

Review Article

Laparoscopic Versus Open Mesh Repair In Treatment Of Inguinal Hernia

Abstract:

Hernia in the definition means to actually protrude. Inguinal Hernia is more common among all the hernias. Hernia repair is the most common surgery performed in all medical institutions. Inguinal Hernia (repair) is a most common performed surgery operations. The contents of Inguinal canal are, Spermatic cord and Ilioinguinal nerve Inguinal Hernia presents in two types Indirect and direct hernia. Indirect type is the most common The prevalence of Inguinal Hernia specifically is more common in males which is 25% and in females is 2% . As known till date, Treatment of hernia is a definitive surgery. 10-15% of hernias are direct. 50% direct hernias occur are of bilateral origin. And 35% of Inguinal hernias are direct. Etiology of hernia is-Chronic cough Smoking

Comment [MF1]: Why brackets?

Comment [MF2]: This should be mentioned in introduction not in abstract.

Straining Constipation Heavy work and Previous appendicectomy When in the late 1984 , Author Lichtenstein coined the term Tension free hernioplasty, it changed the conventional surgical technique by making mesh hernia repair more common. When in 1990 laparoscopic tension free technique which was introduced it was being promoted that it causes less pain shorter recovery period. There are multiple repair techniques for Inguinal hernia. This is a most common occurrence in men which does not have a particular effective surgical technique. This study is to determine whether which technique is comparatively more effective and useful in the future which will be effective as well as economical. This specific study required a meta analysis of randomised control trials . There are multifactorial reasons for deciding which surgical technique is best.

Keywords- laparoscopic, open mesh , inguinal hernia, repair, hernia, surgery

Comment [MF3]: There is no meaning of this phrase.

Comment [MF4]: Why you repeat this word?

Comment [MF5]: Keywords should be not more than 5 and well chosen.

Comment [MF6]: In general ,abstract is too long and most of its contents are repeated in the introduction. Abstract is not organized as known to include background, methods, results and conclusion.

Introduction:

Both the types of surgeries can receive exceptional outcome when it is applied to perfect patient and performed by best man with the knowledge.

Comment [MF7]: I think this phrase is related to the talk in abstract because it has no meaning without relating it the above talk.

Basically, mesh repair and tissue repair are the two techniques used to treat Inguinal hernia.

Tissue repair is done by placing a strip of external oblique aponeurosis.

While Mesh repair requires Prosthetics for the same.

- 1.Lichtenstein open tension free hernia mesh repair (hernioplasty) is the standard one used.
- 2.Bassinis tissue repair not commonly used now
- 3.TEP- TOTALLY EXTRAPERITONEAL PREPERITONEAL MESH REPAIR
- 4.TAPP- TRANS ABDOMINAL PRE PERITONEAL MESH REPAIR

Comment [MF8]: Last 2 points were written in capital letters need to be corrected.

Two types of approaches are there for the repair.

Anterior (Inguinal) approach repair is done in Bassinis, Shouldice, Lichtenstein mesh repair, PHS repair.

Posterior approach repair is done in TEP , TAPP, Nyhus repair.

The mentioned techniques of open surgery allow repair both with and without mesh. It can be used in placing mesh elsewhere also.

Laparoscopic method uses preperitoneal space which is minimally invasive. this study was done to find out and come to a conclusion that either laparoscopic or open mesh is very useful in inguinal hernia repair. Hernia in the definition means to actually protrude. Inguinal Hernia is more common among all the hernias (1) Hernia repair is the most common surgery performed in all medical institutions. Inguinal Hernia (repair) is a most common performed surgery operations. The contents of Inguinal canal are, Spermatic cord and Ilioinguinal nerve Inguinal

Comment [MF9]: This phrase was repeated in abstract?

Hernia presents in two types Indirect and direct hernia. Indirect type is the most common. The prevalence of Inguinal Hernia specifically is more common in males which is 25% and in females is 2% . As known till date (2) Treatment of hernia is a definitive surgery. 10-15% of hernias are direct. 50% direct hernias occur are of bilateral origin. And 35% of Inguinal hernias are direct. Etiology of hernia is-Chronic cough Smoking Straining Constipation Heavy work and Previous appendectomy When in the late 1984 , Author Lichtenstein coined the term Tension free hernioplasty, it changed the conventional surgical technique by making mesh hernia repair more common. When in 1990 laparoscopic tension free technique which was introduced it was being promoted that it causes less pain shorter recovery period. There are multiple repair techniques for Inguinal hernia. This is a most common occurrence in men which does not have a particular effective surgical technique. This study is to determine whether which technique is comparatively more

