ejpmr, 2018,5(7), 472-476

SJIF Impact Factor 4.897

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

OPEN TENSION FREE MESH REPAIR VERSUS LAPAROSCOPIC TOTALLY EXTRA PERITONEAL HERNIOPLASTY FOR INGUINAL HERNIA

Mohamed L. Ahmed (MD)[1], Ashraf A. Zeineldein (MD)[1], Moharram A. Mohamed (MD)[1] and Ahmed A. Shalaby (MBBCH)[2*]

[1]Department of General Surgery, Faculty of Medicine, Menofyia University, Shebin El Kom, El Menofyia, Egypt.
[2]Assistant Specialist of General Surgery, Kotor Central Hospital, Gharbia, Egypt.

***Corresponding Author: Dr. Ahmed A. Shalaby**

Assistant Specialist of General Surgery, Kotor Central Hospital, Gharbia, Egypt.

Article Received on 22/05/2018 **Article Revised on 11/06/2018** **Article Accepted on 01/07/2018**

ABSTRACT

Objectives: The aim of this study is to compare open tension free mesh hernia repair with Laparoscopic totally extraperitoneal hernioplasty for inguinal hernia in regard to recurrence, postoperative pain, chronic pain, hospital stay, return to work, operation length and technical difficulty, and lastly financial considerations. **Background:** Surgical repair of the hernia is considered to be the only definitive Management of hernia. The outcome of hernia surgery is highly surgeon Dependent "no disease of the human body, belonging to the province of surgeons requires in its treatment a greater combination of accurate anatomical knowledge with surgical skill than hernia in all its varieties". The exact cause of inguinal hernia is still unknown but the following factors contribute in its occurrence. A preformed congenital sac, raised intra abdominal pressure and weak abdominal musculature. There is no "gold standard" operation for treatment of inguinal hernias. The optimal surgical approach must be selected individually for the patient, taking into account patient's age, hernia size, unilaterality or bilaterality, primary or recurrent status, type of anesthesia, occupation, and patient's activities. There are three important landmarks in the history of repair of Inguinal hernia: 1.Tissue repair (Eduardo bassini 1887). 2.Onlay mesh (Irving Lichtenstein 1984), tension-free repair. 3.Laparoscopic hernia repair (1990). **Methods:** The study included 60 adult male patients with inguinal hernia, distributed into two groups randomly. Group A: underwent Lichtenstein Repair and group B: underwent laparoscopic total extraperitoneal hernioplasty. **Results:** In patients who underwent Lichtenstein repair the mean age was 40 years, the mean operative time for unilateral cases was 78 min. and for bilateral cases 137.4 min., the hospital stay ranged from 1 to 3 days, with one case of recurrence and they returned to work after 25 +/- 5days. While in patients who underwent laparoscopic total extraperitoneal hernioplasty, the mean age was 40.5 years, the mean operative time for unilateral cases was 83.56 min, and for bilateral cases 118.33min, the hospital stay was one day in all cases, with one case of recurrence and they returned to work after 15 +/- 5days. This study showed that, laparoscopic TEP is a better alternative than open repair in terms of lesser postoperative pain, earlier ambulation, earlier return to work and better cosmetic results. However, laparoscopic TEP had a longer and steeper learning curve. **Conclusion:** Laparoscopic TEP repair is nearly equal to open repair in the management of primary unilateral hernia, but it is more time consuming and more costy. It is better in terms of less postoperative pain, shorter hospital stay, earlier return to work, shorter operative time in bilateral cases and better cosmetic results.

KEYWORD: Inguinal hernia**,** Open repair**,** laparoscopic total extraperitoneal repair.

