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LAPARASCOPIC VERSUS OPEN MESH REPAIR FOR RECURRENT INGUINAL HERNIA: A SYSTEMATIC REVIEW

[1,2]Kevin Gabriel, [1]Siemon Junior Berhimpon

[1]Naibonat Regional General Hospital,Kupang Regency, East Nusa Tenggara, Indonesia
[2]Indonesian Christian University, Special Region of Jakarta, Indonesia

Correspondence Author:
simbolonkevin7@gmail.com

ABSTRACT

Background: *Inguinal hernia is one of the most common conditions seen in clinic,and is often treated through the general surgery department. Laparoscopic repair and open repair with mesh are the typical treatments for inguinal hernia, and both regimens have proved beneficial in treating inguinal hernia. However, recurrence, with a rate as high as 33%, poses a significant problem to the effective treatment of inguinal hernia.*

The aim: *This study aims to show about laparascopic versus open mesh repair for recurrent inguinal hernia.*

Methods: *By comparing itself to the standards set by the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020, this study was able to show that it met all of the requirements. So, the experts were able to make sure that the study was as up-to-date as it was possible to be. For this search approach, publications that came out between 2013 and 2023 were taken into account. Several different online reference sources, like Pubmed and SagePub, were used to do this. It was decided not to take into account review pieces, works that had already been published, or works that were only half done.*

Result: *In the PubMed database, the results of our search brought up 10 articles, whereas the results of our search on SagePub brought up 60 articles. The results of the search conducted for the last year of 2013 yielded a total 2 articles for PubMed and 14 articles for SagePub. The result from title screening, a total 1 articles for PubMed and 10 articles for SagePub. In the end, we compiled a total of 7 papers. We included five research that met the criteria.*

Conclusion: *The laparoscopic approach is superior to the open mesh approach for the repair of recurrent inguinal hernia in some aspects, including the incision infection rate and length of hospital stay. However, more high-quality studies on the effects of laparoscopic and open mesh repair for the treatment of recurrent inguinal hernia are warranted.*

Keyword: *Laparascopic, open mesh, inguinal hernia.*

INTRODUCTION

Inguinal hernia accounts for 75% of all abdominal wall hernias and has a lifetime incidence of 27% in males and 3% in women. Several types of inguinal hernia have been identified and surgery to repair them, which began around the sixteenth century following the establishment of modern anatomy, has since evolved with a number of techniques currently available. There has been ongoing debate about which form of repair offers the best patient outcomes and there is yet to be a unanimously agreed superior approach to the management of inguinal hernias.[1]

The risk factors for an inguinal hernia include the family history of groin hernia, chronic obstructive pulmonary disease, smoking, low body-mass index, increased intraabdominal pressure, collagen diseases, patent processus vaginalis, history of appendectomy, and peritoneal dialysis. Although inguinal hernias usually present as an asymptomatic bulge in the groin, patients can occasionally present with symptoms such as groin pain that worsens toward the end of the day, an increase in the size of the bulge, and a dragging sensation in the groin. A comprehensive history of diet, lifestyle, and comorbidities, along with a detailed physical examination, is reliable enough to conclude the diagnosis of an inguinal hernia. However, further diagnostic tests are often required in challenging cases, such as occult hernias or hernias in female patients. The first line imaging modality used is ultrasonography (USG), which helps diagnose suspected groin hernias that are not clinically evident. A magnetic resonance imaging (MRI) with Valsalva maneuver should be performed if the clinical suspicion is high despite negative USG findings. MRI is superior to a computed tomography scan (CT-scan) and USG in diagnosing hernias. In some patients, herniography can be used, which is superior to USG and CT-scan.[2]

Open inguinal hernia repairs can be categorized into two main categories: tissue repair and mesh repair. There are several named techniques that can be utilized for performing a tissue repair such as the Bassini, McVay, Marcy, and Shouldice repairs. The Desarda repair, a more recently described tissue repair, utilizes a partially detached strip of external oblique aponeurosis. For open mesh repairs, prosthetics are either placed anteriorly or preperitoneal. The gold standard mesh repair is the Lichtenstein tension-free mesh repair which places the mesh anteriorly between the external and internal oblique aponeuroses. Other open mesh techniques include the plug-and-patch, the Gilbert Prolene Hernia System (PHS) Bilayer connected device repair, and the open preperitoneal mesh placed via an inguinal incision after reduction of the hernia. The Stoppa repair, is an open preperitoneal mesh repair utilized for large inguinoscrotal and bilateral inguinal hernias, utilizing a lower midline incision. The anatomic exposure of the Stoppa repair is the precursor for laparoscopic preperitoneal repairs. These aforementioned open surgical techniques allow for repair both with and without mesh, as well as placing mesh in various locations.[3]