effective and useful in the future which will be effective as well as economical. This specific study required a meta analysis of randomised control trials . There are multifactorial reasons for deciding which surgical technique is best. Laparoscopic vs open – The topic of which technique is better is always argued by the surgeon. Many techniques are available today with multiple availability of equipments (3) The variables like the size of hernia , the patient which have comorbidities , previous surgical history are taken into consideration along with the expertise of the surgeon. So it is best for the surgeon to have atleast basic idea of the techniques used in the surgery and advantages and disadvantages of each technique and also should have the knowledge of which one to be performed for a specific patient.

Comment [MF10]: Who rather than which

Comment [MF11]: Is/us?

Methodology

Comment [MF12]: Which search engine used and which period of the publication and what is the mean of analysis?What are search words used and criteria for inclusion and exclusion.

The best way to come to a decision that which method is better can be made by evidence based medicine. The best evidence is given by Meta

analysis or also called Randomised controlled trials.

Along with RCT study there was a priority given to other plausible factors which impartially give results to the study. The other factors taken into consideration are as follows

- Recurrence rate
- Complications
- Duration of operation
- Economical
- Post operative pain
- Return to normal life

Results

The trial was conducted at 14 (4) medical centers. Both the methods of surgery were used on random patients. The trial being conducted on 2164 patients was to be determined on a basis of 2 year outcome.

Going through the various factors mentioned above the study results were that

1. Recurrence rate was moderately more in laparoscopic surgery over open surgery. Laparoscopic 7.3 % and open with 4.1%. but on surgery **om** recurrent hernial it was of a very little difference. At first when the laparoscopic technique was coming into action the surgeons have a very specific knowledge of the kind of material and size of mesh to be used. This caused the mesh to not perform effectively which caused recurrence. To conduct the study, it was taken into consideration that minimum of 25 prior surgeries had to be performed by the surgeon. Out of which those who had performed less than 25 laparoscopic had high recurrence rate of hernia and those who had performed more than 25 had less recurrence rate.

Comment [MF13]: ????

2. Complications- Incidence of vascular as well as visceral complications was more profound in laparoscopic method with a percentage of 39% and open with 32% . Complications were more profound in laparoscopic due to

the factors like less experience of the technique and no proper mesh placement which lead to increase in complication (5)

3. Laparoscopic surgery takes more time than an open repair surgery . The various institutes collected information from RCTs done by various reviewers and came to a conclusion wherein the complete operating time required for a laparoscopic repair technique was more than an open repair technique with the difference of around 45 minutes average time .
4. The cost of the whole procedure including the stay of the patient and also without excluding the parts, the material involved- it was considerably more in laparoscopic surgery than over open repair . This parameter totally depends to patient and surgeon specific factors. The whole calculation also includes the cost of items used. Unilateral hernia performed with open technique costed less as compared with laparoscopic repair. But bilateral performed with open technique got

almost similar cost as compared to laparoscopic. To be said the bilateral laparoscopic hernia repair was more efficient and cost effective since it involve much time , less complications and less recurrence which in overall is a budget and cost saving technique (6)

5. Post operative pain- the laparoscopic method did show any signs of any post operative pain in any of the cases taken into the study. After 14 days of surgery no pain was seen. There was pain in the first 4 to 5 hours after open surgery . This might be caused due to local anaesthesia.
6. Returning to normal activity- in both the procedures patients were capable to return to normal activity within a week . But the patients type of occupation and kind of activity involved changes the criteria according to each individual. Both the group of patients had around similar time for returning to sexual activity. Laparoscopic

procedure patients had one day earlier resuming than open repair group.

There are complexity present in recurrent Inguinal Hernia as compared to primary hernia. For this reason to perform a surgery on complex Inguinal hernia care should be taken to avoid trauma caused by previous surgery (7) For this purpose mesh repair is used in treatment of recurrent Inguinal hernia.

