

## Laparoscopic versus Open Inguinal Hernia Repair in Adults

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### ABSTRACT

Hernias are abnormal protrusions of a viscus (or part of it) through a normal or abnormal opening in a cavity (usually the abdomen). They are most commonly seen in the groin; a minority are para-umbilical or incisional. In the groin, inguinal hernias are more common than femoral hernias. Inguinal hernias occur in about 15% of the adult population, and inguinal hernia repair is one of the most commonly performed surgical procedures in the world. Although open, mesh-based, tension-free repair remains the criterion standard, laparoscopic herniorrhaphy, in the hands of adequately trained surgeons, produces excellent results comparable to those of open repair. We conducted this review using a comprehensive search of MEDLINE, PubMed, EMBASE, Cochrane Database of Systematic Reviews, and Cochrane Central Register of Controlled Trials from January 1, 1985, through June 15, 2017.

**Keywords:** Laparoscopic, Inguinal Hernia Repair, Technique.

### INTRODUCTION

Inguinal hernia repair is one of the most commonly performed surgical procedures in the world. Most surgeons now prefer to perform a tension-free mesh repair. The Lichtenstein tension-free hernioplasty is currently one of the most popular techniques for repair of inguinal hernias. Hernias are abnormal protrusions of a viscus (or part of it) through a normal or abnormal opening in a cavity (usually the abdomen).

They are most commonly seen in the groin; a minority are para-umbilical or incisional. In the groin, inguinal hernias are more common than femoral hernias. Laparoscopic inguinal hernia repair originated in the early 1990s as laparoscopy gained a foothold in general surgery<sup>[1-4]</sup>.

Inguinal hernias account for 75% of all abdominal wall hernias, and with a lifetime risk of 27% in men and 3% in women. Repair of these hernias is one of the most commonly performed surgical procedures in the world<sup>[5]</sup>.

Even though open, mesh-based, tension-free repair residues the criterion standard, laparoscopic herniorrhaphy, in the hands of adequately trained surgeons, produces excellent results comparable to those of open repair<sup>[6, 7]</sup>.

In a comparison between open repair and laparoscopic repair, **Eklund et al.**<sup>(8)</sup> found that 5 years after operation, 1.9% of patients who had undergone laparoscopic repair continued to report moderate or severe pain, compared with 3.5% of those who had undergone open repair.

**Table 1:** Advantages and Disadvantages of Laparoscopic repair

Advantages <sup>[9-11]</sup>	Disadvantages
Reduced postoperative pain	Increased cost
Diminished requirement for narcotics	Lengthier operation
Earlier return to work	Steeper learning curve
	Higher recurrence and complication rates early in a surgeon's experience

### MATERIALS AND METHODS

#### • Data Sources and Search terms

We conducted this review using a comprehensive search of MEDLINE, PubMed, EMBASE, Cochrane Database of Systematic Reviews, and Cochrane Central Register of Controlled Trials from January 1, 1985, through June 15, 2017.

#### • Data Extraction

Two reviewers independently reviewed studies, abstracted data, and resolved disagreements by consensus. Studies were evaluated for quality. A review protocol was followed throughout.

**The study was done after approval of ethical board of Jazan university.**

## INDICATIONS

The general indications for laparoscopic inguinal hernia repair as opposed to watchful waiting are the same as those for open inguinal hernia repair. Typically, the existence of an inguinal hernia has been considered sufficient reason for operative intervention. Nevertheless, studies have shown that the presence of a reducible hernia is not, in itself, an indication for surgery and that the risk of incarceration is less than 1%<sup>[12]</sup>. Symptomatic patients (with pain or discomfort) should undergo repair; however, as many as one third of patients with inguinal hernias are asymptomatic<sup>[12]</sup>.

The issue of observation versus surgical intervention in this asymptomatic or minimally symptomatic population was addressed in two randomized clinical trials, both of which found that there were no significant differences in hernia-related symptoms after long-term follow-up and that watchful waiting did not increase the complication rate<sup>[13]</sup>.

Some reports have listed specific indications for laparoscopy over open repair, including recurrent hernias, bilateral hernias, and the need for earlier return to full activities<sup>[14-16]</sup>.

Numerous studies have validated salutary results for laparoscopic repair of recurrent hernias<sup>[17, 18]</sup>. Recurrence rates may decline to 5% or lower with laparoscopic repair<sup>[17, 19]</sup>, compared with rates as high as 20% for anterior repair<sup>[20]</sup>.