INTRODUCTION

An inguinal hernia is a protrusion of abdominal contents into the inguinal canal through an abdominal wall defect. The lifetime rate of inguinal hernia is 25 percent in males and 2 percent in females.[1]

The risk of inguinal hernia increases with age, and the annual incidence is about 50 percent in males by the age of 75 years.[2]

Approximately 10 percent of cases are bilateral.[3]

In children, the incidence ranges from 0.8 to 4.4 percent. It is 10 times as common in boys as in girls and also more common in infants born before 32 weeks' gestation (13-percent prevalence).[4]

Surgical repair of hernias is the most commonly performed general surgical procedure. These repairs are typically performed on an outpatient basis (87 percent in 1996).[5]

Such a large volume of procedures suggests that even modest improvements in patient outcomes would have a substantial impact on population health.[6]

The primary goals of surgery include preventing strangulation, repairing the hernia, minimizing the chance of recurrence, returning the patient to normal activities quickly, and minimizing post surgical discomfort and the adverse effects of surgery. The various surgeries include a constellation of benefits and risks, which presents some clinical uncertainty in the choice between approaches. Recurrence occurs in approximately 1 to 5 percent of cases. Balancing all the factors (e.g., recurrence, adverse events, time to return to work[RTW]) is a difficult yet critical process in making the best possible medical decisions.[7]

Surgical procedures for inguinal hernia repair generally fall into three categories: open repair without the use of a mesh implant (i.e., sutured), open repair with a mesh, and laparoscopic repair with a mesh. Within each of these categories, several specific procedures have been employed. Until the 1980s, open suture repair was the standard; however, the resulting tension along the suture line yielded relatively high rates of recurrence and patient discomfort. Non sutured "tension-free" surgical mesh has gained in popularity, and many specific open procedures are used. One author estimated that in 2003, 93 percent of groin hernia repairs involved the use of a mesh, and of these, about three-fourths involved either a Lichtenstein repair or mesh plug. In the Lichtenstein procedure, surgeons suture the mesh in front of the hernia defect. Mesh plug repair involves a preshaped mesh plug that surgeons introduce into the hernia weakness during open surgery, they then position a piece of flat mesh on top of the hernia defect.[5]

In terms of setting, most hernia surgeries are performed not in specialized hernia centers but by general surgeons who also perform many other types of surgeries. The laparoscopic surgical repair of inguinal hernia is generally recognized as a highly specialized skill, and patients receiving care from more experienced surgeons may fare better than patients receiving care from less experienced surgeons. The most commonly performed laparoscopic repair procedures are transabdominal pre peritoneal (TAPP) repair and totally extra peritoneal (TEP) repair. During TAPP repair, surgeons enter the peritoneal cavity to place a mesh through an incision over the hernia site. With TEP surgery, surgeons do not enter the peritoneal cavity but use a mesh to cove the hernia from outside the peritoneum.[8]

PATIENTS AND METHODS

This is a prospective randomized controlled study. It included 60 adult male patients with inguinal hernia. Group A (n: 30 patients, with 35 hernias) underwent Lichtenstein repair and group B (n: 30 patients, with 33 hernias) underwent laparoscopic total extraperitoneal hernioplasty. These patients presented in the outpatient clinics at Menofyia university hospitals, and distributed into two groups randomly.

Inclusion criteria **are**

Patients with uncomplicated inguinal hernia were included in the study.

Exclusion criteria **are**

- Patients who are unfit for anesthesia.
- Patients who have systemic disease that is a constant threat to life.
- Those who have complicated inguinal hernia such as irreducibility, bowel obstruction, bowel strangulation, peritonitis or bowel perforation.
- Patients who are under 18 years of age.

Informed concents were obtained from all patients included in the study which were approved by the local ethics committee of general surgery department of faculty of medicine, Menofyia University.

The clinical diagnosis of inguinal hernia was based on symptoms and signs elicited during clinical examination..

Routine investigations were requested for all patients, including:

- Complete blood picture.
- Coagulation profile.
- Liver function tests.
- Kidney function tests.
- Fasting blood sugar.
- EGG and Chest x-ray.

Statistical Analysis

The full detailed form is: SPSS 20, IBM, Armonk, NY, United States of America. Quantitative data were expressed as mean± standard deviation (SD). Qualitative data were expressed as frequency and percentage.

- Independent-samples t-test of significance was used when comparing between two means.
- Chi-square (X^2) test of significance was used in order to compare proportions between two qualitative parameters.

RESULTS

The study included 60 adult male patients with inguinal hernia, distributed into two groups randomly. Group A: underwent Lichtenstein Repair and group B: underwent laparoscopic total extraperitioneal hernioplasty.

