ORIGINAL RESEARCH PAPER
Volume-6 | Issue-10 | October-2017 | ISSN No 2277 - 8179 | IF : 4.176 | IC Value : 78.46
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

Pre-Peritoneal Mesh Repair Via Open Approach Versus Laparoscopic Totally Extra Peritoneal (TEP) Repair: A Comparative Study

General Surgery

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ABSTRACT

Aim : To compare the effectiveness and safety of Laparoscopic Totally Extra Peritoneal repair versus Open Pre-Peritoneal mesh repair in inguinal hernia.

Materials and methods: A prospective, randomized, comparative study was conducted on 100 patients of inguinal hernia in the Surgery department, Sanjay Gandhi Memorial Hospital, Delhi from January 2015 to December 2016. Patients were randomly assigned to two groups. Fifty Patients of group A underwent Laparoscopic Totally Extra Peritoneal (TEP) Mesh repair and those of group B underwent Open Preperitoneal Mesh repair. Various evaluation parameters were recorded for both groups and data was analysed using SPSS. For qualitative data, Chi-square and fisher exact test were used; student's t test or Mann Whitney U tests were used to compare quantitative variables. *p* value less than 0.05 was considered as significant.

Results: Laparoscopic TEP repair is better than open pre-peritoneal repair in terms of post-operative pain score (3.4 ± 1.34 *vs* 4.14 ± 0.86), duration of hospital stay (2.14 days *vs* 4.24 days), time to return to normal activity (5.28 *vs* 8.16 days) and time to resume work (11.2 *vs* 16.16 days).

Conclusions: TEP approach is superior to open pre-peritoneal approach in terms of post-operative pain, wound infections, cosmesis, duration of hospital stay, time to return to normal activity and work.

KEYWORDS

TEP; Open pre-peritoneal mesh repair; Inguinal hernia, open hernia repair, laparoscopic hernia repair

INTRODUCTION

Hernia, an abnormal protrusion of an organ or tissue through a defect in its surrounding wall is a very common surgical problem.[1] Various sites in the body are vulnerable to the occurrence of hernia, but the abdominal wall particularly the inguinal region is most commonly involved region.[2]

The history of hernia surgery dates back to the sixteenth century, when few unillustrated hernia books were published like Pierre Franco's *Petit Traité Contenant une des Parties Principalles de Chirurgie (1556)*. Since then significant advancements have been made in the field of hernia repair. These days, repair of inguinal hernia is one of the commonest surgical procedure worldwide.[3] Bassini and Lichenstein are some of the pioneering techniques, but both have their drawbacks[4,5,6,7]. A number of newer procedures in surgery of hernia are evolving continuously in order to improve the overall outcomes following hernia over last few decades.

Transversalis fascia is the sole support of posterior inguinal wall. Therefore strengthening of transversalis fascia with prosthetic material i.e mesh has gained popularity, approval and support by surgeons worldwide[8].

Pre-Peritoneal Mesh placement has become one of the most popular methods and is done using two approaches - Open or Laparoscopic.

Open technique for pre-peritoneal inguinal henia repair was popularized by NYHUS and STOPPA using concept of pre-peritoneal reinforcement of fascia transversalis over the MyoPectineal Orifice by prosthetic mesh.[9] It is reported to be cost effective, safe and has a short learning curve compared to the laparoscopic total extra-peritoneal pre-peritoneal technique. It is associated with lesser chronic post-operative pain than the Lichtenstein's technique due to the placement of mesh in the pre-peritoneal space as it avoids direct regional nerve dissection and their exposure to bio-reactive synthetic mesh.

Laparoscopic inguinal hernia repairs are performed with placement of a synthetic mesh into the pre peritoneal space which can be done using two approaches: the Trans-abdominal Pre-peritoneal Approach (TAPP) or the Totally Extra Pre-Peritoneal Approach (TEPP).[10]

The present day technique of laparoscopic hernia repair has evolved from Stoppa's concept of pre-peritoneal reinforcement of fascia transversalis over the MyoPectineal Orifice by prosthetic mesh.[9] In TEPP peritoneal cavity is not breached and the entire dissection is performed in the extra-peritoneal space. Laparoscopic repair is reported to be more difficult then open repair along with a much longer learning curve.[11]

The present study aims to compare the effectiveness and safety of Laparoscopic Totally Extra Pre - Peritoneal repair versus Open Pre-Peritoneal mesh repair in inguinal hernia with respect to many broad parameters which are outlined in further sections.