. Open and Laparoscopic approach as well as other surgery can be made useful for this repair. Due to advancement in technology and availability of equipments surgeons nowadays use Laparoscopic repair more frequently for recurrent Inguinal hernia. But when it comes to discussing which technique is better cost-effectiveness, patient satisfaction and recurrence rate are taken into consideration between open and Laparoscopic repair. There Is a major point taken into consideration that is the recurrence of hernia even after repair (8) The range of recurrence of Inguinal hernia is between 1.1% to 33% depending on the

previous surgery performed and the patch used in the repair. The follow up after the surgery is also an important assessment technique to check the recurrence of inguinal hernia. Usually recurrence after open mesh repair is around 30 to 60 months and for Laparoscopic repair is within 12 months. Comparing with previous meta-analyses most of the follow up studies which were performed for periods of more than 18 months , there is no as such difference in recurrence rate of hernia after both the techniques were taken into consideration.

The recurrence rate is significantly reduced by the use of patches but reducing one condition gives rise to other sameway here in patches used there is and increased chance of infection due to formation of an inflammatory reaction. For this condition to be avoided laparoscopic technique is more prevalent because it does involve excessive cutting of tissue and no need to create a bigger separation . The fact of wound infection when

considered, Laparoscopic repair is more advantageous as compared to open mesh repair because there is less chance of infection and this fact is made on the basis of the meta analysis performed (9)

Postoperative hematoma is also one of the complication after surgery where conservative treatment is used . According to older studies this hematoma is more prevalent after open mesh repair and very less seen after laparoscopic repair. But our meta analysis shows there is not much of a difference in open and laparoscopic repair hematoma. This is difficult to attribute too because retroperitoneal hematoma is more seen in laparoscopic repair than in open mesh repair. Day care or single day surgery – open hernia technique can be performed as a day care surgery (10) This implies that the treatment is patient centered which is safe, it is of high quality. It also has less chances of hospital acquired infections. This also means patient can be normal very early. In addition

to these factors there were 2 more points taken into consideration that were.

One day Surgery and early activity- this was more seen in open repair group

All the skills required in performing a procedure is the main part wherein a surgeon should give his/her best and to this point the study showed it took a lot of effort to learn the laparoscopic method and open being the conventional one it required less skill. Final note to this study is that it completely depends on the surgeon and his experience to assess which procedure should be performed for that particular patient . If the patient is accessible to both procedures then it is in the surgeons hands to tell which will be the best to perform (11)

Comment [MF14]: Results section is too long and include no tables or graphs which are better summarizing results of study. Also no any data about significant differences. A lot of talk to explain results not suitable here but it is better to be added to discussion.

Discussion:

There are complexity present in recurrent Inguinal Hernia as compared to primary hernia. For this reason to perform a surgery

on complex Inguinal hernia care should be taken to avoid trauma caused by previous surgery. For this purpose mesh repair is used in treatment of recurrent Inguinal hernia. (12) Open and Laparoscopic approach as well as other surgery can be made useful for this repair. Due to advancement in technology and availability of equipments surgeons nowadays use Laparoscopic repair more frequently for recurrent Inguinal hernia. But when it comes to discussing which technique is better cost-effectiveness, patient satisfaction and recurrence rate are taken into consideration between open and Laparoscopic repair. There is a major point taken into consideration that is the recurrence of hernia even after repair (13) The range of recurrence of Inguinal hernia is between 1.1% to 33% depending on the previous surgery performed and the patch used in the repair. The follow up after the surgery is also an important assessment technique to check the recurrence of inguinal hernia. Usually recurrence after open mesh

repair is around 30 to 60 months and for Laparoscopic repair is within 12 months. Comparing with previous meta-analyses most of the follow up studies which were performed for periods of more than 18 months , there is no as such difference in recurrence rate of hernia after both the techniques were taken into consideration (14) The recurrence rate is significantly reduced by the use of patches but reducing one condition gives rise to other sameway here in patches used there is and increased chance of infection due to formation of an inflammatory reaction. For this condition to be avoided laparoscopic technique is more prevalent because it does involve excessive cutting of tissue and no need to create a bigger separation . The fact of wound infection when considered, Laparoscopic repair is more advantageous as compared to open mesh repair because there is less chance of infection and this fact is made on the basis of the meta analysis performed (15)

Postoperative hematoma is also one of the complication after surgery where conservative treatment is used . According to older studies this hematoma is more prevalent after open mesh repair and very less seen after laparoscopic repair. But our meta analysis shows there is not much of a difference in open and laparoscopic repair hematoma (16-24) This is difficult to attribute too because retroperitoneal hematoma is more seen in laparoscopic repair than in open mesh repair.