The mean age of group A was 41.8 years. (in the range from 18 to 63 years), while the mean age of group B was 42.7 years. (in the range from 19 to 64 years) **[table 1].**

Operative time

Group A: operative time ranged from 45 - 120 min., with a mean time for unilateral cases 77.59 min. according to the difficulty of the case. The mean time in bilateral cases was 137.4 min.

Group B: operative time ranged from 60 – 120 min., with a mean time for unilateral hernia 83.56 min and for bilateral cases 118.33 min **[table 2].**

Postoperative complications

All postoperative complications, as scrotal edema, wound infection and haematoma, resolved spontaneously without the need for surgical intervention **[table 3].**

Recurrence

There was one case of recurrence in every group during the follow up period of 6-12 months with no statistical differences.

Return to work

Group A: the mean time until return to work was (25±5 days).

Group B: the mean time until return to work was (15 ± 5 days).

Table 1: Age of patients in both groups.

1. **Age groups**	2. **Group A** 3. **(N=30)**		4. **Group B** 5. **(N=30)**		6. X^2	7. **P-value**
	8. **N**	9. **%**	10. **N**	11. **%**		
12. **< 40 years**	13. 17	14. 56.7	15. 16	16. 53.3	17. 0.073	18. 0.795
19. **≥ 40 years**	20. 13	21. 43.3	22. 14	23. 46.7		
Range	18 – 63		19 – 64		T: 0.223	0.827
Mean ± SD	41.8 ± 15.48		42.7 ± 16.28			

Table 10: Mean operative time and type of hernia.

Type of hernia		**Operative time**			
		Group A	**Group B**	**T. test**	**P. value**
Unilateral	**Range**	45 – 119	60 – 140	1.283	0.263
	Mean ± SD	77.59 ± 19.37	83.56 ± 18.55		
Bilateral	**Range**	120 – 155	115 – 120	4.882	0.028*
	Mean ± SD	137.40 ± 10.92	118.33 ± 2.89		

Table 11: postoperative complications in both groups.

Postoperative complications	**G A (N=30)**		**G B (N=30)**		X^2	**P-value**
	N	**%**	**N**	**%**		
Urine retention	0	0	0	0	0.0	1.0
Scrotal edema	4	13.3	0	0	4.213	0.040*
Wound infection	1	3.3	1	3.3	0.0	1.0
Haematoma	1	3.3	1	3.3	0.0	1.0
Early recurrence	1	3.3	1	3.3	0.0	1.0
Total	6	20	3	10	1.182	0.278

DISCUSSION

Surgical repair of inguinal hernia is a common procedure in adult men. However, recurrence of hernias has been reported to occur after repair in 15% or more, and postoperative pain and disability are frequent. After the introduction of tension-free surgical repair with the use of prosthetic mesh, recurrence rates were reported to be less than 5%, and patients' discomfort was reported to be substantially improved over that obtained by the traditional, tension-producing techniques.[9]

Tension-free prosthetic mesh repair performed laparoscopically can be and should be compared only with an equivalent procedure performed by the open technique (Lichtenstein). Both laparoscopic TEP and Lichtenstein repairs involve placement of prosthetic mesh to strengthen the transversalis fascia and essentially are tension-free because no suturing of local tissues is involved, making them comparable.[10]

In this study, the lengths of the operations were analyzed in two ways: By the type of hernia found at operation and by the type of repair involved.

There were marked differences between the times taken to repair an indirect hernia as compared to a direct one. As would agree with general experience, repairs that involve the dissection of an indirect sac take the longest to perform.

The operative time for laparoscopic TEP was longer than for open repair in unilateral cases, this is attributed to the learning curve and the extreme caution exercised by the surgeon in the development of new procedure. In contrast to these findings, Momin, et al. reported that the operative time for laparoscopic TEP for unilateral cases was significantly shorter than for Lichtenstein repair.**[11]** To achieve an average operative time of less than 1 hour for laparoscopic TEP of unilateral inguinal hernia, involved surgeons must have surmounted the steep learning curve for laparoscopic TEP.**[11]**

On the other hand, the operative time for repair in bilateral cases was lower in laparoscopic TEP group than for Lichtenstein repair. This study included 8 bilateral cases (5 underwent laparoscopic TEP and 3 underwent Lichtenstein repair). This is matching with the results of other studies.[11,12]

There was no reported cases of intraoperative or life-threatening complications in this study. Findings of other studies showed that these complications are more liable to occur in the laparoscopic repair group than in the open repair group.[13]

In this study, postoperative surgical emphysema occurred in two patients underwent laparoscopic TEP. This was insignificant and expected after gas insufflation, and resolved spontaneously.

