



Review Article

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An Overview on Laparoscopic Inguinal Hernia Repair

Abdulaziz Sulaiman Alsalem^{1*}, Musaad Abdullah Alotaibi², Ziyad Mansour Alsadhan², Jalawi Saeed Alqahtani³, Mukhlid Saud Aljuaid³, Nawaf Mohammed Alwagdani³, Ziyad Fahad Althobaiti³, Rayan Ahmed Hakamy³, Rasis Khalid Saleh Saber⁴, Faisal Fahad Alnazawi⁵, Rajwan Saleh Aljawi⁶

¹Faculty of Medicine, King Saud University, Riyadh, KSA.

²Faculty of Medicine, Shaqra University, Shaqra, KSA.

³Faculty of Medicine, Taif University, Taif, KSA.

⁴Faculty of Medicine, Batterjy Medical College, Jeddah, KSA.

⁵Faculty of Medicine, King Abdulaziz University, Jeddah, KSA.

⁶Emergency Department, King faisal hospital, Makkah, KSA.

*Email: Azizalsalem87@gmail.com

ABSTRACT

One of the most frequent surgical operations in the globe is the repair of inguinal hernia, with over 20 million individuals undergoing it each year. A small percentage of individuals are asymptomatic; nonetheless with imminent surgery in 70% of the cases in this group even with a watchful surgery. In the vast majority of instances, surgical therapy is highly effective. Laparoscopic inguinal repair, which was initially reported in the 1990s, still faces opposition from surgeons today due to several disadvantages and challenges. However, there is current evidence that laparoscopic repairs have substantial benefits, including fewer problems, especially in recurring instances, quicker recovery, and reduced postoperative chronic pain, as well as recurrence rates that are at least comparable to traditional repairs. To review the published literature that discussed laparoscopic inguinal hernia repair and its different aspects. The keys used in the mesh of the PubMed database for journal selection were: (“laparoscopic inguinal hernia repair”[Mesh]) AND (“TEP”[Mesh]) OR (“TAPP”[Mesh])). Laparoscopy appears to produce less pain and numbness to last longer. It also takes less time to resume normal daily activities. Laparoscopy hernia repairs have a steep learning curve and need more expensive infrastructure; therefore, a substantial percentage of hernia repairs are still done openly. Despite certain challenges, laparoscopic surgery is becoming the favored method for bilateral and recurrent hernia repair.

Key words: Laparoscopic surgery, Hernia repairs, Inguinal hernia, Management

INTRODUCTION

One of the most frequent surgical operations in the globe is the repair of inguinal hernia with over 20 million individuals undergoing it each year [1]. Groin hernias, or protrusions of the femoral or inguinal canal by adipose or viscera tissues, affect 27–43% of males and 3–6% of women during their lifetime. Inguinal hernias are usually symptomatic, and surgery is the only method to get rid of them [2, 3]. A small percentage of individuals are asymptomatic; nonetheless, even a watchful waiting strategy in this group leads to surgery in around 70% of cases within 5 years. In the vast majority of instances, surgical therapy is highly effective [2, 4-6].

Today, the anticipated risk of recurrence after inguinal hernia surgery is still 11%. Slightly more than half of all inguinal hernia recurrences happened within 10 years of the prior hernia surgery. Even after more than 50 years, some of the remaining 43% of all recurrences occurred until long later [7]. Chronic discomfort lasting more than

three months, which affects 10–12% of all patients following inguinal hernia surgery, is another issue. Approximately 1–3% of individuals suffer from severe chronic pain that causes long-term impairment, necessitating therapy [2].

Laparoscopic inguinal repair, which was initially reported in the 1990s, still faces opposition from surgeons today [8]. The main reasons for this are the greater direct costs, the necessity for general anesthesia, and the increased risk of severe complications associated with laparoscopic surgery [9]. Another disadvantage of the laparoscopic technique is the increased surgical complexity required to detect "novel" anatomy of the posterior inguinal wall, which is unusual for general surgeons [10]. Acquiring competence necessitates specialized instruction. However, there is current evidence that laparoscopic repairs have substantial benefits, including fewer problems, especially in recurring instances, quicker recovery, and reduced postoperative chronic pain, as well as recurrence rates that are at least comparable to traditional repairs. Laparoscopic inguinal repair improves patients' quality of life and satisfaction, making it a good option for inguinal hernia patients. The laparoscopic posterior flat mesh repair is primarily conducted via the transabdominal preperitoneal (TAPP) approach or the extraperitoneal (TEP) approach [11-14]. In this article, we aim to review the published literature that discussed laparoscopic inguinal hernia repair and its different aspects.