The reduced pain after laparoscopic inguinal hernia repair as compared with conventional anterior repair makes laparoscopy the approach of choice for bilateral hernias<sup>[21]</sup>. A specific advantage of TAPP repair in a patient with bilateral inguinal hernias is that both sides can be repaired via the same laparoscopic port sites.

**Koch *et al.***<sup>[22]</sup> found that recurrence rates were higher in women and that recurrence was 10 times more likely to be of the femoral variety in women than it was in men.

Such findings have led some to the conclusion that procedures providing coverage of the femoral space (eg, laparoscopic repair) at the time of initial operation are better suited for women as primary repairs.

## Types of hernia repair

Inguinal hernia repairs may be divided into the following three general types:

**Table 2.** Types of hernia repair

<b>Herniotomy (removal of the hernial sac only) - This, by itself, is adequate for an indirect inguinal hernia in children in whom the abdominal wall muscles are normal; formal repair of the posterior wall of the inguinal canal is not required</b>
<b>Herniorrhaphy (herniotomy plus repair of the posterior wall of the inguinal canal) - This may be suitable for a small hernia in a young adult with good abdominal wall musculature; the Bassini and Shouldice repairs are examples of herniorrhaphy</b>
<b>Hernioplasty (herniotomy plus reinforcement of the posterior wall of the inguinal canal with a synthetic mesh) - This is required for large hernias and hernias in middle-aged and elderly patients with poor abdominal wall musculature; the Lichtenstein tension-free mesh repair is an example of hernioplasty</b>

## Open vs laparoscopic repair

Though numerous surgical methods have been developed to treat inguinal hernias, the Lichtenstein tension-free mesh-based repair remains the criterion standard. In a Cochrane review comparing mesh with non mesh open repair, the evidence was sufficient to conclude that the use of mesh was associated with a reduced rate of recurrence<sup>[23]</sup>.

Laparoscopic approaches are feasible in expert hands, but the learning curve for laparoscopic hernia repair is long (200-250 cases), the severity of complications is greater, detailed analyses of cost-effectiveness are lacking, and long-term recurrence rates have not been determined<sup>[24]</sup>.

The role of laparoscopic inguinal hernia repair in the treatment of an uncomplicated, unilateral hernia is so far to be resolved. In any case, trans abdominal peritoneal (TAPP) or absolutely extraperitoneal (TEP) laparoscopic inguinal hernioplasty may offer particular advantages for a few patients, for example, those with intermittent hernia after ordinary foremost open hernioplasty, those with two-sided hernias, and those experiencing laparoscopy for other clean agent methods. A 2014 meta-examination of seven investigations contrasting laparoscopic repair and the Lichtenstein system for treatment of intermittent inguinal hernia inferred that in spite of the preferences not out of the ordinary with the previous (eg, decreased torment and prior come back to typical exercises), working time was essentially longer with the negligibly intrusive procedure, and the decision between the two

methodologies depended to a great extent on the accessibility of nearby ability.

## TECHNIQUE

**Inguinal hernia repairs are of the following three general types:**

- Herniotomy (removal of the hernial sac only).
- Herniorrhaphy (herniotomy plus repair of the posterior wall of the inguinal canal).
- Hernioplasty (herniotomy plus reinforcement of the posterior wall of the inguinal canal with a synthetic mesh).

The ensuing discussion focuses primarily on the Lichtenstein tension-free mesh repair, which is an example of hernioplasty and is currently one of the most popular techniques of inguinal hernia repair [13, 25].

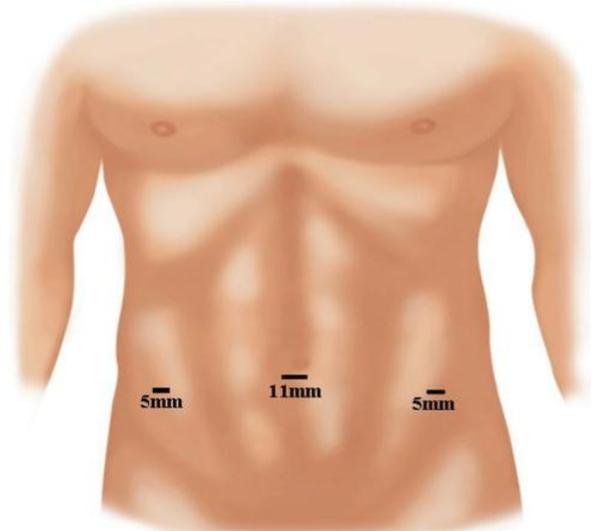
The Bassini, Shouldice, and darn repairs (all examples of herniorrhaphy). The key technical point is that in the Lichtenstein tension-free repair, there is no attempt to repair the posterior wall, as is done in Bassini or Shouldice repairs; the weak posterior wall is reinforced with mesh.

