

## Comparative Assessment of the Outcome of Laparoscopic Inguinal Hernia Repair and Open Incisional Inguinal Hernia Repair Surgery

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**Conflict of interest: Nil**

### **Abstract**

**Aim:** The present study evaluate and compare the outcome in terms of operative duration, post-operative pain, post-operative analgesic requirement, and post-operative complications between laparoscopic inguinal hernia repair and open incisional inguinal hernia repair surgery.

**Methods:** The present study was conducted in the Department of General Surgery, Sri Ramkrishna Institute of Medical Sciences and Sanaka, Hospital, Durgapur, West Bengal, for the period of 1 year . A total of 70 patients with uncomplicated inguinal small or medium sized, direct or indirect, unilateral or bilateral hernias undergoing elective inguinal hernia surgery, who are fit for laparoscopy and open surgery were included in the study. The study consisted of 70 patients, of which 35 were in the open surgery group and 35 were in the laparoscopic group.

**Results:** The study consisted of 70 patients, of which 35 were in the open surgery, while the other 35 were in the laparoscopic group. The open surgery group had patients with a mean age of  $44.16 \pm 14.50$  years, with 25 males and 10 females. The laparoscopic group consisted of patients with a mean age of  $46.67 \pm 19.21$  years, with 28 males and 7 females. 59 of the cases presented with unilateral hernia, of which 38 showed right laterality and 21 displayed left laterality. In 11 cases, bilateral representation was noted. 21 cases were of direct type, 36 of indirect type, and 13 of direct/indirect type.

**Conclusion:** Laparoscopic hernia repair is safe and provide less postoperative morbidity in experienced hands compared to open hernia repair.

**Keywords:** Inguinal hernia repair, Laparoscopic hernioplasty, Open hernioplasty

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### **Introduction**

Repair of inguinal hernia is one of the commonest operations performed by surgeons around the world. The treatment of this common problem has seen an evolution from the pure tissue repairs to the prosthetic repairs and in the recent past to laparoscopic repair. Preferred approach

for open inguinal hernia repair is Lichtenstein's tension free inguinal hernioplasty using a prosthetic mesh. [1] The recurrence rate is less than 1% in experienced hands as compared to tissue repairs where it may be as high as 15%.

[2] The postoperative morbidity is low and recovery is quick.

Laparoscopy had gained widespread acceptance in today's era of surgery. The advantages and efficacy of laparoscopic cholecystectomy over open cholecystectomy have been well documented and it has become the gold standard for management of gallstone disease. [3] Several studies have shown the benefit of the laparoscopic hernioplasty over open hernioplasty (OH) in terms of less postoperative pain and morbidity, wound complications, postoperative pain, early resumption of activity and work and better cosmetic results. [4-6] But it had some limitations like twice longer operative time, longer learning curve, higher hospital cost, a potential for serious life threatening accidents and a higher recurrence rate especially immediately in early postoperative period as compared with open surgery.

There are many types of hernias, but most of them occur in the abdomen or groin. Direct inguinal, indirect inguinal, and femoral hernias are the three forms of groin hernias based on their placement relative to the inguinal (Hesselbach) triangle. A groin hernia is characterized by a protrusion in the groin that grows larger over time. An inguinal hernia affects 27% of men and 3% of women over the course of their lives, and the risk increases with age. Most people who have groin hernias experience discomfort or general feeling of unease but up to a third are asymptomatic.

The main drawback with open tension-free repair is dissection through the scarred tissue, with the risk of cord injury or nerve injury, whereas the main advantages are lower cost, a shorter learning curve [7] and no need of general anesthesia.

Laparoscopic and open-surgery techniques have their advantages and pitfalls. With various patient factors, and surgeon factors influencing the outcome, it becomes imperative to assess the outcome of these

therapeutic approaches. Therefore, this study intended to carefully evaluate and compare the outcome in terms of operative duration, post-operative pain, post-operative analgesic requirement, and post-operative complications between laparoscopic inguinal hernia repair and open incisional inguinal hernia repair surgery.

### Materials and Methods

The present study was conducted in the Department of General Surgery, Sri Ramkrishna Institute of Medical Sciences and Sanaka, Hospital, Durgapur, West Bengal, for the period of 1 year.

A total of 70 patients with uncomplicated inguinal small or medium sized, direct or indirect, unilateral or bilateral hernias undergoing elective inguinal hernia surgery, who are fit for laparoscopy and open surgery were included in the study.

