obstructed hernia, strangulated hernia, recurrent hernia, patients who could not afford the mesh and patients with uncontrolled diabetes mellitus. After admission a detailed history and examination was performed.

All patients underwent basic investigations including complete hemogram, liver and renal function test, coagulation profile, blood glucose and chest x-ray. Electrocardiogram was done in all patients. Permission to carry out the study was obtained from Institutional Ethical Committee. All cases were operated electively in surgery department of the institute. Prophylactic antibiotics were given routinely one hour before surgery (1gm inj. ceftriaxone *i.v.*).

All patients' hernias were repaired according to Lichtenstein technique. Polypropylene mesh was used in all patients. No drains were used. A polypropylene mesh  $(3 \times 6 \text{ inch})$  is trimmed to fit the floor of the inguinal canal, and its apex is sutured to the public tubercle using a 2-0 polypropylene suture. Postoperatively, patient was given same analgesics and three doses of i.v. antibiotics used preoperatively. All patients were discharged in the second post-operative day, followed up in the outpatient clinic once every week for one month then once a month for next one year.

Sutures were removed after 10 days of the operation, and those who developed wound infection had alternate stitch removal and daily dressing until infection subsided, then rest of stitches were removed. Data recorded included age, sex, symptoms, site of hernia, unilateral or bilateral

hernia, postoperative complications, and recurrence in follow up period of one year.

#### **RESULTS**

200 patients with uncomplicated inguinal hernia were reviewed, 196 (98%) were males and 4 (2%) were females. Age of the patients ranged from 20-68 years with mean age of 40.82 years. Most common presenting symptom was swelling in inguinal region. 110 (55%) patients had indirect and 82 (41%) patients had direct inguinal hernia while 8 (4%) of patients had pantaloon hernia. Of 110 patients with indirect inguinal hernia 47 patients had right inguinal hernia and 55 patients had left inguinal hernia while 8 patients had hernia on both sides.

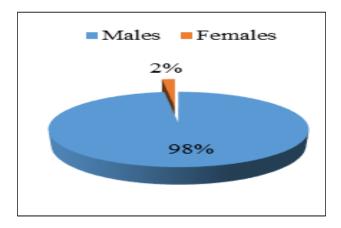


Figure 1: Gender wise distribution of inguinal hernia.

13 (6.5%) patients were diabetics, 26(13%) patients were hypertensive, 12 (6%) patients had bronchial asthma, 8 (4%) patients had ischemic heart disease.

Table 1: Distribution of inguinal hernias according to side and type.

Side (indirect hernia)	No. of hernia	Percentage
Left	55	50
Right	47	42.72
Bilateral	8	7.27
Type of hernia		
Direct	82	41
Indirect	110	55
Pantaloon	8	4

Postoperative pain was recorded on visual analogue scale as no pain, mild, moderate and severe. The pain was easily relieved by the use of single analgesics. 42 patients (21%) had no pain in postoperative period, while 124 patients (62%) had mild pain, 26 patients (13%) had moderate pain and 8 patients (4%) complaint of severe pain. Acute urinary retention was seen in 18 patients (9%).

Seroma formation was seen in 4 patients (2%) and hematoma was seen in 12 patients (6%) and was relieved

by aspiration by disposable needle of 18G. Superficial surgical site infection was seen in 6 patients (3%) and 1 patient (0.5%) had deep surgical site infection but not associated with mesh infection. Residual neuralgia was seen in 3 patients (1.5%) and was relieved by use of analgesics and methyl-cobalamin in 1 month in all 3 patients. Transient testicular swelling was noticed in 14 patients (7%) who were relieved by use of scrotal bandage and scrotal support. Abdominal distension was present in 1 patient (0.5%) which was relieved by Ryle's tube insertion and digital rectal stimulation.

Table 2: Post-operative pain recorded on visual analogue scale.

Intensity of pain	No. of patients	Percentage
No pain	42	21
Mild pain	124	62
Moderate pain	26	13
Severe Pain	8	4

In follow, up none of the patients had ischemic orchitis, testicular atrophy, mesh rejection and mortality. Recurrence was seen in 1 (n= 0.5%) patient in  $9^{\text{th}}$  month.

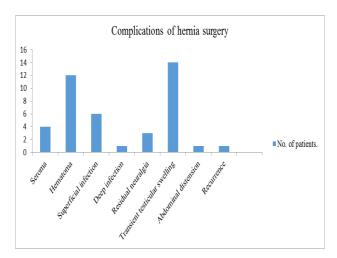


Figure 2: Complications following Lichtenstein tension-free mesh hernioplasty.

