

## A Prospective Study For Comparison of Lichtenstein's Tension free Open Inguinal Hernia Repair Versus Laparoscopic Inguinal Hernia Repair



### Medical Science

KEYWORDS : Hernia, Lichtenstein-TEP repair

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### ABSTRACT

*HERNIA can be defined as 'abnormal protrusion of a part or whole of viscus through a normal or an abnormal opening in the wall containing it. The present study was conducted for comparison of advantages and disadvantages of open modified Lichtenstein hernia repair and laparoscopic hernia repair. Study is done to compare the operative time between laparoscopy and other procedures, the duration of pain, post-operative hospital stay, intraoperative and postoperative complications, recurrence rate in each group. The Study of 100 cases of laparoscopic and Lichtenstein open hernia repair was carried out in the Department of Surgery, SMIMER. Total 100 cases were divided in two groups of 50 cases each with random table method. The operative time in Lichtenstein tension free repair is significantly less than that of Laparoscopic repair. Amplitude of pain in postoperative period at 12, 24, 72 hours and Post-operative hospital stay and Duration of return to daily normal activities are significantly less in Laparoscopic repair method group as compared to Lichtenstein repair. Both the groups have similar intraoperative and post-operative complications and recurrence rate. Thus, Laparoscopic repair is comparatively a better procedure in terms of duration of hospital stay, postoperative pain, postoperative complications and early return to normal activity as compared to Lichtenstein's tension free repair.*

### INTRODUCTION

HERNIA can be defined as 'abnormal protrusion of a part or whole of viscus through a normal or an abnormal opening in the wall containing it'. Sir Astley Cooper had said, "No disease of the human body belonging to the province of the surgeon requires in its treatment, a better combination of accurate anatomical knowledge with surgical skill hernia in all its variety".<sup>3</sup> Estimates put the incidence at around 5% of the population. Depending on the type, 75% of all hernias occur in the inguinal region with 2/3<sup>rd</sup> being direct and the rest 1/3<sup>rd</sup> being indirect. Incidence of hernia is more at the extreme of age. Male are 25 times more likely to have a hernia than females with direct hernia being rare in females. Still the inguinal hernia remains the most common type of hernia in females. 10% females and 50% males with a femoral hernia have or will develop an inguinal hernia. Incisional hernias are twice as common in females as in males. Inguinal hernias are more common on the right side. In inguinal hernia this is thought to be because of delay in atrophy of the processus vaginalis following normal slower descent of the testis on the right side.

### AIM AND OBJECTIVES

The study has been undertaken at SMIMER, Surat during the period July 2012-december 2014 with the following aims & objectives:

1. This comparison is being done under the following sub headings:
  - a. To compare the operative time between laparoscopy and other procedures.
  - b. To study and compare the duration of pain and post-operative hospital stay.
  - c. To study and compare the intraoperative and postoperative complications in all the groups.
  - d. To study and compare the recurrence rate in each group.
2. To study the overall advantages or disadvantages of using laparoscopic and Lichtenstein's tension free hernia repair.

### MATERIAL AND METHODOLOGY

The Study of 100 cases of laparoscopic and Lichtenstein open hernia repair was carried out in the Department of Surgery,

SMIMER. Total 100 cases were divided by random number table method in two groups of 50 cases each. Group A was treated with laparoscopic hernia repair and Group B was treated with open mesh (Lichtenstein's tension free) repair. Owing to ethical considerations, strict confidentiality of data has been maintained and permission has been obtained from Institutional Ethical Committee (IEC) of SMIMER before conducting the study. Informed written consent would be taken after persuading the participants about the possible benefits/risks and implications of the study.

The duration of study was spread over two and half years. All the patients who were diagnosed with inguinal hernia from July 2012 up to July 2014 were enrolled in the study. The cases were then followed for a period of 6 months from the date of commencement of surgical procedure.

### Patient Selection

All patients above 15 years with primary and recurrent hernias were included. No selection regarding socio-economic status, type, side or size of hernia was made. Complicated hernias (obstruction, strangulation) were excluded. All were elective repairs. Informed consent was obtained. Patients who were mentally incompetent or not able to speak were also excluded. Exclusion criteria were any additional surgical intervention planned during the hernia repair, a history of extensive lower abdominal surgery, severe local inflammation or radiotherapy, very huge hernia. All the cases which were not completed with laparoscopic procedure and hence to be converted to open procedure were excluded from the study.

A standardized history was obtained, and a physical examination performed. Before operation, the patients were told both orally and in writing that they should resume normal activity after surgery, including work and sports, when they felt able to do so. It was emphasized that this recommendation applied to both surgical techniques. Basic blood chemistry and xray chest and ecg was done. A dose of antibiotic is given 1 hour before surgery (usually cefotaxim 1 gram intravenous).