MATERIALS AND METHODS

The keys used in the mesh of the PubMed database for article selection were: (("laparoscopic inguinal hernia repair"[Mesh]) AND ("TEP"[Mesh]) OR ("TAPP"[Mesh])).

Articles were included in the literature review based on their inclusion of one of the following select topics: laparoscopic inguinal hernia repair, TAPP, TEP.

Exclusion criteria were all other articles, whose primary endpoint was not these topics

RESULTS AND DISCUSSION

Inguinal hernias cause a bulge in the groin that disappears when the patient applies little pressure or lies down. The majority of them produce mild to moderate pain that gets worse with movement. One-third of surgical patients are in no agony, and extreme discomfort is unusual (1.5% at rest and 10.2% with activity) [15]. A hernia can be reducible if it happens only occasionally (for example, while straining or standing) and can be forced back into the abdominal cavity, but irreducible if it persists outside the abdominal cavity permanently. A reducible hernia is generally a long-term problem, and it is diagnosed clinically based on common symptoms and indicators. The problem might be unilateral or bilateral, and it can come back after therapy (recurrent hernia). Inguinal hernias are categorized as either direct or indirect based on the bulging of the hernia sac. It can be direct through the posterior wall of the inguinal canal travels, However, it can also go across the spermatic cord through the internal inguinal ring, following the inguinal canal's course giving it the name indirect hernia. Trying to distinguish between the two hernias, on the other hand, has little therapeutic value [16].

Recently, a heated controversy has emerged about whether open or laparoscopic prosthesis repairs should be used. Several studies in the literature have contrasted open and minimum access surgical (laparoscopic) methods. To begin with, the expense of laparoscopic repairs remains a major concern, as they are more expensive than open procedures [17].

According to Hynes *et al.*, laparoscopic repair costs \$638 more on average in North America than open surgical methods [18]. Likewise, McCormack *et al.* found that laparoscopic repair costs the health service around 300-350 pounds per patient more than open surgical repair [19]. According to Eklund *et al.*, the overall hospital cost for TEP repair was 710.6 Euros higher, rising to 795.1 Euros when the additional costs due to recurrences and complications within 5 years were taken into account [20]. A cost difference of \$128.58 was found by Khajanchee *et al.* for a TEP repair [21]. In a randomized trial, the cost-minimization analysis, which included community costs, any reoperations, and unexpected complications over a 5-year follow-up period, revealed that laparoscopic inguinal hernia repair was associated with a small but significant increase in overall costs when compared to open repair [20]. Most importantly, the patient's economic burden and expensive infrastructure costs have been a stumbling block, particularly in poor nations. McCormack *et al.*, conducted a comprehensive study comparing the different procedures and found no discernible difference in recurrence [19].

Laparoscopy appears to produce less discomfort and numbness to last longer. It also takes less time to resume normal daily activities [22]. However, when utilizing the laparoscopic approach, the operation duration is much more timely, and there appears to be a higher risk of significant consequences in terms of vascular and visceral

(particularly bladder) gouges. In a comparable comprehensive study, it was discovered that when comparing the complications of laparoscopic and open repairs, laparoscopic repairs are linked with a higher overall rate of seroma development. Nonetheless, there are fewer possibilities of hematoma development (which is more common in TEP patients) and laceration/superficial infections, although the evidence is too mixed to make a definitive statement [23].

Trocar site bleeding and/or herniation, as well as damage to the epigastric or gonadal arteries, are further risks associated with laparoscopic hernia surgery, albeit they occur less often. Hypotension owing to higher intra-abdominal pressure, hypercapnia, subcutaneous emphysema, pneumothorax, and increased peak airway pressures are complications associated with laparoscopy and less so with surgeon technique [22].

