



## Original Article

# AUDIT OF PATIENT OUTCOMES AFTER LICHTENSTEIN HERNIOPLASTY FOR THE REPAIR OF ADULT INGUINAL HERNIA

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### Abstract

**Background:** Inguinal hernia repair is one of the most commonly performed surgeries worldwide. While numerous surgical approaches exist to treat inguinal hernias, the Lichtenstein tension-free mesh repair remains the gold standard. This retrospective study is carried out to evaluate the short and long term outcomes of Lichtenstein hernioplasty in the hand of a general surgeon.

**Patients and Methods:** A retrospective analysis of all adult inguinal hernia repair by Lichtenstein method between January 2003 and December 2009 was carried out. The outcome measures were early post-operative complications, incidence of chronic groin pain and recurrence rate.

**Results:** A total of 526 procedures were carried out in 445 adult male patients during the study period. The median age of the patients was 49 years (range, 21-73 years). All patients underwent Lichtenstein hernioplasty under spinal anesthesia. Length of hospital stay was median 2.4 days (range, 1-4 days). Median time to the resumption of normal activities was 8 days (range, 5-10 days). Urinary retention was the most frequent early post-operative complication (5.16%). Rate of wound infection was acceptable (0.44%). Chronic groin pain was experienced by three patients (0.67%). There was no recurrence observed among the 291 (65.4% of the total) patients who were available after two years of the procedure.

**Conclusion:** The Lichtenstein open tension-free mesh repair of adult inguinal hernia is a safe procedure with least post-operative morbidity and least chance for recurrence. It is a simple technique, quick and easy to perform without compromising the patient's care and long-term outcome in the hand of an experienced general surgeon.

**Key words:** Lichtenstein hernioplasty, Inguinal hernia

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### Introduction

Inguinal hernia repair is the most frequently performed operation in general surgery with about 20 million procedures being carried out worldwide, annually<sup>1</sup>. Post-operative pain and disability and recurrence rates have led to a gradual evolution in inguinal hernia repair. Modern era of hernia repair began more than 100 years ago when Bassini proposed an anatomical approach to inguinal hernia repair<sup>2</sup>. Further modifications of the anatomical approach by McVay<sup>3</sup> and Shouldice<sup>4</sup>

reduced recurrence rates radically. For many years, recurrence was the only criterion by which the quality of a hernia repair was measured. Recurrence rates of over 15% for primary repair were accepted before mesh techniques were introduced. After the introduction of the tension-free surgical repair with use of prosthetic mesh by Lichtenstein et al<sup>5</sup>, recurrence rates were reported to be less than 5 percent and patients comfort was reported to be substantially improved over that obtained by the traditional tension-producing techniques<sup>6,7</sup>.

Specialist hernia centers and public hospitals, with a dedicated hernia service in Europe and America have achieved remarkable results for hernia repair by Lichtenstein technique. Such specialist centers are nonexistent in our country. Moreover, our populations are different from those in the western world. We conducted a retrospective analysis of the patients who underwent Lichtenstein hernioplasty under the care of one consultant surgeon, with recurrence and incidence of chronic pain and disability being taken as primary outcome measures.

### Patients and Methods

We performed a retrospective review of all adult inguinal hernia repairs by standard Lichtenstein method carried out between January 2003 and December 2009 in the department of general surgery, Bangabandhu Sheikh Mujib Medical University and in a specialized private hospital under the care of one consultant surgeon. Indications for surgery were indirect inguinal hernias, symptomatic direct inguinal hernias and recurrent hernias. All patients received the standard flat polypropylene mesh repair under spinal anesthesia according to the technique described by Lichtenstein et al. With the patient in the supine position, an incision was made in the skin about 2-3 cm above and parallel to the medial two thirds of the inguinal ligament. Incision was deepened to expose the external oblique aponeurosis, dividing two or three superficial veins in between ligatures that cross the line of the incision. Inguinal canal was exposed by splitting the fibers of external oblique aponeurosis. Hernial sac was identified and dissected. An indirect hernial sac was opened and the contents were reduced to the peritoneal cavity. Neck of the sac was transfixed with 2/0 polyglactin 910 suture and the distal part of the sac was excised. A large indirect sac was divided straight across within the inguinal canal. Proximal portion was isolated and transfixed at the