**Lichtenstein tension free hernioplasty<sup>1,2</sup>**

The classical skin incision 2.5 cm above and parallel to inguinal ligament .Indirect hernia sac is dissected free till neck and then opened from the fundus part. Proximal part is transfixed and ligatured with polyglactin, just above the neck and cut distal to it.A precut sheet of polypropylene mesh 8 x 16cm (3 x 6 inches) is used. A slit is made in the lateral end of the mesh creating two tails the wider one (2/3) above, the narrower one (1/3) below. This creates a new internal ring made of mesh. These are kept underneath the external oblique aponeurosis, which is then closed over the cord using non absorbable suture material. Skin is closed with polyamide or staples.

**Total extraperitoneal repair<sup>6</sup>**

The procedure is performed under general anesthesia. A 10 mm infra umbilical transverse incision is made. The rectus muscle is retracted laterally from the midline and by finger dissection a space is created between the rectus muscle and the posterior rectus sheath. The Hassan's cannula snugly fits into the incision and is secured with stay sutures. The camera is introduced through the infraumbilical port and the preperitoneal space is visualized. The other two working ports are placed in the preperitoneal space. First, a 5 mm port is placed about 2-3cm above the pubic symphysis in the midline and second, a 5mm port is placed in the midline, midway between the two placed ports (sub umbilical and suprapubic). In case of direct hernia, the hernial sac is visualized going into the weakness in the Hasselbach's triangle before the inferior epigastric vessels can be visualized. On the other hand, in the indirect hernia, the inferior epigastric vessels are seen before the hernial sac is encountered. After creating the lateral space adequately, the polypropylene mesh of 15 x 12 cm<sup>2</sup> size is introduced through the 10 mm infraumbilical port. The mesh is placed over the space created so that it covers the site of direct, indirect, femoral and obturator hernias. In this study, fixation suture used is polypropylene 3-0. After adequately spreading the mesh, which extends from the midline medially to lying over the psoas muscle on the lateral side, preperitoneal space is deflated.

**Post-operative care**

All patients were allowed sips of water orally after six hours of operation and given full diet in evening.Only oral analgesic therapy was required to manage pain and cap amoxicillin for 5 days. The patients were requested to return to the outpatient clinic on second day; at third day, after one week, at one month and 6 months for a standardized history taking by a resident doctor and physical examination by the surgeon who had performed the surgery. In the study visual analogue scale (VAS) pain scoring system was used to monitor post-operative pain.<sup>16</sup>



**DATA ANALYSIS**

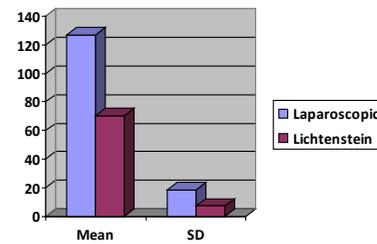
Data management and analysis was done using Microsoft excel and Epi-info software. Double data entry procedure was adopted and digitized data were checked for completeness and consistency. The categorical variables were assessed using Pearson chi-square and t-test. Mantel Hanzel Odds Ratio (OR) and corresponding 95% Confidence Interval (CI) were calculated for dichotomous variables. Statistical significance will be measured at 95% confidence interval.

**RESULT AND OBSERVATIONS**

The most common associated medical condition was hypertension (25%), followed by prostatism (12%), constipation (11%), chronic cough (11%) and diabetes mellitus (7%).All the medical conditions were evenly distributed amongst both the groups as their P value is > 0.05

All patients of laparoscopic repair were given GA.All patients of Lichtenstein's open hernia repair were given SA.

