

**Original Article**

## **Comparison of Laparoscopic VS Open Inguinal Hernioplasty in a Tertiary Care Hospital**

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### **Abstract**

**Background:** Inguinal hernia repair is one of the most common surgical procedures in Bangladesh. The option of surgical treatment remains controversial. Laparoscopic hernia repair has all the benefits of a tension free repair. We aimed to compare postoperative outcome and cost between laparoscopic and open inguinal hernia repair. **Objective:** This study was conducted with an objective to compare the effectiveness of each procedure and complications if any. **Materials and Methods:** Fifty cases of inguinal hernia admitted in the tertiary care center were selected by non-probability (purposive) sampling method. All patients with uncomplicated hernia treated by open or laparoscopic method were included. The age/sex, incidence, mode of presentation, surgical treatment and postoperative complications were evaluated and compared with standard published literature. **Results:** Postoperative wound infection developed in three cases of open hernioplasty and one case in laparoscopic surgery. Hematoma and seroma at the operated site were found in one case of laparoscopic hernioplasty and in two cases of open hernioplasty. Orchitis was more prevalent in the laparoscopic hernioplasty patient with incidence among two cases as compared to one in open group. The mean duration of hospitalization was 59.62±6.11 hours in case of laparoscopic hernioplasty while 53.33±8.26 hours in open hernioplasty. The mean duration of procedure was 72.33 minutes in laparoscopic group while 64.62 minutes in open surgery. The mean cost for the laparoscopic repair group was around taka 63000/= whereas in the open group it was around 42000/= only with significant difference. Prolonged groin pain was seen in four cases in open group as compared to one in laparoscopically operated cases. **Conclusion:** There were less post-operative complications in the laparoscopic group.

**Key words:** Inguinal hernia; Laparoscopic hernioplasty; Lichtenstein tension free hernioplasty

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### **Introduction**

Surgical repair of inguinal hernias is a common procedure in adult men. The standard method for hernia repair has changed little over a hundred years. Introduction of synthetic mesh has changed the scenario. It can be placed either by open or laparoscopic techniques. Laparoscopic hernia repair was first reported by Ger and colleagues in 1990.<sup>1</sup> The advent of laparoscopy has revolutionized abdominal

surgery and a large body of evidence has been amassed to compare laparoscopic and open techniques in the repair of primary inguinal hernias.<sup>2</sup> Advantages of laparoscopic procedures may include a reduction in postoperative pain and hospital stay, and the ability to undertake a simultaneous repair of symptomatic incipient contralateral herniation. In our institutions, inguinal hernia repair is one of the common surgeries

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performed regularly. The main aims of the study are: i) to compare the outcomes of laparoscopic inguinal repair with open repair, patient's duration of stay, complications that occur in open inguinal hernia repair and laparoscopic hernia repair and to arrive at a conclusion, ii) to evaluate the limitations of laparoscopic inguinal hernia repair, iii) to compare between the times taken for open and laparoscopic inguinal hernia repair and iv) to compare the costing of surgery of open and laparoscopic inguinal hernia repair.

### Materials and Methods

This prospective study was done in a tertiary care center during the period of October 2016 to September 2017. This study was approved by Human Research Ethics Committee. Written and informed consents were taken from the patients. All the laparoscopic operations were performed by totally extraperitoneal (TEP) or transabdominal preperitoneal (TAPP) procedures. Total 50 cases were selected by the non-probability (purposive) sampling method. Adults above 18 years age having unilateral, primary inguinal hernia were included. Complicated hernia, bilateral hernia, associated groin conditions like hydrocele, varicocele etc, recurrence and previous surgery with mesh in the same region, patients in American Society of Anesthesiologists (ASA) class IV (i.e., those who had systemic disease that is a constant threat to life) or class V (i.e., those who were unlikely to survive for 24 hours with or without operation), immunocompromised patients with malignancy were excluded.