Open inguinal hernia repair has long been the method of choice for most surgeons and is often recommended in contemporary literature as the optimal approach for primary unilateral inguinal hernia, which is a hernia occurring for the first time on one side of the groin, without any prior repair. Open repairs have mainly been classified as open mesh (e.g. Lichtenstein) or open non-mesh (e.g. Shouldice) repairs based on whether a synthetic material has been used to re-enforce the repaired posterior wall. Tension-free mesh repair (Lichtenstein technique) is usually considered the repair method of choice among open repairs due to its easy reproducibility by non-specialist surgeons. However, there are concerns about the risk of chronic groin pain, although recurrence rates have been noticeably very low.[1]

METHODS

Protocol

By following the rules provided by Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020, the author of this study made certain that it was up to par with the requirements. This is done to ensure that the conclusions drawn from the inquiry are accurate.

CRITERIA FOR ELIGIBILITY

For the purpose of this literature review, we compare and contrast of laparascopic versus open mesh repair for recurrent inguinal hernia. It is possible to accomplish this by researching or investigating the laparascopic versus open mesh repair for recurrent inguinal hernia. A systematic review. As the primary purpose of this piece of writing, demonstrating the relevance of the difficulties that have been identified will take place throughout its entirety.

In order for researchers to take part in the study, it was necessary for them to fulfil the following requirements: 1) The paper needs to be written in English, and it needs to determine about laparascopic versus open mesh repair for recurrent inguinal hernia. In order for the manuscript to be considered for publication, it needs to meet both of these requirements. 2) The studied papers include several that were published after 2013, but before the time period that this systematic review deems to be relevant. Examples of studies that are not permitted include editorials, submissions that do not have a DOI, review articles that have already been published, and entries that are essentially identical to journal papers that have already been published.

SEARCH STRATEGY

We used " Laparascopic for recurrent inguinal hernia"; "Open mesh repair for recurrent inguinal hernia" as keywords. The search for studies to be included in the systematic review was carried out using the PubMed and SagePub databases by inputting the words: *(("Laparascopic"[MeSH Subheading] OR "Hernia"[All Fields] OR "Inguinal hernia"[All Fields]) AND ("Incident of hernia"[All Fields] OR "Open mesh"[All Fields]) AND ("Open mesh repair"[MeSH Terms] OR ("recurrent hernia"[All Fields]) OR ("recurrent inguinal hernia [All Fields]))* used in searching the literature.

DATA RETRIEVAL

After reading the abstract and the title of each study, the writers performed an examination to determine whether or not the study satisfied the inclusion criteria. The writers then decided which previous research they wanted to utilise as sources for their article and selected those studies. After looking at a number of different research, which all seemed to point to the same trend, this conclusion was drawn. All submissions need to be written in English and can't have been seen anywhere else.