### Methodology

The study consisted of 70 patients, of which 35 were in the open surgery group and 35 were in the laparoscopic group.

Patients with complicated hernia (irreducible, obstructed, strangulated), those with large size sac, recurrent hernia were excluded. Also excluded were those unfit for general anesthesia, laparoscopy or pneumoperitoneum i.e. those with cardiac diseases (MI, IHD), respiratory diseases (chronic asthma, COPD), renal or hepatic diseases, bleeding disorders etc were excluded from the study.

All patients were clinically evaluated and underwent routine investigations for fitness. Even elderly patients with American Urological Association (AUA) Score for prostate of more than 6 also underwent evaluation for prostate by digital rectal examination, ultrasonography, and cystourethroscopy.

Group A were operated with open tension free hernioplasty.

Group B operated by laparoscopic repair using mesh.

Patients were admitted one day prior to surgery. They were operated as per allotted group and relevant operative findings were noted. The antibiotic protocol was perioperative antibiotics only, consisting of three intravenous doses of inj. ceftriaxone 1 gm. In patients with the drain, antibiotic was continued till the drain was removed.

All open procedures were conducted under local/epidural/spinal/general anaesthesia, while all laparoscopic procedures were performed under general anaesthesia. In addition, the post-operative outcomes of pain using the visual analogue scale (VAS) immediately, 6 hours, 12 hours, and 24 hours, analgesic requirement, and presence or absence of post-operative complications were recorded.

Sutures were removed between 7-10 days. The wounds were checked and graded

accordingly. Patients were evaluated on 1st week, 2nd week, 1 month, 2 month, 3 month and presence of any cough impulse, swelling, and signs of recurrence. Patients where recurrence was suspected both immediate and early were kept under close supervision, if found they were operated by standard open repair. The scars were checked at each visit and the subjective and objective cosmetic results of scar accessed. Required surgical variables and clinical outcomes were noted and compared between the two groups during and after surgeries.

The operative data and post-operative outcomes of all patients were recorded and statistically analyzed by statistical package for the social sciences (SPSS) software. Descriptive statistics were calculated, and outcomes were compared using student's t-test. A p value  $\leq 0.05$  was considered significant.

## Results

**Table 1: Comparison of patient characteristics**

Patient characteristics	Open	Laparoscopic	P value
<b>Age</b>	44.16 $\pm$ 14.50	46.67 $\pm$ 19.21	0.850
<b>Gender</b>			
Male	28	30	
Female	7	35	0.650
<b>Laterality</b>			
Right	20	18	
Left	10	11	0.820
Bilateral	5	6	
<b>Types</b>			
Direct	10	11	
Indirect	17	19	0.785
Direct/Indirect	8	5	

The study consisted of 70 patients, of which 35 were in the open surgery, while the other 35 were in the laparoscopic group. The open surgery group had patients with a mean age of 44.16 $\pm$ 14.50 years, with 25 males and 10 females. The laparoscopic group consisted of patients with a mean age of 46.67 $\pm$ 19.21 years, with 28 males and 7

females. 59 of the cases presented with unilateral hernia, of which 38 showed right laterality and 21 displayed left laterality. In 11 cases, bilateral representation was noted. 21 cases were of direct type, 36 of indirect type, and 13 of direct/indirect type (Table 1). No statistical correlation was noted with the age, gender, laterality, type and surgical procedure employed.

**Table 2: Postoperative pain score (VAS) among the study groups**

Time	Open	Laparoscopic	P value
0 minutes	2.50±1.90	1.50±1.10	0.000
6 minutes	5.30±2.10	2.75±0.98	0.000
12 minutes	6.16±1.80	3.50±1.50	0.000
24 minutes	6.40±2.90	3.80±1.60	0.000
Duration of procedure (mins)	58.50±9.60	69.50±13.36	<0.0001

The VAS score values of laparoscopic were always lower than that of open group at the same hour and this difference was shown to be statistically significant. Thus laparoscopic caused significantly less pain and hence was less morbid as given in Table 2.

## Discussion

In the last decade, laparoscopic repair of inguinal hernias has gained worldwide acceptance. Laparoscopic repair currently is the preferred approach for surgical repair of inguinal hernia at our institution. It is used for any uni- or bilateral inguinal hernia recurrence after open repair. Open repair is used for unilateral inguinal hernia recurrence after all TAPP and some TEP repairs, previous lower midline incision, irreducible hernia, and inability to tolerate general anesthesia.