Optimization of precipitating factors was done. The type of anesthesia used was spinal anesthesia for open cases and general anesthesia for laparoscopic hernia mesh repair. A single dose of preoperative broad spectrum antibiotic was given. The procedure was based on the patient's wish, the general patient condition, and associated cost of the laparoscopic and open procedure.

Post-operative complications like bleeding, wound infection, seroma, orchitis and urinary retention were carefully monitored. NSAID was given post-operative

for two days and later as and when required. Patients were discharged once fit and called on for regular follow-up after one week, two weeks and at the end of month. Chi-square and Independent sample T-tests were done for statistical analyses using SPSS version 16.0.

### Results

In our study we analyzed total 50 patients, of whom 35 were operated by open technique and 15 were selected for laparoscopic inguinal hernioplasty. Age range of patients was 30 to 70 years. All the patients in the study were men. In 39 cases (78%) age was  $\geq 50$  with mean  $60.89 \pm 5.24$  years and in 12 cases (22%) age was  $< 50$  years with mean  $41.90 \pm 5.57$  years (Table I). Right sided groin swelling was present in 64% and left sided groin swelling in 36% (Table II). Most (74%) of the patients presented within first year of onset of complaints while rest (26%) presented after one year. Hypertension was the most common associated illness with 12 people suffering from it. Diabetes mellitus was seen in eight people.

### Duration of Surgery

Mean time taken for laparoscopic inguinal hernia repair (hernioplasty) was  $72.33 \pm 9.99$  minutes compared to the average duration  $64.62 \pm 8.23$  minutes taken for open inguinal hernia repair. Difference between two procedures is significant ( $p=0.0007$ ).

### Postoperative complications

Five (14.28%) cases of urinary retention were in open hernioplasty as compared to no retention in laparoscopic repair due to catheterization. Wound infection was seen in 3 (8.57%) cases in open group as compared to one (6.66%) in laparoscopically operated cases. Orchitis was more prevalent in the laparoscopic hernioplasty patient with 2 (13.33%) cases as compared to 1 (2.85%) in open group. One (6.66%) case of seroma was found in the laparoscopic hernioplasty group whereas in 2 (5.71%) cases in open repair group (Table III).

Prolonged groin pain was seen in 4 (11.42%) cases in open group as compared to one (6.66%) in laparoscopically operated cases. Recurrence was more prevalent in the laparoscopic hernioplasty patients

with 2 (13.33%) cases as compared to 1 (2.85%) in open group. One (6.66%) case of sensory loss was found in the laparoscopic hernioplasty group whereas in 2 (5.71%) in open repair group. Postoperative complications were fewer in laparoscopic hernia repairs when compared to the open hernia repair group, which may be due to less sample size of laparoscopic inguinal hernioplasty patients (n=15). Further, the p values are not significant between the two groups.

**Duration of hospital stay**

The mean length of the hospital stay was found 59.62±6.11 hours for the laparoscopic hernioplasty

compared to the open hernia group in which it was around 53.33±8.26 hours. p value is significant (p=0.004).

**Postoperative pain**

Postoperative pain (visual analog score) was lower in the patients who underwent laparoscopy than in those with open surgery.

**Cost**

The mean cost for the laparoscopic repair group was around taka 63000/= whereas in the open group it was around 42000/= only with significant difference (p=0.000).

Table I: Distribution of patients according to age (N=50)

Age	Number	Percentage	Mean±SD	p value
≥50	39	78	60.89±5.24	0.000
<50	11	22	41.90±5.57	

Table II: Site of inguinal hernia (N=50)

Groups	Right side (n=32)		Left side (n=18)	
	Number	Percentage	Number	Percentage
Laparoscopy	9	18	6	12
Open	23	46	12	24

Table III: Complications following surgery (N=50)