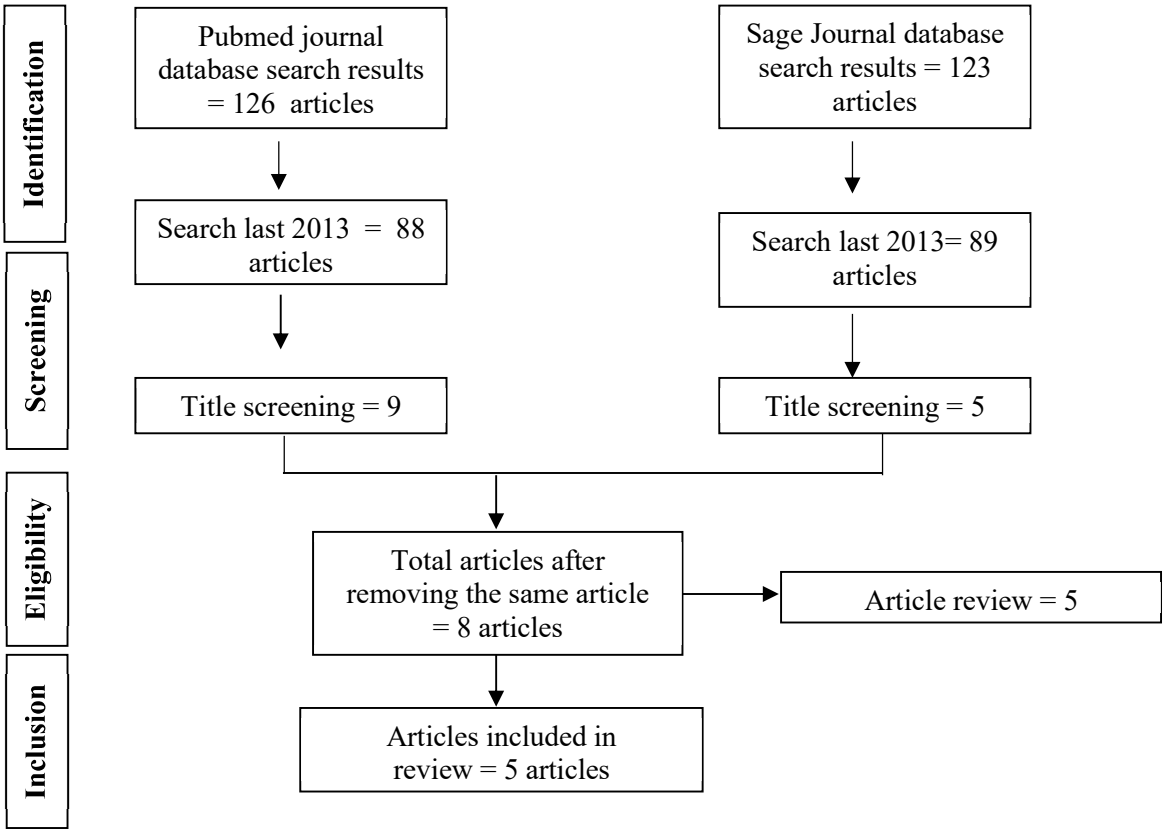

Figure 1. Article search flowchart

Only those papers that were able to satisfy all of the inclusion criteria were taken into consideration for the systematic review. This reduces the number of results to only those that are pertinent to the search. We do not take into consideration the conclusions of any study that does not satisfy our requirements. After this, the findings of the research will be analysed in great detail. The following pieces of information were uncovered as a result of the inquiry that was carried out for the purpose of this study: names, authors, publication dates, location, study activities, and parameters.

QUALITY ASSESSMENT AND DATA SYNTHESIS

Each author did their own study on the research that was included in the publication's title and abstract before making a decision about which publications to explore further. The next step will be to evaluate all of the articles that are suitable for inclusion in the review because they match the criteria set forth for that purpose in the review. After that, we'll determine which articles to include in the review depending on the findings that we've uncovered. This criteria is utilised in the process of selecting papers for further assessment. in order to simplify the process as much as feasible when selecting papers to evaluate. Which earlier investigations were carried out, and what elements of those studies made it appropriate to include them in the review, are being discussed here.

RESULT

In the PubMed database, the results of our search brought up 126 articles, whereas the results of our search on SagePub brought up 123 articles. The results of the search conducted for the last year of 2013 yielded a total 88 articles for PubMed

and 89 articles for SagePub. The result from title screening, a total 9 articles for PubMed and 5 articles for SagePub. In the end, we compiled a total of 8 papers. We included five research that met the criteria.
Elmessiry, MM & Gebaly, AA (2020)[4] showed Simultaneous laparoscopic TAPP repair of uncomplicated primary bilateral inguinal hernia has superior early postoperative outcome, less chronic pain and higher patients' satisfaction rate compared to open approaches with similar low recurrence rate.

Sudarshan, PB *et al* (2017)[5] showed Inguinal hernia repair is one of the commonly performed general surgical procedures. Currently both open and laparoscopic procedures are being performed for inguinal hernia repairs and they have various advantages and disadvantages. In our study we have come to a conclusion that laparoscopic repair of unilateral inguinal hernia have a considerable short term clinical advantage than open hernia repair.