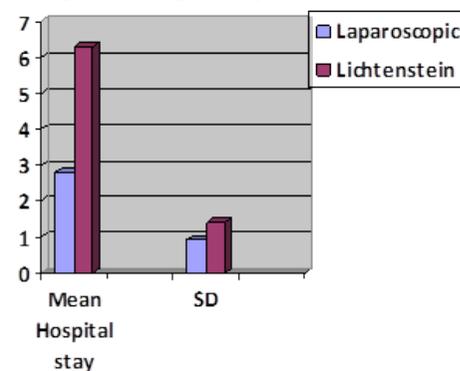
**Duration of Surgery**



**P value < 0.0001**

It was observed from the above data that the mean operative time by Lichtenstein repair was 70.20 min with SD of 7.42. Laparoscopic repair took mean time of 126.8 min with SD of 18.45.The difference between operating time is highly significant (P value < 0.0001).In total, the Laparoscopy had an Incidence of vessel injury in 2%. There was no incidence of injury to spermatic cord.The cases of seroma formation were seen in Lichtenstein repair (8%). Aspiration was required in 1 case of seroma formation, while other resolved spontaneously with conservative management.Incidence of scrotal edema was more in Lichtenstein group (20%) as compared to laparoscopic group, which was statistically significant (P value = 0.01). Neuralgia was maximum in Lichtenstein group (14%) compared to 4% in laparoscopy group.Urinary retention was seen in 6% cases of Lichtenstein group. It may be due to postoperative spinal anesthesia effect. All patients taken for laparoscopy were catheterized & after 24 hours there was no case of urinary retention.Wound infection was 10% in Lichtenstein group in comparison to laparoscopy group which was 2% where port site infection was considered. No mesh infection was reported in any group.All the parameters were comparable with each other and rate of complications in both the group is statistically insignificant as their P value is > 0.05 except scrotal edema.

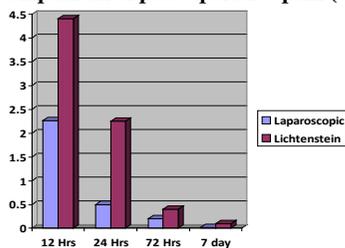
**Postoperative hospital stay**



**P value < 0.0001**

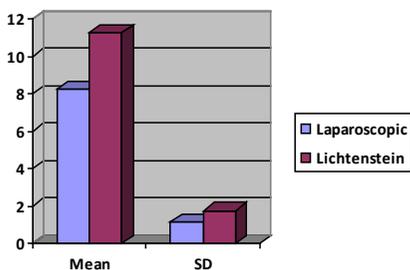
Postoperative hospital stay was the least in laparoscopic repair group which is 2.8 days compared to Lichtenstein's tension free repair group which is 6.3 days stands to be statistically significant (P value < 0.05).

**Comparison of post-operative pain (VAS Score)**



The Laparoscopic repair with mean of 2.26 & SD of 0.75 was significantly less painful at 12 hours than the Lichtenstein repair with mean of 4.4 & SD of 1.03 (P value < 0.001). The Laparoscopic repair with mean of 0.5 days & SD of 0.14 was significantly less painful at 24 hours than the Lichtenstein repair with mean of 2.25 & SD of 1.04 (P value < 0.001). The visual analogue score at 72 hours in Laparoscopic method group was less than that in Lichtenstein group (P value = 0.007). On day seven, there was no significant difference between the two groups [0.02 versus 0.1 (P value = 0.306)].

**Comparison of Time to return to normal activity**



**P value < 0.0001**

The time taken to return to normal activity in laparoscopic group was 8.22 days with SD 1.14 days. While Lichtenstein's tension free repair group had longer time to get back to normal activity with mean of 11.24 days and SD of 1.79 days. There is statistically significant difference in post-operative return to normal activity (P value < 0.0001).

**SUMMARY**

The present study included 100 patient of inguinal hernia admitted in SMIMER, Surat during a period from July 2012 to December 2014. The patients were divided into 2 groups of 50 patients each and were operated as under:

1. Laparoscopic method of repair
2. Lichtenstein method of repair

The mean age of patients in both groups was comparable: laparoscopic method group having mean age of 41.48 and Lichtenstein method group having mean age of 47.38 years. Patient had the following associated medical conditions like chronic cough (11%), prostatism (12%), constipation (11%), hypertension (25%) and diabetes mellitus (7%). Total time duration of Lichtenstein tension free repair method group was 70.2 minutes while in laparoscopic method group it was 126.8 min. The difference was statistically significant. In Pawanindra et al<sup>13</sup> (2003) study, the mean operating time in laparoscopic repair was 75.72 minutes and in Lichtenstein repair was 54 minutes. Mike SL Leim et al (1997) study, the laparoscopic repair time was 95.5 minutes and Lichtenstein repair time was 60 minutes. In Kavic SM study