Complications	Laparoscopic repair (N=50)		Open repair (N=50)		p values
	Number	Percentage	Number	Percentage	
Urinary retention	0	0	5	14.28	
Wound infection	1	6.66	3	8.57	0.824
Orchitis	2	13.33	1	2.85	0.159
Seroma	1	6.66	2	5.71	0.899
Prolonged groin pain	1	6.66	4	11.42	0.616
Sensory loss	1	6.66	2	5.71	
Injuries to spermatic cord, vessels and bowel	0	0	0	0	
Recurrence (after 1 year)	2	13.33	1	2.85	

## Discussion

In this study we compared the outcomes between laparoscopic inguinal hernioplasty and open inguinal hernioplasty including duration of operation, hospital stay, complications and cost involved. Sultan et al<sup>3</sup> found 982 (92.38%) male and 81 (7.62%) female in their study of 1063 cases of hernia. Out of these, right inguinal hernia (RIH) was the most frequent (44.12%) as expected followed by left inguinal hernias (LIH) (18.72%). Femoral hernias were the least common with a frequency of 0.85%. The study also found peak incidence of various hernias above 50 years of age. Our findings are in consistence with the literature. The age incidence of our study matches with the above study.

Saeed et al<sup>4</sup> evaluated inguinal hernias and found that 68% were right-sided, 32% were left-sided, 56% were indirect inguinal hernias and 44% were direct inguinal hernias. Alam et al<sup>5</sup> also found the incidence of a right-sided hernia more common. In our study also right sided inguinal hernia is more common. Right side dominance is because of later descent of right testis.<sup>6</sup>

In the present study 35 cases underwent Lichtenstein repair while 15 cases underwent laparoscopic (TEP or TAPP) procedure. The procedure was chosen based on patient's choice, need and financial status. The mean duration for hernioplasty in our study was 72.33 minutes for laparoscopic surgery. Time for open inguinal hernia repair was 64.62 minutes. (Weighted mean difference 7.71 minutes,  $p=0.007$ )

Most evidence in the literature points to a shorter operation duration with open repair. The 2003 Cochrane Database Systematic Review demonstrated that the duration of operation was longer in the laparoscopic groups (weighted mean difference 14.81 minutes;  $p<0.0001$ ). A meta-analysis in the British Journal of Surgery described a similar increase of 15.2 minutes with laparoscopic inguinal hernia repair ( $p<0.001$ ).<sup>2</sup>

Five (14.28%) cases of urinary retention were found in open hernioplasty as compared to no retention in laparoscopic repair due to catheterization. Wound infection was seen in 3 (8.57%) cases in the open group as compared to 1 (6.66%) in laparoscopically operated cases. Orchitis was more prevalent in the

laparoscopic hernioplasty patients with 2 (13.33%) cases as compared to 1 (2.85%) in open group. One (6.66%) case of seroma was found in the laparoscopic hernioplasty group whereas 2 (5.71%) in open repair group. Prolonged groin pain was seen in 4 (11.42%) cases in open group as compared to 1 (6.66%) in laparoscopically operated cases.

Recurrence was more prevalent in the laparoscopic hernioplasty patient with incidence of 2 (13.33%) cases as compared to 1 (2.85%) in open group. One (6.66%) case of sensory loss was found in the laparoscopic hernioplasty group whereas 2 (5.71%) in open repair group.

In our study the postoperative complications like wound infection, and prolonged groin pain were comparatively lower in the laparoscopic hernia repair group (6.66%, 6.66%) compared to that of the open hernioplasty group (8.57%, and 11.42% respectively). As hernia surgery is a clean operation, it does not require routine antibiotic prophylaxis. However, we are practicing in our center to administer the pre-operative single dose of antibiotic. Even in the presence of antibiotic prophylaxis, we had a little higher wound infection rate, probably because of poor personal local and general hygiene by the patients.