MATERIALAND METHODS

A prospective, randomized, comparative study was conducted on 100 patients of Inguinal Hernia in the Department of Surgery, Sanjay Gandhi Memorial Hospital, Mangolpuri, govt. of NCT of Delhi starting from January 2015 to December 2016. This study was approved by the Hospital Ethical and Scientific Committees of Sanjay Gandhi Memorial Hospital, New Delhi. Informed consent for Anaesthesia and Surgery were taken from each patient in their native

language.

Patients were randomly assigned to two groups A and B using online random number generator (http://stattrek.com/statistics/random-number-generator.aspx)[12]. This study was done in consultation with an independent statistician. Fifty Patients of group A were subjected to Laparoscopic Totally Extra-preperitoneal (TEPP) Mesh placement and Fifty patients of group B were subjected to Open Preperitoneal Mesh placement

Methods of Preperitoneal Mesh Placement:

Group A - Laparoscopic TEPP Approach

Initial access to the pre-peritoneal space was gained via a short infraumbilical incision. The space was created using glove fingers on a laparoscopic suction irrigation using saline canula. The pre-peritoneal space was maintained by insufflation of carbon dioxide at 12-14 mm Hg. After this Hassan's Trocar was introduced in the same infraumbilical incision (Port 1). A 10 mm 30 degree laparoscope was introduced through this port. Two 5 mm ports, one 1 cm above pubic symphysis (Port 2) and the other midway between the first two ports (Port 3) was made. The pubic bone, Coopers Ligament, Inferior EpigastrIc Vessels and the hernia sac alongwith the Cord Structures were identified. The sac was dissected and reduced and polypropylene 15 x 15 cm mesh placed. Mesh was fixed in all the cases with tackers to the Coopers Ligament. The mesh covered all the hernial orifices. In bilateral cases both sides were operated at the same sitting.

Group B - Open Approach

A transverse incision was made two finger-breadths above the pubic tubercle and deepened through the anterior rectus sheath (Pfannensteil Incision). The rectus muscle was retracted laterally to expose the inferior epigastric vessels, which were ligated and divided. This properly exposed the preperitoneal plane. The hernia sac was reduced and polypropylene 15 x 15 cm mesh was then placed covering all the hernia sites. Then the peritoneum was allowed to return to its normal position. The mesh separated the peritoneum from the hernia sites. Closure was done in layers. Bilateral repair was done in patients having bilateral hernia.

Evaluation Parameters:

A. Total operative time.
It included:
1. Time taken for dissection and separation of hernial sac.
2. Time taken for placement of mesh.
3. Total operative time.

B. Intra –operative parameters:
1. Hemorrhage
2. Peritoneal tear
3. Vas injury
4. Any other complication.

C. Early Post operative parameters:
1. Post operative pain scored from 0-10 on a Visual Analogue Scale (VAS) on post-op days 0, 1 and 2.
2. Length of hospital stay: patients were kept in surgery post-operative ward for a minimum of 2 days. But the total length of stay will be individualised as per their needs.
3. Urinary retention
4. Ileus
5. Scrotal edema
6. Time to resume normal activity (in days).
7. Time to resume work in days.

D. Late Post-op Parameters and Follow up:
Patients were followed upto a minimum of 6 months after the surgery. Follow up would be done in the surgery outpatient department at 7 days, 1 month, 6 months and 12 months from the date of surgery. Those who were not reported back in the OPD were contacted on phone. Following parameters were evaluated:

a. Wound infection.
b. Chronic groin pain and its assessment on visual analogue scale (VAS)
It is a psychometric response scale which can be used in questionnaires. It is a measurement instrument for subjective characteristics or attitudes that cannot be directly measured. Using a ruler, the score is determined by measuring the distance (mm) on the 10 cm line between the no pain anchor and the patients mark providing a range of scores from 0-100. A higher score indicated greater pain intensity.
No pain (0-4 mm)
Mild pain (5-44 mm)
Moderate pain (45-74 mm)
Severe pain (75-100 mm)
The scale had shown to the patient otherwise it is an auditory scale, not a visual one.
b. Any other complication such as seroma, ischemic orchitis etc
c. Cosmesis.
d. Recurrence.
e. Cosmesis.

Statistical Analysis

The data thus obtained was entered on MS Excel 2010 sheet. The data was analysed by using Statistical Package for social services (v.20). The categorical variables were presented as percentage. Means and SD or median was analysed for quantitative data. For qualitative data, Chi-square and fisher exact test was used as test of significance. Student's test or Mann Whitney U tests were used to compare for quantitative variables. A p value of less than 0.05 was considered as statistically significant.