Conclusion:

Laparoscopic method uses preperitoneal space which is minimally invasive. this study was done to find out and come to a conclusion that either laparoscopic or open mesh is very useful in inguinal hernia repair. Hernia in the definition means to actually protrude. Inguinal Hernia is more common

Comment [MF15]: Again here is a repetition of the talk found in abstract and introduction .no need for it here.

among all the hernias. Hernia repair is the most common surgery performed in all medical institutions. Inguinal Hernia (repair) is a most common performed surgery operations The contents of Inguinal canal are, Spermatic cord and Ilioinguinal nerve Inguinal Hernia presents in two types Indirect and direct hernia. Indirect type is the most common The prevalence of Inguinal Hernia specifically is more common in males which is 25% and in females is 2% . As known till date, Treatment of hernia is a definitive surgery. 10-15% of hernias are direct. 50% direct hernias occur are of bilateral origin (18) And 35% of Inguinal hernias are direct. Etiology of hernia is-Chronic cough Smoking Straining Constipation Heavy work and Previous appendicectomy When in the late 1984 , Author Lichtenstein coined the term Tension free hernioplasty, it changed the conventional surgical technique by making mesh hernia repair more common. When in 1990 laparoscopic tension free technique

which was introduced it was being promoted that it causes less pain shorter recovery period. There are multiple repair techniques for Inguinal hernia. This is a most common occurrence in men which does not have a particular effective surgical technique. This study is to determine whether which technique is comparatively more effective and useful in the future which will be effective as well as economical (19) This specific study required a meta analysis of randomised control trials After the completion of the study it shows that though laparoscopic repair is more advance it has its advantages and disadvantages as well. Giving priority to particular factors like post operative complications, time taken for surgery, economical- laparoscopic goes on the higher terms than open repair . Open repair can be considered adequately best to performed for correction of Inguinal Hernia. Depending on the convenience of the patient along with surgeons expertise , type of repair to be used

can be determined. This decision is made taking in mind all investigation and diagnosis (20).

Success rate of each of the repair is different in each aspect respectively. So no particular harsh decision can be made to use one of the repair compulsorily.

References:

1. Simons MP, Aufenacker TJ, Berrevoet F, Bingener J, Bisgaard T, Bittner R, Bonjer HJ, Bury K, Campanelli G, Chen DC, Chowbey PK (2017) World guidelines for groin hernia management.
2. Nordin P, Bartelmess P, Jansson C, Svensson C, Edlund G (2002) Randomized trial of Lichtenstein versus Shouldice hernia repair in general surgical practice. *Br J Surg* 89(1):45–49
3. Lange JFM, Kaufmann R, Wijsmuller AR, Pierie JPEN, Ploeg RJ, Chen DC, Amid PK

(2015) An international consensus algorithm for management of chronic postoperative inguinal pain. *Hernia* 19(1):33–4

4.O'reilly EA, Burke JP, O'connell PR (2012) A meta-analysis of surgical morbidity and recurrence after laparoscopic and open repair of primary unilateral inguinal hernia. *Ann Surg* 255(5):846–853

5.Bobo Z, Nan W, Qin Q, Tao W, Jianguo L, Xianli H (2014) Meta-analysis of randomized controlled trials comparing Lichtenstein and totally extraperitoneal laparoscopic hernioplasty in treatment of inguinal hernias. *J Surg Res* 192(2):409–420

6.Scheuermann U, Niebisch S, Lyros O, Jansen-Winkel B, Gockel I (2017) Transabdominal Preperitoneal (TAPP) versus Lichtenstein operation for primary inguinal hernia repair: a systematic review and meta-analysis of randomized controlled trials. *BMC Surg* 17(1):55

7. Patterson TJ, Beck J, Currie PJ, Spence RA, Spence G (2019) Meta-analysis of patient-reported outcomes after laparoscopic versus open inguinal hernia repair. *Br J Surg*. <https://doi.org/10.1002/bjs.11139>
 8. Köckerling F, Stechemesser B, Hukauf M, Kuthe A, Schug-Pass C (2016) TEP versus Lichtenstein: which technique is better for the repair of primary unilateral inguinal hernias in men? *Surg Endosc* 30(8):3304–331
 9. Burcharth J, Pommergaard HC, Bisgaard T, et al. Patient-related risk factors for recurrence after inguinal hernia repair: a systematic review and meta-analysis of observational studies. *Surg Innov* 2015;22:303-17. [[Crossref](#)] [[PubMed](#)]
 10. Yang X, Aihemaiti M, Zhang H, et al. Mesh-preservation approach to treatment of mesh infection after large incisional ventral hernia repair—how I do it. *Ann Transl Med* 2019;7:698. [[Crossref](#)] [[PubMed](#)]
-