Table 1. The litelature include in this study

Author	Origin	Method	Sample Size	Result
Elmessiry, MM & Gebaly, AA., 2020[4]	Egypt	Prospective study	180 patients	In comparison to open PP and bilateral Lichtenstein repair, Laparoscopic TAPP repair had significantly longer operative time and superior early postoperative outcomes including significantly less postoperative pain, hospital stay, time till return to normal activity and to work. Chronic groin pain and mesh sensation was lower in Laparoscopic TAPP group with significantly higher satisfaction rate compared to open groups. No significant difference between study groups in 3 years recurrence rate.
Sudarshan, PB *et al*., 2017[5]	India	Prospective study	60 patients	Out of the 60 patients, 30 patients underwent open inguinal hernia repair and another 30 patients underwent Laparoscopic inguinal hernia repair. The mean age group was 46.73 in open surgery group and 42.10 in laparoscopic group. 23.3% of the patients in open hernioplasty developed seroma, hematoma in the post-operative period. Whereas 10% had seroma collection in laparoscopic group. No incidence of recurrence in both the groups. No significant difference in pain score between both the groups during immediate post-operative period on POD 0, however there was significant difference in pain score on POD 3 (mean pain in open group 4.13 and lap group 2.87) and POD 7(mean pain in open group 2.90 and lap group 1.23). Mean duration of stay in hospital for open hernioplasty was 7.8 days and for Laparoscopic hernioplasty was 3.07 days. Mean duration of return to work in open

				hernioplasty was 14.37 days and in laparoscopy group was 9.13 days.
Eker,HH *et al*., 2013[6]	Netherlands	Multicenter randomized controlled trial	206 patients	Median blood loss during the operation was significantly less (10 mL vs 50 mL; P = .05) as well as the number of patients receiving a wound drain (3% vs 45%; P < .001) in the laparoscopic group. Operative time for the laparoscopic group was longer (100 minutes vs 76 minutes; P = .001). Perioperative complications were significantly higher after laparoscopy (9% vs 2%). Visual analog scale scores for pain and nausea, completed before surgery and 3 days and 1 and 4 weeks postoperatively, showed no significant differences between the 2 groups. At a mean follow-up period of 35 months, a recurrence rate of 14% was reported in the open group and 18%, in the laparoscopic group (P = .30). The size of the defect was found to be an independent predictor for recurrence (P < .001).
Xu, Z *et al*., 2023[7]	China	Retrospective study	319 patients	After PSM, 78 pairs of elderly patients were enrolled in this study, and there were no significant differences in baseline between LIHR and OIHR groups. Compared to OIHR, univariable and multivariable logistic regression analysis showed that LIHR was independently affected for reducing intraoperative hemorrhage (OR = 0.06, 95% CI: 0.02–0.18, P < 0.001) and shortening postoperative hospitalization time (OR = 0.29, 95% CI: 0.15– 0.57, P < 0.001) in elderly patients. Furthermore, LIHR (OR = 0.28, 95% CI: 0.14– 0.57, P < 0.001) and age (OR = 0.89, 95% CI: 0.82–0.96, P = 0.002) were independent affecting factors for relieving postoperative pain. Meanwhile, no obvious differences were detected in postoperative complications [LIHR 7.7% (6/78) vs OIHR 14.1% (11/78), P = 0.199].
Yang, C & Deng, S., 2020[8]	China	A comprehensive, meta-analysis	1017 patients	Ten RCTs involving a total of 1,017 patients were included. There was no statistically

				significant difference in the rate of recurrence (P=0.23; OR: 0.74, 95% CI: 0.45–1.21), hematoma (P=0.47; OR: 0.71, 95% CI: 0.28–1.79), urinary retention (P=0.94; OR: 0.97, 95% CI: 0.46–2.07) and acute pain (P=0.71; OR: 0.74, 95% CI: 0.14-3.76) between the laparoscopic and open mesh repair groups. The incision infection rate (P=0.02; OR: 0.28, 95% CI: 0.10–0.81) of the laparoscopic group was lower and the length of hospital stay (P<0.0001; MD: −3.65, 95% CI: −4.76 to −2.53) was significantly shorter than those of the open repair group. However, the laparoscopic group had a longer operative time (P=0.0002; MD: 20.30, 95% CI: 9.60–31.01).