RESULTS

1. The mean (± SD) duration Unilateral TEP surgery was 65.05 (± 9.129) and by open approach was 50.24 (± 12.27) minutes. This difference in duration of surgery was statistically significant between the TEP and open approach groups. The mean (± SD) duration of surgery by bilateral approach in TEP group was 79.89 minutes (± 8.24) and open approach was 65.25 (± 12.42) minutes. This difference in duration of surgery was statistically significant between the TEP and open approach groups. (Table 1)

Duration of surgery	TEPP Mean ± SD	Open approach Mean ± SD	T value	P value, Sig
Unilateral	65.05 ± 9.129	50.24 ± 12.27	6.324	0.000, Sig
Bilateral	79.89 ± 8.24	65.25 ± 12.42	5.44	0.027, Sig

Table 1. Distribution of the study group according to duration of surgery

2. The mean (± SD) VAS score on post operative day – 1 was 5.7 (± 0.91) in TEP group and 6.24 (± 0.797) in open approach group. About 40% of the TEP patients had a score of 6 and 40% in the open approach group had score of 7. There was a statistically significant difference in VAS pain score on post operative day – 1 between the TEP and Open approach group.(Figure 1)

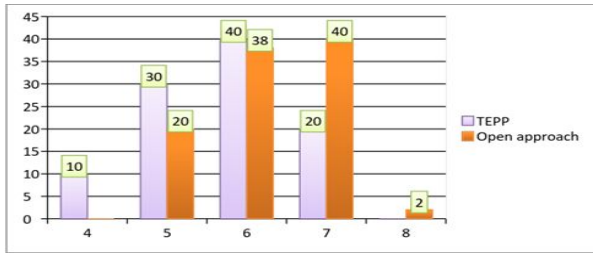

Figure 1. Distribution of the study group according to Pain score post operative day – 1

3. The mean (± SD) VAS score on post operative day – 2 was 3.4 (± 1.34) in TEP group and 4.14 (± 0.86) in open approach group. About 28% of the patients in TEP group and 40% in open approach group had a score of 5. This difference in pain scores was statistically significant between the TEP and open approach groups. (Figure 2)

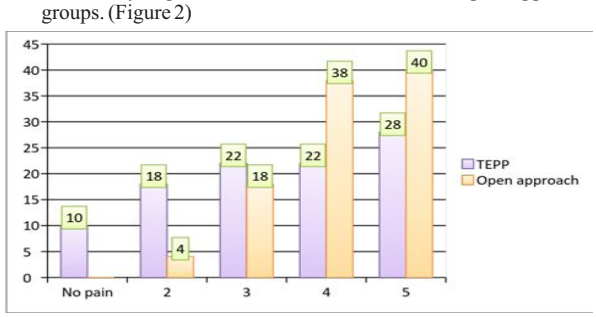

Figure 2. Distribution of the study group according to Pain score post operative day - 2

4. About 62% of the study subjects in TEP group required once oral above the routine doses of analgesic. About 44% of the open approach patients had used analgesic more than once oral in open approach group. There was a statistically significant difference between the analgesic requirement above routine doses. (Figure 3)

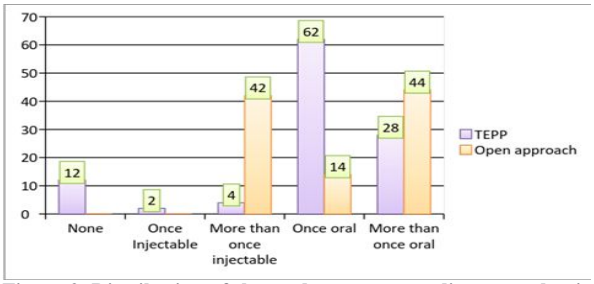

Figure 3. Distribution of the study group according to analgesic requirement above routine doses

5. The mean duration of hospital stay in TEP group was 2.14 days and 4.24 days in open approach group. There was a statistically significant difference in mean hospital stay of TEP and open approach group. (Figure 4)

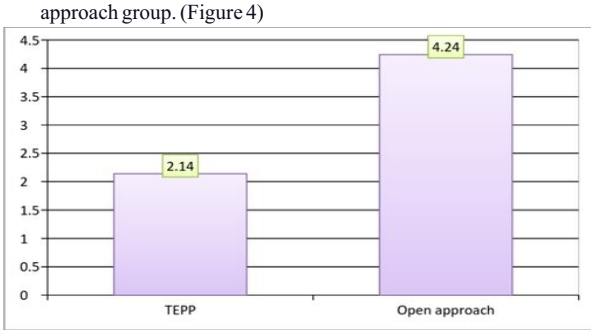

Figure 4. Distribution of the study group according to duration of hospital stay in days