Laparoscopic hernia repairs have a steep learning curve and need more expensive infrastructure; therefore, open hernia repair still makes up a substantial percentage of treatment procedures [24]. Despite certain challenges, laparoscopic surgery is becoming the favored method for bilateral and recurrent hernia repair.

TAPP technique was the first method utilized for this, but concerns such as peritoneal cavity violation and the incidence of several complications, such as intestinal obstruction following peritoneal cavity invasion, had always been a worry for this strategy [25].

Because TEP repair is still regarded as an "advanced" laparoscopic operation due to the unusual anatomy and needs substantial training and surgical expertise, another laparoscopic approach gradually became more frequently used: TAPP treatment [26].

A registry-based study of 57,906 patients that were propensity score-matched with primary unilateral inguinal hernia repair found that TEP and TAPP had considerably fewer postoperative problems, complication-related reoperations, discomfort at rest, and agony on exertion than the Lichtenstein method. TEP, on the other hand, has been shown to have drawbacks in terms of intraoperative complications [1]. TEP and TAPP are two laparoscopic procedures that have been compared in meta-analyses and registry studies [27, 28]. As a result, the HerniaSurge Group suggests in its International Guidelines that the surgeon's skills, level of knowledge, and experiences should be considered when choosing between TEP and TAPP [2].

The only difference between the two procedures is that in the TAPP approach, the peritoneum is incised, which needs closure following mesh installation. The location of laparoscopic ports varies between the two methods. The ports are generally inserted in a line from the pubic bone to the umbilicus in a TEP method. The three ports on the left and right sides of the abdomen are positioned at the umbilicus level while the area of the mid-clavicular line at the umbilicus level in the TAPP method. The surgeon can use either the TEP or TAPP method to repair bilateral inguinal hernias with these port locations. The preperitoneal space is accessed at the level of the umbilicus in the TEP approach, and it is not violated during the operations. The surgeon must open and seal a peritoneal flap that starts at the medial umbilical ligament and is incised laterally towards the anterior superior iliac spine in the TAPP method. Following mesh implantation, the surgeon should seal the peritoneal flap, which can be done using sutures or tack fixation. The mesh can then be placed preperitoneally, away from the abdominal cavity and viscera. In either the TAPP or TEP technique of laparoscopic inguinal hernia repair, a broad mesh patch covering the whole myopectineal orifice is placed. This covers both the two main hernias, as well as femoral hernias [29].

Complications

The two primary problems associated with laparoscopic inguinal hernia surgery are intraoperative complications and postoperative complications. Surgical problems can include laparoscopic access (which might be reduced using the TEP method) and damage to the inguinal region's surrounding tissues, such as vascular structures and the bladder. Low intraoperative complication rates can be achieved by having a thorough understanding of the relevant preperitoneal inguinal anatomy and careful dissection. Hernia recurrence (which has been reduced with the use of mesh) and persistent groin pain are the most prevalent postoperative complications. A broad mesh covering the whole myopectineal orifice, as well as atraumatic or properly positioned upsetting fixation away from the triangle of pain and doom, might reduce the likelihood of reoccurrence and endless pain [2].

Clinical significance

Generally, if the surgeon is well skilled and equipped in the procedure the results between the open and laparoscopic inguinal hernia are comparable. Laparoscopic inguinal hernia, as documented, has a steep learning curve associated with it which needs to be critically recognized while evaluating results related to this surgery. When surgeons have surmounted their learning curve, which is estimated to be between 50 and 250 cases, the

laparoscopic technique has the potential to provide faster recovery and lesser occurrences of long-term groin discomfort with comparable rates of recurrence as to the open approach [30-32].

Although both the TAPP and TEP methods have their advocates, the results are comparable, and the surgeon can choose which approach to use. Although there are minor variations in a few of the outcomes when comparing laparoscopic versus open inguinal hernia surgery, the results are generally comparable [2].