Eker,HH *et al* (2013)[6] showed Incisional hernia is the most frequent surgical complication after laparotomy. Up to 30% of all patients undergoing laparotomy develop an incisional hernia. This is associated with discomfort, pain, respiratory restriction, and dissatisfactory cosmetic results.1-6 The associated morbidity often results in subsequent hernia repair.7,8 Although significant improvements have been achieved in the field of incisional hernia concerning operative technique and the use of prosthetic materials, recurrence rates remain high at 32% to 63%.9 Risk factors associated with recurrence, such as hernia size, unfortunately cannot be influenced.10 The quest for more effective and less invasive techniques continues.

Xu, Z *et al* (2023)[7] showed With the global aging process today, the number of elderly patients with inguinal hernias in China has been on the rise, and the healthcare care system for elderly patients requires more attention. The LIHR approach has the advantages of reducing intraoperative bleeding, shortening postoperative hospital stay, and independently affecting in relieving postoperative pain in elderly inguinal hernia patients. This treatment approach may better care for and benefit more elderly patients.

Yang, C & Deng, S (2020)[8] showed there were no statistically significant differences in the recurrence rate or the incidence of hematoma, urinary retention, or acute pain between the laparoscopic and open group in the treatment of recurrent inguinal hernia. The incision infection rate is much lower with the laparoscopic approach and the length of hospital is much shorter than with open repair, but the laparoscopic approach does carry a longer operative time. Ultimately, the choice between laparoscopic and open mesh repair for the treatment of recurrent inguinal hernia should be based on the patient's specific conditions and the proficiency of the operating surgeon.

DISCUSSION

The prevalence of groin hernia repair peaks in childhood at 0-5 years (males 1.4%; females 0.4%) and in adults at 75-80 years (males 4.1%; females 0.36%). The open repair is the gold standard as evidenced by nationwide data (n = 2,476). By performing an open repair, the integrity of the abdominal cavity is respected as opposed to a laparoscopic approach to repair. However, since the introduction of laparoscopy in general surgery 30 years ago in paediatric inguinal hernia repair and especially in the past decade, an increasing number of surgeons have argued for laparoscopic paediatric repair.[9]

Laparoscopic inguinal hernia repair originated in the early 1990s as laparoscopy gained a foothold in general surgery. 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. In the United States, approximately 800,000 inguinal herniorrhaphies are performed annually.[10]

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. In a comparison between open repair and laparoscopic repair, Eklund et al 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.[10]

According to the current treatment guidelines of the HerniaSurge Group, laparoscopic repair is recommended for treating recurrent inguinal hernia (RIH) after primary anterior open repair (PAOR). This is because the Lichtenstein patch repair (LPR) is the most common method of PAOR, especially in Europe and the United States. Also, laparoscopic repair, including totally extraperitoneal repair and transabdominal preperitoneal repair (TAPP), can be performed easily after LPR, during which the parietal peritoneum behind the posterior floor is nearly untouched. However, in Japan, LPR is less common than in Europe and the United States; rather, open posterior mesh repair (OPMR), including mesh plug repair (MPR) and transinguinal preperitoneal mesh repair (TIPPMR), is the most common open repair. Therefore, completely laparoscopic repair (CLR) for RIH that develops after PAOR has been rarely reported in Japan.[11,12]

Operation for a recurrent inguinal hernia is common (12%), and the risk of re-recurrence is high. In all guidelines of the international hernia societies, laparo-endoscopic recurrent inguinal hernia repair is recommended after failed open anterior tissue or Lichtenstein repair and open anterior repair in Lichtenstein technique after failed posterior laparo-endoscopic repair. Once an open anterior repair has been done, a laparo-endoscopic repair will generally go through nearly undisturbed tissue planes, permitting relative ease of dissection. After a failed TEP or TAPP repair, where the posterior extraperitoneal space was entered, it is strongly recommended that an open anterior mesh repair (Lichtenstein)—which does not involve entering the posterior space—should be performed.[13,14]

CONCLUSION

The laparoscopic approach is superior to the open mesh approach for the repair of recurrent inguinal hernia in some aspects, including the incision infection rate and length of hospital stay. However, more high-quality studies on the effects of laparoscopic and open mesh repair for the treatment of recurrent inguinal hernia are warranted.

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