Several prospective randomized trials comparing the laparoscopic and open approaches have shown the superiority of laparoscopic hernia repair over open repair, with reduced postoperative pain, a shorter recovery period, and earlier return to work, as well as better cosmetic results, cost effectiveness, and accessibility to different potential hernia defects. [5,8-10] The main concern, however, is prevention of recurrence. Recurrence rates of 1.1 to 33% have been reported depending on the technique as well as the type and size of mesh used to repair the primary inguinal hernia. [11-15]

Although not a novel topic for general surgeons, inguinal herniorrhaphy is still evolving. Many issues surrounding surgery for inguinal hernias remain unresolved,

including the indications for correction and surgical approach, risk of complications, and even the disease's aetiology. This study established that laparoscopic herniorrhaphy is superior to the open incision method in post-operative pain. The post-operative pain and subsequent need for analgesics were significantly lesser with the laparoscopic method. However, the duration of surgery and post-operative complication of seroma was significantly higher with laparoscopic surgery. Pain is one of the most prevalent long- and short-term side effects of inguinal hernia repair. This is especially concerning because many patients arriving for hernia treatment have little or no pain from their hernia at the outset. [16]

The results are also in lieu of another prospective, blinded, randomized study of 62 male patients with a mean ( $\pm SD$ ) age of 51±14 years comparing post-operative pain after laparoscopic hernia repair with conventional open hernia repair. McGill pain score (MPS) and McGill VAS were the scales employed. On the first post-operative day, the open group reported 35% more pain by MPS and 44% more pain by the VAS score and 18% more required analgesic tablets. On day 2, open repair patients had 38% more pain by MPS and 73% more by VAS, and 73% more required analgesic tablets. The study concluded that laparoscopic hernia repair was associated with significantly less pain postoperatively. [17] EU hernia trialists collaboration did a systematic review of thirty-four randomized controlled trials involving 6804 participants, which compared laparoscopic with open methods of groin hernia repair. Duration of

operation and post-operative pain were significantly longer in the laparoscopic groups; Although both procedures had few surgical consequences, the laparoscopic group had higher visceral and vascular damage. [18]

Similar results were also noted by Choudhary et al [19] who conducted a prospective comparative observational study of 100 patients of different types of inguinal hernia who underwent either laparoscopic or open type of hernia repair. A visual analogue scale was used to assess pain. The observers noted. There was no statistical difference between the mean ages of the groups. There was a statistically significant observation in the mean operative time in the laparoscopic group ( $105.38 \pm 35.13$  minutes) with the open group ( $79.95 \pm 31.12$  minutes). Also, the mean pain score of the laparoscopic group was significantly lesser. No, statistically significance was noted in the post-operative complication rate.

This study found concurrence in results with Dhawan, who compared laparoscopic and open herniorrhaphy in 60 patients diagnosed with inguinal hernia. The mean operative time for laparoscopic repair was  $132.67 \pm 58.98$  minutes, while  $85.00 \pm 31.79$  minutes in the open mesh repair method. When post-operative pain was evaluated at 12 hours, 24 hours, 48 hours and 7 days postoperatively, the pain was significantly lower in the laparoscopic technique. The mean analgesic tablet administered was  $5.27 \pm 1.72$  in open mesh repair compared to  $3.53 \pm 1.93$  in laparoscopic repair, which was also significant. [20]

In this study the postoperative pain following laparoscopic surgery was lower than that of open surgery at any given time and this difference was statistically significant  $p < 0.05$ . This may be attributed to reduction in the size of incision, no need of extra or bilateral incisions in case of bilateral hernias, minimal dissection and less handling of cord structures. Same observations was also made by Fujita et al,

Winslow et al and Pokorny et al. [21-24] based on the VAS scores at various hours and the need for additional analgesics.

## Conclusion

Laparoscopic hernia repair is safe and provide less postoperative morbidity in experienced hands and definitely had many advantages over open repair such as early resumption of daily activities and work, better subjective and objective cosmetic results with some limitations like more operative time, need of drainage and high recurrence rate. For bilateral and recurrent inguinal hernias laparoscopic approach is recommended. With so many surgical options available, deciding on the optimal repair form can be tough. Several variables assist in determining the appropriate operating procedure for a patient with an inguinal hernia.

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