Regarding this study, the postoperative complications after laparoscopic TEP were 10%, while the postoperative complications after the tension-free prosthetic mesh repair were 20% in the form of scrotal edema and wound infection. This was statistically insignificant difference and matching with results of other studies as.[14]

In this study, postoperative hematoma appeared after single case of both laparoscopic repair and open repair groups and treated conservatively, wound infection occurred in one case in both groups with no statistical difference.

Complications with experience and technical improvements are now minimal in the laparoscopic repair and studies indicate similar complication rates between open and laparoscopic repairs, but open repairs appear to have a higher rate of postoperative complications such as groin hematoma.[14] And this goes with the result of this study which showed more postoperative complications in open than in laparoscopic group.

The findings of this study demonstrated that the incidence of mild chronic pain after laparoscopic TEP was significantly lower than after open repair. Ielpo, et al., stated that postoperative pain at rest after laparoscopic TEP was significantly less than after Lichtenstein hernioplasty.[15]

Postoperative hospital stay was insignificantly different in both groups, it was lower in laparoscopic TEP group. The mean hospital stay in laparoscopic TEP group was 1 day, while in Lichtenstein was 1.6 day. These results coincide with the results of the others as Pisanu, et al in which the mean hospital stay in laparoscopic TEP group was 1.2.[16]

In this study, findings demonstrated that patients who underwent laparoscopic TEP returned to their usual activities earlier than those who underwent open repair. These results are consistent with.[11] and also with.[17]

In this study, the recurrence rate was similar in both groups (one case in each group) no statistical differences in the rate of recurrence in both groups this is consistent with the results of.[11]

The absence of significant difference in this study may be due to the small number of patients or the short follow up period.

Dismatching with our results, Lundström, et al., reported that the rate of recurrence of hernias was higher after laparoscopic repair than after repair by the Lichtenstein procedure at two years of follow up. May be the increased incidence of recurrences in their study is related not to the technique (laparoscopy) but rather to the size of the mesh and to the longer time of follow up period.[18]

Learning curve for laparoscopic hernia repair plateaued after as few as 30 cases. There is decrease in the rate of recurrence only among surgeons who reported having previously performed more than 250procedures. Among primary repairs performed by highly experienced surgeons (those who had performed more than 250 procedures), recurrence rates appeared to be similar for hernias repaired by the laparoscopic approach and those repaired by the open approach.[19]

One disadvantage of the laparoscopic repair is the high cost. Cost must be considered when evaluating hernia repair. However, the cost of hernia staples and balloon dissectors will decrease with the wide use of the laparoscopic technique and the operative cost will become closer to that of the anterior mesh repair. It is important to take into account that the patients have less disability and earlier return to work after laparoscopic repair, which results in a cost saving to the employees and indirectly to the society. Modifications of the technique will greatly reduce the cost of the procedure.[20]

Most surgeons agree that laparoscopic hernia repair is superior to open mesh repair in management of recurrent cases after a conventional repair as they are

dealing with virgin anatomy without disruption or adhesions. But unfortunately, there was no recurrent cases included in this study. We may be in need for another study including only recurrent and bilateral cases to confirm the superiority of laparoscopic TEP over open mesh repair.[11]

CONCLUSION

Laparoscopic TEP repair is nearly equal to open repair in the management of primary unilateral hernia, but it is more time consuming and more costy. It is better in terms of less postoperative pain, shorter hospital stay, earlier return to work, shorter operative time in bilateral cases and better cosmetic results.