neck; the distal portion was left in situ keeping the mouth wide open. Direct hernial sac was isolated and pushed inwards. A large sac was kept invaginated by a running suture of 2/0 polyglactin 910, carried across the stretched transversalis fascia so as to flatten the bulge without tension. A polypropylene mesh (size, 15 x 7.5 cm; weighing 82 gm/m<sup>2</sup>) was placed behind the spermatic cord in such a way so that it extended approximately 2 cm medial to the pubic tubercle, 3-4cm above the Hesselbach's triangle, and 5-6 cm lateral to the internal ring. The mesh was partially incised from its lateral margin, placing the cut one-third of the distance from the lower edge to accommodate the spermatic cord at the deep inguinal ring. Lower medial corner of the mesh was made slightly rounded and fixed with 3/0 polypropylene to the thick dense tissue over the pubic tubercle. The lower edge of the mesh was fixed to the inguinal ligament with running 3/0 polypropylene suture. The medial and upper margins of the mesh were then secured in position by fixing with conjoint tendon with five to six interrupted 3/0 polypropylene sutures. At the lateral margin of the mesh, narrower lower leaf was overlapped by the upper leaf accommodating the spermatic cord in between them and secured with one interrupted suture lateral to the cord. Spermatic cord was replaced in the inguinal canal and external oblique aponeurosis was closed with 2/0 polyglactin 910 forming a new superficial inguinal ring that accommodated the tip of the little finger snugly. Skin edges were apposed with interrupted silk sutures. Absolute hemostasis was ensured throughout the whole procedure either by diathermy coagulation and/or suture ligation of blood vessels. Every effort was given to identify and safeguard the ilioinguinal, iliohypogastric and genital branch of genitofemoral nerves and avoiding their entrapment within the suture materials while fixing the mesh in position. In patients with bilateral hernias, both sides were repaired simultaneously. Recurrent hernias were repaired by the same standardized technique as for primary hernias. All patients received combination of Ciprofloxacin and Flucloxacillin intravenously 30 minutes before giving the incision and the antibiotics were continued orally for 7-10 days post-operatively. Post-operative pain relief was obtained initially with a single dose of intramuscular Pethidine. Subsequent analgesia was maintained with oral Paracetamol with additional Diclofenac suppositories in some patients.

All the patients were given standardized post-operative instructions to have normal diet and to resume daily activities unless the activities caused pain. Patients were discharged home within 36-48 hours of the procedure with advice for removal of stitches on the 7<sup>th</sup> post-operative day. All the patients were advised to have follow-up visits at 6 weeks, 3 months and then yearly for a minimum of two years and were instructed to consult the operating surgeon in case of any adverse post-operative event.

The data were collected retrospectively by case-note review and included patients demographics and baseline characteristics, early post-operative complications, length of hospital stay, time to the resumption of daily activities, and long-term outcome in terms of groin pain and recurrence. Variables and results were presented as median value, range and percentage.

## Results

Between January 2003 and December 2009 a total of 526 inguinal hernia repairs were carried out in 445 adult male patients. Table 1 shows the baseline characteristics of the patients. The median age was 49 years (range, 21-73 years). All the patients underwent Lichtenstein mesh repair under spinal anesthesia. Length of hospital stay was median 2.4 days (range, 1-4 days). The median time to the resumption of normal activities was 8 days (range, 5-10 days). Early post-operative complications were reported in 67 (15%) patients (Table 2). These were 2 wound infections, 4 epididymo-orchitis, 17 scrotal swellings, 23 urinary retentions, 19 seromas and 2 hematomas (none of which required evacuation). Groin pain persisting for more than 6 weeks after surgery was reported in 16 (3.6%) patients. Chronic groin pain (pain lasting for more than 3 months after surgery) was experienced by 3 (0.67%) patients – who were referred to pain clinic for subsequent management. In long-term follow-up 38 patients (8.53%) complained of a foreign body sensation in the groin. Two patients needed intervention for developing vaginal hydrocoele. No recurrence was observed among the 291 patients (65.4% of the total) available for evaluation after 2 years of the procedure.

**Table-I**

*Baseline characteristics of the patients (n=445)*

| Characteristics               | Number of Patients (%) |
|-------------------------------|------------------------|
| Age (years) <sup>a</sup>      | 49 (21-73)             |
| Hernia                        |                        |
| Unilateral                    | 328 (73.7%)            |
| Bilateral                     | 81 (18.2%)             |
| Recurrent                     | 36 (8%)                |
| Associated Medical Conditions |                        |
| Diabetes                      | 61 (13.7%)             |
| Hypertension                  | 92 (20.7%)             |
| Heart disease                 | 14 (3.2%)              |
| Obstructive airway disease    | 17 (3.8%)              |
| Prostatism                    | 37 (8.3%)              |
| Impaired renal function       | 08 (1.8%)              |

<sup>a</sup> Median value (range)

**Table-II**

*Post-operative Course with short and long term outcome.*

| Variable   | Number of Patients (%) |
|--|------------------------|
| Early post-operative complications   |                        |
| Urinary retention  | 23 (5.16%)             |
| Seroma   | 19 (4.26%)             |
| Hematoma   | 02 (0.44%)             |
| Scrotal swelling   | 17 (3.82%)             |
| Epididymo-orchitis   | 04 (0.89%)             |
| Wound infection  | 02 (0.44%)             |
| Length of hospital stay (days) <sup>a</sup>  | 2.4 (1-4)              |
| Time to the resumption of daily activities (days) <sup>a</sup>                       | 8 (5-10)               |
| Long term complications  |                        |
| Groin pain   |                        |
| Lasting for > 6 weeks after surgery  | 16 (3.6%)              |
| Persisting for > 3 months after surgery  | 3 (0.67%)              |
| Foreign body sensation   | 38 (8.53%)             |
| Vaginal hydrocoele   | 2 (0.44%)              |
| Recurrence (Among 291 patients available for evaluation 2 years after the procedure) | 0 (0%)                 |