Satisfaction was high for both procedures. The laparoscopic procedure was superior only for return to work. Laparoscopic patients had significantly less first-day pain (5.44 vs 6.30,  $p=0.02$ ).<sup>8</sup> The incidence of orchitis was higher in the laparoscopic group (15%) as compared to open group (3.33%). Cochrane review also suggests that operative complications were uncommon for both techniques but more frequent in the laparoscopic group for visceral (overall 8/2315 versus 1/2599) and vascular (overall 7/2498 versus 5/2758) injuries.<sup>7</sup> A systematic review by Cochrane collaboration showed transabdominal pre-peritoneal (TAP) operation was associated with increased risk of port-site hernia and visceral organ injury and also concluded that there are insufficient data to prove the relative effectiveness of the TEP and TAP repair for inguinal hernia.<sup>9</sup> During laparoscopy most common vascular injuries occurred involving the inferior epigastric and spermatic vessels.<sup>8</sup>

The difference in the duration of the operation can be partly attributed to operative complications which were, although uncommon for both methods, more frequent in the laparoscopic group for visceral (overall 8/2315 vs. 1/2599) and vascular (overall 7/2498 vs. 5/2758) injuries.<sup>7</sup>

The external iliac, profunda and obturator vessels are also at risk, and previous lower abdominal surgery is a risk factor.<sup>10</sup> Vidovic et al<sup>11</sup> reported a higher rate of urinary retention following TEP which was successfully managed by per-urethral catheterization. In our study, urinary retention was more common in open hernia group probably because of spinal anesthesia and patients with older age group might have associated benign prostatic hyperplasia. The overall rate of vascular injury during laparoscopic repair was 0.09% as against no reported cases during open operations.<sup>9</sup> In the present study we did not encounter any case of vascular injury probably because of small sample size (N=50). In our study we found the higher rate of orchitis in laparoscopic group possibly because of extensive dissection during TEP leading to thrombosis of vascular plexus or foreign body reaction to mesh.

In our study we found that the mean period of hospitalization was 53.33 hours in case of open hernia repair and 59.62 hours in case of laparoscopic hernioplasty with statistically significant difference. Cochrane review stated that length of hospital stay did not differ between open and laparoscopy groups (WMD 0.04 days, 95% CI 0.08 to 0.00; p=0.05).<sup>7</sup>

The cost of anesthesia is a factor to consider while selecting patients for surgery and cost of operation is increased when general anesthesia is used. Cost of laparoscopic repair was higher than that of open repair. However, this study did not show the cost saving arising from the faster recuperation and early re-entry into the workforce.<sup>8</sup> Operating cost can also be reduced by avoiding the use of disposable instruments.<sup>12</sup>

When making the decision for open or laparoscopic inguinal hernia repair, differentiating between the chronic pain associated with two methods is another important consideration.<sup>13</sup> A meta-analysis published in the British Journal of Surgery in 2010 used chronic pain as a primary outcome and found no significant

difference between the laparoscopic and open cohorts.<sup>14</sup> However these results differ from many other reports including the 2003 Cochrane Database Systematic Review which reported less persisting pain (overall 290/2101 versus 459/2399, p <0.0001) in the laparoscopic groups. Similar results were reported by Eklund et al<sup>14</sup> in 2010. A comparison between open and laparoscopic (totally extra-peritoneal patch) repair found that five years post-operatively, 1.9% of patients who had undergone laparoscopic repair continued to report moderate or severe pain compared with 3.5% of those in the open repair group. Bignell et al<sup>15</sup> reported a similar higher incidence in chronic groin pain in open inguinal hernia repair. However, the decrease in chronic groin pain with laparoscopic repair reported in this study did not translate into a significant improvement in the quality of life.<sup>16</sup> The use of mesh during laparoscopic hernia repair is associated with a relative reduction in the risk of hernia recurrence of around 30–50%. However, there is no apparent difference in recurrence between laparoscopic and open mesh methods of hernia repair. The data suggest less persisting pain and numbness following laparoscopic repair. Return to usual activities is faster. Operation times are longer and there appears to be a higher risk of serious complication rate in respect of visceral (especially bladder) and vascular injuries.

### Limitations

Due to less number of laparoscopic surgeries in this year we could not have the same number in both groups for easy comparison. Since the study period was for a short duration, long term outcomes and results/recurrences could not be assessed.

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