REFERENCES

1. Nicks BA, Askew K. Hernias. In: eMedicine [online database]. Omaha, NE: eMedicine. com; 2010 Jan 25. http://emedicine. medscape. com/article/ 775630overview. Accessed July 14, 2010.
2. Inguinal hernia: epidemiology [online database]. San Mateo, CA: Epocrates, Inc.;2010.https://online.epocrates.com/noFrame/showPage.do?method=diseases&MonographId=723 &ActiveSectin Id=23. Accessed July 14, 2010.
3. Schneider E. Inguinal hernia. Excerpt from The 5-Minute Pediatric Consult. Health GradesInc.; 2008.www.wrongdiagnosis.com/i/inguinal-hernia/book-diseases-20a.htm. Accessed January 26, 2011.
4. Brandt ML. Pediatric hernias. Surg Clin North Am, 2008 Feb; 88(1): 27-43, vii-viii. PMID: 18267160.
5. Rutkow IM. Demographic and socioeconomic aspects of hernia repair in the United States in 2003. Surg Clin North Am, 2003 Oct; 83(5): 1045-51, v-vi. PMID: 14533902.
6. Zhao G, Gao P, Ma B, et al. Open mesh techniques for inguinal hernia repair: a meta-analysis of randomized controlled trials. Ann Surg, 2009 Jul; 250(1): 35-42. PMID: 19561484.
7. Sherwinter DA, Lavotshkin S. Hernia inguinal repair, open: treatment & medication. eMedicine. Updated 2009 Jul 24. http://emedicine. medscape.com/article/1534281-treatment. Accessed January 26, 2011.
8. Jacobs DO. Mesh repair of inguinal hernias--redux. N Engl J Med, 2004 Apr 29; 350(18): 1895-7. PMID: 15107484.
9. Christiano M. P. Claus, MD, PhD, Gabriela M. Rocha, MD, Antonio C. L. Campos, MD, PhD, Joao A. N. Paulin, MD, and Julio C.U. Coelho, MD, PhD. Mesh Displacement After Bilateral Inguinal Hernia Repair With No Fixation: background and objectives, 2017; 1-2.
10. Reiner, Mark A., and Erin R. Bresnahan. "Laparoscopic total extraperitoneal hernia repair outcomes." *JSLS: Journal of the Society of Laparoendoscopic Surgeons*, 2016; 20.3.
11. Momin, Rehan Sabir, Sadiq Hussain, and Shadan Quadri. "Laparoscopic Inguinal Hernia, Hernioplasty." *Laparoscopic tep versus open hernioplasty: a comparative study of extraperitoneal tension free mesh repairs in inguinal hernia*, 2015; 8877.
12. Pawar, Tushar, et al. "A comparative study of laparoscopic total extraperitoneal repair technique versus open tensionfree (lichtenstein) repair technique for uncomplicated primary unilateral inguinal hernia." *Indian Journal of Applied Research*, 2018; 8.1.
13. Nsadi, Berthier, Olivier Detry, and Willy Arung. "Inguinal hernia surgery in developing countries: should laparoscopic repairs be performed?." *The Pan African Medical Journal*, 2017; 27.
14. Berndsen, Marta Rós. *A prospective study on the short-and long-term outcome of inguinal hernia surgery*. Diss, 2017.
15. Ielpo, Benedetto, et al. "A prospective randomized study comparing laparoscopic totally extra peritoneal (TEP) versus Lichtenstein repair for bilateral inguinal hernias." *The American Journal of Surgery*, 2017.
16. Pisanu, Adolfo, et al. "Meta-analysis and review of prospective randomized trials comparing laparoscopic and Lichtenstein techniques in recurrent inguinal hernia repair." *Hernia*, 2015; 19.3: 355-366.
17. Nawaz, Allah, et al. "Comparison of Laparoscopic Total Extraperitoneal Repair With Lichtenstein Repair In Inguinal Hernia." *Journal of Surgery Pakistan (International)*, 2015; 20: 2.
18. Lundström, K-J., et al. "Patient-reported rates of chronic pain and recurrence after groin hernia repair." *BJS*, 2018; 105.1: 106-112.
19. Bansal, Virinder Kumar, et al. "Learning curve in laparoscopic inguinal hernia repair: experience at a tertiary care centre." *Indian Journal of Surgery*, 2016; 78.3: 197-202.
20. Hanif, Zulfiqar, Sajid, Pandya, Shanmugarajah & Mahmud. "Modification of standard laparoscopic total extra peritoneal hernia repair technique: Methods to improve feasibility in the UK health service." *International Journal of Surgery Open*, 2017; 9: 45-47.