11. Burcharth J. The epidemiology and risk factors for recurrence after inguinal hernia surgery. *Dan Med J* 2014;61:B4846. [[PubMed](#)]
 12. Burcharth J, Andresen K, Pommergaard HC, et al. Recurrence patterns of direct and indirect inguinal hernias in a nationwide population in Denmark. *Surgery* 2014;155:173-7. [[Crossref](#)] [[PubMed](#)]
 13. Dedemadi G, Kalaitzopoulos I, Loumpias C, et al. Recurrent inguinal hernia repair: what is the evidence of case series? A meta-analysis and metaregression analysis. *Surg Laparosc Endosc Percutan Tech* 2014;24:306-17. [[Crossref](#)] [[PubMed](#)]
 14. Dallas KB, Froylich D, Choi JJ, et al. Laparoscopic versus open inguinal hernia repair in octogenarians: a follow-up study. *Geriatr Gerontol Int* 2013;13:329-33. [[Crossref](#)] [[PubMed](#)]
-

15. Esposito C, Escolino M, Turra F, et al. Current concepts in the management of inguinal hernia and hydrocele in pediatric patients in laparoscopic era. *Semin Pediatr Surg* 2016;25:232-40. [[Crossref](#)] [[PubMed](#)]
 16. Pisanu A, Podda M, Saba A, et al. Meta-analysis and review of prospective randomized trials comparing laparoscopic and Lichtenstein techniques in recurrent inguinal hernia repair. *Hernia* 2015;19:355-66. [[Crossref](#)] [[PubMed](#)]
 17. Esposito C, St Peter SD, Escolino M, et al. Laparoscopic versus open inguinal hernia repair in pediatric patients: a systematic review. *J Laparoendosc Adv Surg Tech A* 2014;24:811-8. [[Crossref](#)] [[PubMed](#)]
 18. O'Reilly EA, Burke JP, O'Connell PR. A meta-analysis of surgical morbidity and recurrence after laparoscopic and open repair of primary unilateral inguinal hernia. *Ann Surg* 2012;255:846-53. [[Crossref](#)] [[PubMed](#)]
-

19. Liberati A, Altman DG, Tetzlaff J, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. *BMJ* 2009;339:b2700. [[Crossref](#)] [[PubMed](#)]

20. Beets GL, Dirksen CD, Go PM, et al. Open or laparoscopic preperitoneal mesh repair for recurrent inguinal hernia? A randomized controlled trial. *Surg Endosc* 1999;13:323-27. [[Crossref](#)] [[PubMed](#)]

21. Kailuke, Reshama Manoharrao, Bhavitha Venigalla, and Sanjot Sudhir Ninave. “Laparoscopic Appendicectomy in a 26-Weeks Parturient.” *JOURNAL OF EVOLUTION OF MEDICAL AND DENTAL SCIENCES-JEMDS* 9, no. 27 (July 6, 2020): 1964–66.

<https://doi.org/10.14260/jemds/2020/427>.

22. Ladke, Amruta B., Pandit A. Palaskar, and Vinod R. Bhivsane. “Parasitic Fibroid:

Complication of Post-Laparoscopic Morcellation.” JOURNAL OF OBSTETRICS AND GYNECOLOGY OF INDIA, n.d.

<https://doi.org/10.1007/s13224-020-01307-7>.

23. Shrey, Shruti, Amol Singam, Basant Singh Latwal, Pratibha Nagpure, and Ayushma. “A Comparative Study of Intraperitoneal Ropivacaine and Bupivacaine for Postoperative Analgesia in Laparoscopic Cholecystectomy.” JOURNAL OF EVOLUTION OF MEDICAL AND DENTAL SCIENCES-JEMDS 9, no. 4 (January 27, 2020): 200–205.

<https://doi.org/10.14260/jemds/2020/47>.

24. Verma, Neeta, S. Krishnendu, Aruna Chandak V, Amol Singam, Vijay C. Chandak, and Vivek Chakole. “Effectiveness of Transverse Abdominis Plane Block as a Method of Regional Anaesthesia in Unilateral Inguinal Hernia Repair.” JOURNAL OF EVOLUTION OF MEDICAL AND

DENTAL SCIENCES-JEMDS 9, no. 42
(October 19, 2020): 3097–3101.
<https://doi.org/10.14260/jemds/2020/680>.

UNDER PEER REVIEW