<sup>a</sup> Median value (range)

## Discussion

With the introduction and widespread use of prosthetic mesh there has been a great upsurge in interest in hernias over the past two decades. The aims of surgical repair are to relieve pain and discomfort, and to remove the risk of complications like obstruction and strangulation which carry significant morbidity and mortality, particularly in the elderly<sup>8</sup>. Emphasizing the principle of no tension, the Lichtenstein group advocated routine use of mesh to reinforce the weakened posterior wall of the inguinal canal where the mesh is placed between transversalis fascia and external oblique aponeurosis and extends well beyond the Hesselbach's triangle. Mesh functions in hernia repair by producing scar tissue which forms a mesh-scar complex that acts as a barrier to herniation. The success of any hernia repair is determined by the recurrence rate and the incidence of chronic pain. Tension-free mesh repair gives a better result than a conventional sutured repair. According to the EU Hernia Trialists Collaboration meta-analysis of 2002, compared with sutured repair, patients having a mesh repair had a shorter hospital stay, a faster return to normal activities and a fewer incidence of persisting pain than those who had sutured repair<sup>9</sup>. Open mesh repair was also associated with a 50-70% reduction in the risk of recurrence.

The overall risk of complications after inguinal hernia surgery varies widely. Early complications include urinary retention, seroma, hematoma, scrotal swelling, epididymo-orchitis and wound infection. Late complications include sensory loss, foreign body sensation, hyperesthesia, chronic groin pain, testicular atrophy, hydrocoele and recurrence of hernia. In this series, urinary retention was found to be the most frequent early complication (5.16%). In a meta-analysis, the incidence of urinary retention after herniorrhaphy was reported to be 2.42% with regional anesthesia<sup>10</sup>. Such retention is attributed to the inhibitory effect of regional anesthesia on bladder function. Seroma and hematoma in a small percentage of patients resolved spontaneously. Meticulous dissection and adequate hemostasis will reduce the incidence of these complications. Wound infection was not a significant issue in this series. We used antibiotic prophylaxis routinely since a foreign material was implanted in the body. The conditions resolved spontaneously and there was no need for mesh removal.

In this series 3.6% patients had pain persisting for more than 6 weeks, and 3 (0.67%) patients were referred to pain clinic for chronic pain lasting for more than 3 months. Chronic groin pain is one of the most debilitating long-term complications after inguinal hernia repair and is now considered as an important primary endpoint in hernia surgery. There is evidence from several studies that up to 30% patients will have some degree of discomfort or pain one year or more after inguinal hernia repair<sup>11-14</sup>. The etiology of this pain is probably multi-factorial. Its close association with numbness in some patients suggests a neuropathic cause<sup>15</sup>. Another proposed mechanism for the development of post-operative chronic pain is the inflammation and fibrosis induced by the mesh, which is in close proximity to the ilioinguinal nerve<sup>16</sup>. Enfolding and rolling of the mesh due to inadequate fixation, neuroma formation after accidental division of nerves, nerve entrapment by suture or mesh, perineural fibrosis – all are thought to have some role in the development of chronic groin pain. In up to 15% of cases, chronic groin pain in patients who have had inguinal hernia repair may be unrelated to the operation<sup>17</sup>. In most of the cases, this will subside with time, though in 6% of patients this pain will be severe enough to interfere with the patient's ability to continue normal daily activities<sup>1</sup>.

Median time to the resumption of daily activities for the patients in this series was 8 days. According to international standard, the majority of patients should be able to return to normal activities at one week after surgery<sup>7, 18</sup>. Failure to do so may be related to pain and wound problems, but may equally well be a result of inadequate pre-operative counselling<sup>18</sup>.

The success of any hernia repair is determined by the recurrence rate. Uniformly excellent results have been reported consistently with Lichtenstein hernioplasty using polypropylene mesh and at 5 years, this procedure in specialist hernia centers has a recurrence rate of 0.1%<sup>19</sup>. The majority of the recurrences occur within the first 2-3 years of the repair. Acceptable recurrence rates should be below 3% at 5 years. In our series, we did not observe any recurrence among 291 patients (65.4% of the total) who were available for evaluation two years after the procedure. This may not be the actual figure as because there was a drop out of significant number of patients during the follow-up period. Moreover, patients with recurrence might have reported to somewhere else. Recurrence in Lichtenstein hernioplasty may be

due to faulty surgical technique. The factors involved are insufficient mesh size, incorrect placement, immediate or early displacement by folding, inadequate mesh fixation or lifting of the mesh by hematoma and urinary retention. Defective collagen metabolism of the patient may be another patient related factor. We feel the necessity of a diligent long term follow-up to keep track of actual incidence of recurrence.

### Conclusion

With our limited experience in a relatively small number of patients, Lichtenstein tension-free mesh repair offered excellent results in the hand of a general surgeon. Lichtenstein hernioplasty for inguinal hernia in adults is a safe and durable procedure with least morbidity and least chance for a recurrence.

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