Controversies

There are still some questions about laparoscopic inguinal hernia repair. As previously stated, many people disagree on the best indications for using the laparoscopic technique, which was first limited to recurring and bilateral hernias. The laparoscopic technique has become a well-accepted treatment option, and in some cases preferable, for all inguinal hernias, including unilateral hernias, as a result of increased teaching and research. There is also a lot of disagreement over the best mesh fixation methods for laparoscopic inguinal hernia repair. Options for mesh fixation include no fixation, glue, tacks, and suture fixation. When considering mesh fixation, the possibility of recurrence and persistent discomfort must be carefully considered. In most situations, recent guidelines advise atraumatic or no fixation; nevertheless, mesh fixation is indicated in patients with large direct hernias to avoid recurrence. Another point of debate is the sort of mesh utilized. Overall, polypropylene or polyester meshes are used, and because there is no conclusive data on the efficacy of one type of product or material over another, the surgeon's choice of mesh is typically left to his or her discretion, with the size of the mesh and ability to cover all potential hernia spaces likely being more important than the material [2].

Recurrence after laparoscopic inguinal hernia repair can occur at any time after the procedure, although it is more prevalent in younger patients and during the first three years [33]. Regardless of the method used the mesh usage in inguinal hernia surgery reduces the risk of recurrence by 50–75% [34] when compared to suture repair. The recurrence rate after laparoscopic mesh hernia repair has been reported to range between 1 and 7.9%, with the greatest rate coming from Australia, and has remained consistent over the previous two decades [35, 36].

Inguinal hernias are most likely caused by a combination of factors. This comprises multiple patient risk factors both non- and technical ones, and it's conceivable that the pathophysiology of distinct groin hernia subtypes differs [37]. Non-technical patient-related risk factors are most likely to influence the likelihood of recurrence. Improved intraoperative surgical methods and optimizing some of the patient variables perioperatively help to reduce the risk of hernia recurrence. Patient variables are essentially unmodifiable, especially when a patient arrives as an emergency case, as surgical factors may be adjusted and improved. Body mass index (BMI), diabetes, smoking, and iatrogenic caused immunosuppressive states such as steroid consumption are some of the patient risk variables that might be adjusted when the procedure is conducted in an elective environment.

Recurrences following laparoscopic inguinal hernia repair can happen at any time and have a high morbidity rate. Hernias reoccur for a variety of reasons, including both non- and technical patient-related risk factors, and it's conceivable that the pathophysiology of distinct groin hernia subtypes differs. These recurrences following laparoscopic inguinal hernia repair can be caused by a variety of patient-related and surgical risk factors. The identification of these risk variables will undoubtedly aid in the prevention of recurrences. To reduce the likelihood of recurrence, patients should be instructed on some of the non-technical or changeable risk factors, such as higher BMI, diabetes, smoking, and the use of steroids. Surgical variables such as surgeon expertise, good surgical technique, greater tissue overlap by use of proper mesh sizes that are beyond the margin of the hernia orifice, avoidance of postoperative infection, seroma, and hematoma, and surgeon education will all help to lower the recurrence rate. Other variables, such as the kind of repair (TEP versus TAPP), mesh type, and whether or not mesh fixation is used, do not appear to have a role in hernia recurrence. To obtain the best possible outcome following laparoscopic inguinal hernia repair, both surgeons and patients must be taught. The patient permission form and the recommendations from various hernia associations should offer a realistic analysis of these risk factors that contribute to hernia recurrence after laparoscopic surgery [38].

CONCLUSION

Several studies in the literature have contrasted open and minimum access surgical (laparoscopic) methods. To begin with, the expense of laparoscopic repairs remains a major concern, as they are more expensive than open procedures. Laparoscopy appears to produce less pain and numbness to last longer. It also takes less time to resume normal daily activities. Laparoscopy hernia repairs have a relatively steeper learning curve and need more

expensive infrastructure; therefore, a substantial percentage of hernia repairs are still done openly. Despite certain challenges, laparoscopic surgery is becoming the favored method for bilateral and recurrent hernia repair. Although both the TAPP and TEP methods have their advocates, the results are comparable, and the surgeon can choose which approach to use. Although the variations are minor in some outcomes when juxtaposing laparoscopic versus open inguinal hernia surgery, the results are generally similar.

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