6. In TEP group, the time to return to normal activity was 5.28 days and 8.16 days in open approach group. There was a statistically significant difference in time to return to normal activity was statistically significant between the TEP and open approach. (Figure 5)

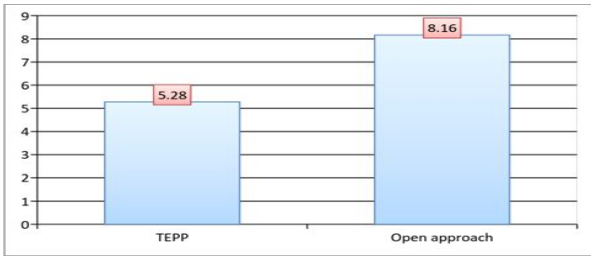

Figure 5. Distribution of the study group according to time to normal activity in days

7. In TEP group, the time to work was 11.2 days in TEP group and 16.16 days in open approach group. There was a statistically significant difference between the time to work in days between the TEP and open approach groups. (Figure 5)

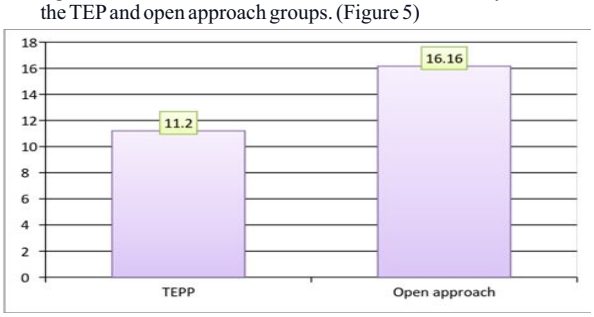

Figure 5. Distribution of the study group according to time to work in days

8. In TEP group, all the patients had no complications during follow up at one month. In open approach group, no complication was reported in 78% of the patients, poor cosmesis was reported in 14% of the patients and persistent pain in 8% of the patients. This difference was statistically significant between the TEP group and Open approach groups. (Figure 6)

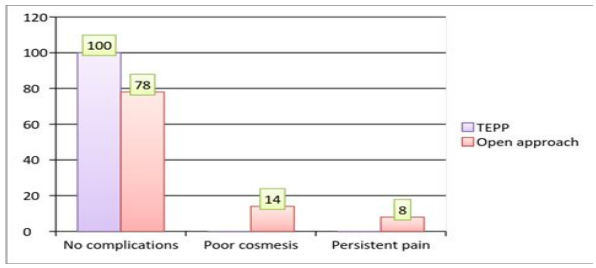

Figure 6. Distribution of the study group according to follow up at one month

9. After six months of follow up, all the patients had reported no complications. In Open approach group, 90% of the patients had no complications and 10% had poor cosmesis. This difference was statistically significant between the TEP and open approach groups. (Figure 7)

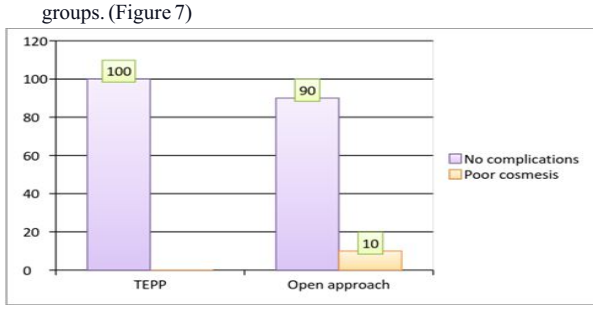

Figure 7. Distribution of the study group according to follow up at six months

DISCUSSION

Our study has shown that:

1. The outcome of Laparoscopic TEP repair and Open Pre-Peritoneal repair were comparable in terms of time to start oral feed after surgery.
2. TEP group was better with lesser number of complications such as post operative pain and wound infection than the Open Pre-Peritoneal approach. Our findings agree with those of Gokal P et al[13], Rao et al[14], Jeelani et al[15] and More et al[16].
3. Cosmesis was better in Laparoscopic TEP repair than the Open Pre-Peritoneal approach.
4. Open Pre-peritoneal is better than laparoscopic TEP repair in terms of operative time. These findings are similar to those of Gokal P et al[13], Hamza et al[17] and Bar et al[18].
5. Laparoscopic TEP repair is comparable to Laparoscopic TEP repair in terms of recurrence rates.
6. Laparoscopic TEP repair is better than open pre-peritoneal repair in terms of post-operative pain score, duration of hospital stay, time to return to normal activity and time to resume work.
7. But this study is not without limitations. The sample size was smaller to compare the two surgical techniques. Though this study has brought out many important facts about the hernia surgery, in future the researchers can take up more studies to compare these techniques.