A number of considerations should be kept in mind in the performance of laparoscopic inguinal repair, whether via the totally extraperitoneal (TEP) approach or via the transabdominal preperitoneal (TAPP) approach. Extreme care must be exercised in placing the mesh fixation tacks.

This point cannot be overstated. A nerve injury caused by an errant tack can be truly debilitating to the patient and very challenging to treat. Tacks should be placed only above the iliopubic tract [26].

Proper placement may be ensured by drawing a line from the pubic tubercle to the anterior superior iliac spine (ASIS) at the start of the procedure. Before firing each tack, carefully palpate the tacker head through the abdominal wall to ensure that it is above this line.

Violation of the peritoneum during TEP repair causes loss of insufflation from the preperitoneal space into the peritoneal cavity, which, in turn, causes the preperitoneal space to collapse to some degree. This collapse can make the procedure more difficult to complete; in addition, it places intra-abdominal organs at risk for injury and may lead to adhesion formation.



**Figure 1.** Port placement for TAPP and TEP hernia repair.

Consequently, efforts should always be made to avoid tearing the peritoneum if at all possible. If the rent is small, endoscopic clips can be placed to close the defect and minimize the leak. Otherwise, conversion to a TAPP repair or an open repair may be necessary. Another option is to place a Veress needle through a stab incision into the abdominal cavity to drain the carbon dioxide.

Trocar placement should always be done under direct vision. To prevent bleeding and hematoma formation, the trocars should be placed exactly in the midline so as to avoid tearing the fibers of the rectus abdominis. During preperitoneal dissection, the inferior epigastric artery and vein sometimes become separated from the abdominal wall and then hang down into the operative field. Clipping and dividing these vessels may be required in order to complete the procedure.

It is very helpful to place the mesh in such a way as to facilitate its subsequent flush deployment. This may be accomplished by folding the mesh in half lengthwise, grasping it by the fold, and advancing it through the trocar toward the ASIS. When the grasper is released, the natural memory of the mesh causes it to spring open in a properly oriented position, without any need for time-consuming manipulation.

Vascular injury is a relatively uncommon but nonetheless potentially disastrous adverse event. It can be avoided by respecting the proximity of the femoral vessels, particularly when the mesh is being tacked to the Cooper ligament [27].

Recurrence of the hernia is a significant concern. The key to minimizing the recurrence rate is to use an ample-sized piece of mesh. The mesh must be large enough to extend 2 cm medial to the pubic tubercle, 3-4 cm above the Hesselbach triangle, and 5-6 cm lateral to the internal ring. If the patient is male, the surgeon should always remember to pull the testes gently back down to their normal scrotal position at the end of the procedure.

### Postoperative Care

After the procedure, the patient is asked to rest for few hours. He or she may be discharged later the same day on a day-care basis. Early mobilization is the key to rapid convalescence. Patients can safely ambulate on the evening of the operation. If general or regional anesthesia is used, the patient may be hospitalized for a few days. There is some pain in the postoperative period, and suitable analgesics should be prescribed. The dressing is removed on postoperative day 5, and stitches are removed on postoperative day 7. Patients should be advised to avoid strenuous activities for a few weeks. Typically, light work can be resumed after 1 week, heavier jobs after 6 weeks.

Male patients should be monitored for testicular atrophy, which may occur as a result of venous or arterial injury or obstruction in the spermatic cord. All patients should be monitored for the development of nerve pain from nerve entrapment in suture material. Finally, patients should be monitored for recurrence, which may arise as a consequence of inadequate repair, wound infection, or chronic straining (eg, from coughing, constipation, or urination).

### CONCLUSION

For patients with recurrent inguinal hernia, or bilateral inguinal hernia, or for women, laparoscopic repair offers significant advantages over open techniques with regard to recurrence risk, pain, and recovery. For unilateral first-time hernias, either laparoscopic or open repair with mesh can offer excellent results. The major drawback of laparoscopy is that the technique requires a significant number of cases to master. For surgeons in group practice, it makes sense to have one surgeon in the group perform laparoscopic repairs, so that experience can be concentrated. For others, the best technique remains the approach that the surgeon is most comfortable and experienced performing.

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