showed (a 2003 Cochrane Database Systematic Review) demonstrated weighted mean difference between laparoscopic group and Lichtenstein group of 14.81 min (P value < 0.0001)<sup>7,8</sup>. Intraoperative complications were more in laparoscopic method group as compared to Lichtenstein method group like injury to vessels and cord structure and were not statistically significant. Post-operative complications like wound infection, seroma formation, neuralgia, urinary retention and scrotal edema were least in laparoscopic method group in comparison to Lichtenstein repair method group due to minimal invasive procedure. But these differences were not statistically significant. Post-operative hospital stay was least in laparoscopic method group accounting for mean of 2.8 days as compared to Lichtenstein tension free repair (mean=6.3) which was statistically highly significant (p < 0.0001). Pawanindra et al (2003) reported hospital stay mean of 2.48 days with SD 1.2 days for Lichtenstein method group and mean of 1.4 days with SD 1 day in Lichtenstein method group. Mike SL Leim study (1997) showed mean of 1 day with SD of 1 day of hospital stay for laparoscopic method group and mean of 5 days with SD of 1 day for Lichtenstein method group. In our study, pain at 12 hours post-operative, in laparoscopic method group, mean of visual analogue scale was 2.26 with SD of 0.75. In Lichtenstein method group, mean of visual analogue scale was 4.4 with SD of 1.03. At 24 hours, in laparoscopic method group, mean of visual analogue scale was 0.5 with SD of 0.14. In Lichtenstein method group, mean of visual analogue scale was 2.25 with SD of 1.04. Visual analogue scale (VAS) at 12 hours in laparoscopic method group was 2.2 less than that of Lichtenstein tension free repair method group. At 24 hours, visual analogue scale was 1.75 less than visual analogue scale of Lichtenstein tension free repair group. The differences were statistically highly significant (P value < 0.0001). However, on seventh day there was no significant difference in Visual analogue score between the two groups (P value = 0.306). Our study correlates with Pawanindra et al (2003) showing Visual analogue scale of 2.64 with SD of 1.4 and 1.76 with SD of 1.4 at 12 hours and 24 hours respectively in laparoscopic method group. Lichtenstein method group showed mean of 3.52 with SD of 1.7 and mean of 2.74 with SD of 1.5 at 12 hours and 24 hours respectively. In Kavic SM study showed (a 2003 Cochrane Database Systematic Review) demonstrated less persisting pain (overall 290/2101 vs. 459/2399, p < 0.0001), and less persisting numbness (overall 102/1419 vs. 217/1624, p < 0.0001) in the laparoscopic groups as compared to Lichtenstein group<sup>9,10,11</sup>. Treadwell J, Tipton K, Oyesanmi O, Sun F, Schoelles K study favored laparoscopic method group compared to Lichtenstein method group with significant odd's ratio for post-operative pain (0.61)<sup>12</sup>. Patients who underwent laparoscopic repair, returned to their normal activity within mean of 8.22 days that was very early when compared to Lichtenstein tension free repair where it took 11.24 days to return to normal activity. Patients returned 3.02 days earlier in laparoscopic method group than Lichtenstein method group. Mike SL Leim et al (1997) showed median time of return to normal activity of 6 days (ranging between 4-10 days) in laparoscopic repair method group and 10 days (ranging between 6-10 days) in Lichtenstein tension free repair method group. Pawanindra et al (2003) showed time to return to normal activity with mean of 12.8 days with SD of 7.1 days in laparoscopic method group while in Lichtenstein method group it was 19.3 days of mean and SD of 4.3 days. In Neumayer et al<sup>15</sup>(2004) study, the median time was 4 days in laparoscopic method group and 5 days in Lichtenstein method group. Kavic SM study (a 2003 Cochrane Database Systematic Review) reported that patients who underwent laparoscopic method repair resumed normal daily activity 4 days earlier (6 days versus 10 days; p < 0.001). Treadwell J, Tipton K, Oyesanmi O, Sun F, Schoelles K reported 4.6 days earlier return to normal activity for laparoscopic method group which is highly significant. Single recurrence reported in laparoscopic repair group while Lichtenstein tension free repair group did not have any recurrence during follow up period. The difference was statistically insignificant.

nificant. Mike SL Leim et al (1997), showed 3 % of recurrence in laparoscopic method group and 6 % recurrence in Lichtenstein method group. Neumayer et al (2004) study showed recurrence in 10.1 % of laparoscopic method group and 4.9 % of patients of Lichtenstein method group.

## CONCLUSION

From the whole study undertaken at SMIMER, Surat during the period from July 2012 to December 2014, following conclusions are made.

1. The operative time in Lichtenstein tension free repair is significantly less than that of Laparoscopic repair.
  2. Amplitude of pain in postoperative period at 12, 24, 72 hours is significantly less in Laparoscopic repair method group as compared to Lichtenstein repair method group. However, at 7 days both the groups has similar pain score.
  3. Post-operative hospital stay is significantly less in Laparoscopic repair method group than Lichtenstein repair method group.
  4. Duration of return to daily normal activities is also significantly less in Laparoscopic repair method group than Lichtenstein repair method group.
  5. Both the groups have similar intraoperative and post operative complications. No life threatening complications was encountered in any of the groups.
  6. Although one recurrence was noted in the Laparoscopic group method, it is statistically not significant. Thus, both the groups have similar recurrence rate.
- Thus, Laparoscopic repair is comparatively a better procedure in terms of duration of hospital stay, postoperative pain, postoperative complications and early return to normal activity as compared to Lichtenstein's tension free repair.

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