CONCLUSION

The results of the study shows that TEP is superior to open pre-peritoneal approach in terms of :

1. Post operative pain
2. Wound infection
3. Cosmesis
4. Duration of hospital stay
5. Time to return to normal activity

6. Time to return to work

However longer operative time, longer learning curve and cost-effectiveness are the limitations for TEP repair.

REFERENCES

1. Wantz GE. Abdominal wall hernias. In: Schwartz SI, editor. Principles of Surgery. 7th ed. New York, NY: McGraw-Hill; 1999: 1585-611.
2. Malangoni MA, Rosen MJ. Hernias. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL, editors. Sabiston Textbook of Surgery. Pennsylvania, PA: Saunders Elsevier; 2010: 1155: 1160-1.
3. Heikkinen TJ,Haukipuro K, Hulkko A. A cost and outcome comparison between laparoscopic and lichenstein hernia operations in a day-care unit. A randomized prospective study. Surg Endosc 1998; 12:1199-203.
4. Johnson J, Roth JS, Hazey JW, Pofahl WE. The history of open inguinal hernia repair. Curr Surg : 2004; 61:49-52.
5. Amid PK. Groin hernia repair: open techniques. World J Surg. 2005; 29:1016-1051.
6. Amid PK. Lichtenstein tension-free hernioplasty: its inception, evolution and principles. Hernia 2004; 8:17.
7. Poobalan AS, Bruce J, King PM. Chronic pain and quality of life following open inguinal hernia repair. Brj Surg 2001, 88: 1122-26.
8. Ramshaw B, Abiad F, Voeller G. polyester (Parietex) mesh for total extraperitoneal laparoscopic inguinal hernia repair: initial experience in the United States. Surg Endosc. 2003;17:498-501.
9. Stoppa RE. The pre-peritoneal approach and prosthetic repair of groin hernias. In: Nyhus LM, Condon RE, Editors. Hernia. 4th ed. Philadelphia, PA: JB Lippincott; 1995. PP. 188-210.
10. Wantz GE. Preperitoneal hernioplasty with unilateral giant prosthetic reinforcement of the visceral sac. Contemp Surg 1994; 44:83-89.
11. Wright D. The learning curve for laparoscopic hernia repair. Semin Laparosc. Surg 1998; 5: 227-232.
12. Harvey Burman. StatTrek.com 2016. http:/stattrek.com/statistics/random-number - generator.aspx [accessed on 25/10/2014].
13. Gokalp A, Inal M, Maralcan G, Baskonus I, A prospective randomized study of Lichtenstein open tension free versus laparoscopic totally extraperitoneal techniques for Inguinal Hernia repair, Acta chir belg, 2003, 103, 502-506.
14. Rao AMK, Trans-abdominal Preperitoneal (TAPP) Vs Total Extra-peritoneal (TEP) Laparoscopic Inguinal Hernia Repair; A Comparative Study in terms of Operative and Postoperative Complications, PJMHS: 2014: Apr – Jun: 8: 2: 356 – 360.
15. Jeelani S, Ahmad MS, Dar HM, Abbass MF, Mushtaq A, Ali U, A comparative study of trans-abdominal peri-peritoneal verses totally extra peritoneal mesh repair of inguinal hernia, AMR, 2015: 1: 2: 57- 61.
16. More MP, Nasta AM, More RM, Shedge R, Comparison of Laparoscopic TAPP (Trans-abdominal Pre-peritoneal) and Laparoscopic TEP (Totally Extra peritoneal) Techniques for Inguinal Hernia Repair- An Observational Study of 60 Cases, IOSR – JDMS: 2016: July: 15: 7: II: 90 – 93.
17. Hamza Y, Gabr E, Hammadi H, Khalil R, Four arm randomized trial comparing laparoscopic and open hernia repairs, International Journal of Surgery: 2010: 8: 25–28.
18. Bae SU, Min BS, Baik SH, Kim NK, Hur H, Single port laparoscopic total extraperitoneal inguinal hernia repair without fixation of the mesh, Journal of Minimally Invasive Surgery:2016: 19: 1: 25 – 31.