#### DISCUSSION

An abdominal hernia is a defect in the wall of the abdominal cavity that allows protrusion of an organ or abdominal content through it. These defects most commonly involve the anterior abdominal wall, particularly at sites considered weak as the inguinal, femoral, and umbilical areas. The groin represents the area where the majority of abdominal wall hernias occur, totalling approximately 75% of the total incidence.<sup>5</sup>

Ninety-five per cent of patients presenting to primary care are male, and in men the incidence rises from 11 per 10,000 persons years aged 16-24 years to 200 per 10,000 persons years aged 75 years or above. In our study 98%

of patients were male and 2% were females with mean age of 40.82 years. 110 patients (55%) had indirect and 82 patients (41%) had direct inguinal hernia while 8 patients (4%) had pantaloon hernia. Of 110 patients with indirect inguinal hernia 47 patients had right inguinal hernia and 55 patients had left inguinal hernia while 8 patients had hernia on both sides. In a study by Ayesha Fatima and Mohammed Riyaz Mohiuddin of 433 patients (457 inguinal hernias), inguinal hernia was seen in 365 (84.3%) males and 68 (15.7%) females. Out of 457 inguinal hernias 387 (84.68%) were seen in males and 70 (15.68%) were seen in females. The number of right sided inguinal hernias was 266 (58.21%) and the number of left sided inguinal hernias was 143 (31.29%). There were 2 (5.25%) bilateral hernias. According to their study out of the total 457 inguinal hernias, 379 (82.93%) were of indirect variety and 78 (17.07%) were direct variety.<sup>7</sup> Men are 25 times more likely to have a groin hernia than women. An indirect inguinal hernia is the most common hernia, regardless of gender. In men, indirect hernias predominate over direct hernias at a ratio of 2:1. Indirect inguinal occur more commonly on the right side. This is attributed to a delay in atrophy of the processes vaginalis after the normal slower descent of the right testis to the scrotum during fetal development.<sup>2</sup>

In our study Postoperative pain was recorded on visual analogue scale as no pain, mild, moderate and severe. The pain was easily relieved by the use of single analgesics. 42 patients (21%) had no pain in postoperative period, while 124 patients (62%) had mild pain, 26 patients (13%) had moderate pain and 8 patients (4%) complaint of severe pain.

Several components of hernia surgery bring about pain. Its effect is the combination of dissection and inflammation, causing nociceptor stimulation and nerve injury. The experience of the operating team and the surgical technique could determine the extent of the dissection. Although the experience did not seem to influence the risk of post herniorrhaphy pain in at least three large studies,<sup>8-10</sup> careful dissection to reduce the inflammatory responses is advocated.11 The normal inflammation encountered in the surgical field is wound healing. Complications like infection and haematoma allow inflammatory mediators to lower the threshold of nociceptors which may enhance pain. 12,13 Pain may also be dependent on the method of fixation. Sutures may cause ischaemia, muscle contraction or nerve damage resulting in pain. This is corroborated by the fact that removal of sutures can be an effective treatment in patients with pain. 14,15

In our study urinary retention was seen in 18 patients (9%). This complication after hernia repair has a reported incidence of 1.3 to 5.8%. It is usually precipitated in elderly patients, especially if symptoms of prostatism are present.<sup>16</sup>

Seroma formation was seen in 4 patients (2%) and hematoma was seen in 12 patients (6%) and was relieved by aspiration by disposable needle of 18G. It is a common complication after laparoscopic hernia surgery, the incidence being in the range of 5-25%. They are specially seen after large indirect hernia repair. Most resolve spontaneously over 4-6 weeks. A seroma can be avoided by minimizing dissection of the hernial sac from the cord structures, fixing the direct sac to pubic bone and fenestrating the transversalis fascia in a direct hernia. <sup>16</sup>

Superficial surgical site infection was seen in 6 patients (3%) and 1 patient (0.5%) had deep surgical site infection but not associated with mesh infection. Incidences of mesh-related infection after hernia repair of up to 8% have been reported. The rate of infection is influenced considerably by underlying co-morbidity, and seems to be increased in patients with diabetes, immunosuppression or obesity.<sup>17</sup>

Residual neuralgia was seen in 3 patients (1.5%) and was relieved by use of analgesics and methyl-cobalamin in 1 month in all 3 patients. Chronic groin pain is not uncommon. It is particularly common in patients with pre-operative pain due to hernia and in patients who are of younger age. Diagnosing chronic groin pain is difficult and needs a high level of patient co-operation. There is currently a lack of consensus on the appropriate transition from medical to surgical management of these patients. The anti-depressants and antiepileptics are helpful in neuropathic pain whereas opioids or NSAIDs are usually minimally effective or ineffective for neuropathies. In most studies, NSAIDs were used as the first line analgesic treatment. Kim et al used gabapentin or oral steroids as second line agents following the failure of NSAIDs.18

In our study recurrence was seen in 1 (n= 0.5%) patient in  $9^{th}$  month. The Lichtenstein repair is considered the "gold standard" against which other repairs are compared. Results from 3019 repairs from 5 sites have demonstrated a 0.5% recurrence rate. The early group of recurrences is mainly caused by failure on the part of the surgeon (technical errors or tension on the suture line) and by infection. Late recurrence results from defects in collagen metabolism as the patient ages, with thinning of scar tissue and continued inherent weakness of the inguinal floor.

A meta-analysis comparing the Lichtenstein, mesh plug, and bilayered repairs has reported no significant differences in the rate of recurrence, chronic groin pain, other complications, or time to return to work. Approximately 50% of recurrences are found within 3 years after primary repair. Recurrence continues to occur after this time in non-mesh-based repairs but is uncommon with tension free repairs.<sup>19</sup>

#### **CONCLUSION**

Authors have observed that Lichtenstein tension-free mesh hernioplasty is simple, safe, effective and economical and has good patient satisfaction. Recurrence rate is acceptable. In our opinion this procedure is acceptable for hernia surgery.

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Institutional Ethics Committee

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