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TOTAL EXTRAPERITONEAL VS TRANS ABDOMINAL PRE PERITONEAL REPAIR FOR INGUINAL HERNIA: A COMPARITIVE STUDY

General Surgery

Dr. Vivek Kumar Asssociate Professor, S. N. Medical College, Agra, Uttar Pradesh, India

Dr. Divya Tomar Junior Resident, S. N. Medical College, Agra, Uttar Pradesh, India.

Dr. Prateek Jain Junior Resident, S. N. Medical College, Agra, Uttar Pradesh, India.

Dr. Kanika Bora Junior Resident, S. N. Medical College, Agra, Uttar Pradesh, India.

ABSTRACT

Introduction: Inguinal hernia, a condition where intra-abdominal viscera protrude through the inguinal canal, is most common among hernias, particularly in men. Various surgical techniques, including Shouldice's herniorrhaphy, Lichtenstein's open mesh hernioplasty, and laparoscopic approaches, are used for repair. Laparoscopic methods, such as Transabdominal Preperitoneal (TAPP) and Total Extraperitoneal (TEP), have gained popularity due to their reduced postoperative pain and recurrence rates. **Aim:** This study aims to compare the safety and postoperative outcomes of laparoscopic TAPP and TEP repairs for inguinal hernia. **Materials And Methods:** A prospective comparative study was conducted with 124 male patients, aged 25-65 years, undergoing either TAPP or TEP repair. Immediate postoperative complications, hospital stay duration, recurrence rates, and intraoperative time were compared between the two groups. The study's sample size was calculated using standard formulas, and patients were followed up at 7 days, 30 days, and 6 months post-surgery. **Conclusion:** The study found no significant difference in early and late postoperative complications or hospital stay between TAPP and TEP. However, TEP was associated with shorter operative times. Both techniques are effective and safe for inguinal hernia repair, with the choice of procedure potentially influenced by operative time and surgeon preference. Further studies with larger sample sizes are needed to confirm these findings.

KEYWORDS

Inguinal hernia, TAPP repair, TEP repair, laparoscopic hernioplasty, postoperative outcomes.

INTRODUCTION

The protrusion of intra abdominal viscera or part of viscera through inguinal canal is known as inguinal hernia. There are many types of hernia and inguinal is most commom among them, men are more commonly affected by inguinal hernia.[1] Incidence of hernia is between 5% and 7%. The prevalence is higher in developing countries like India, where most population is involve in farming, construction work, and heavy lifting. Inguinal hernias accounts for roughly 75% of all groin hernias.[2,3]

Over the past century, over a hundred different procedures for inguinal hernia have been described, and no single technique has been found to be superior to the other. Following techniques are commonly used in todays practive :

(1) Shouldice's Herniorrhaphy- it involves double breasting of conjoint tendon and inguinal ligament.
(2) Lichtenstein's open mesh hernioplasty- In this technique mesh is used to over the defect to cover it, this helps in strengthening the repair.
(3) Laparoscopic posterior mesh hernioplasty.

Regarding necessary equipment, learning curve, recurrence rates, complications, post op recovery time, and rates of occurence of pain either chronic or acute, each technique has pros and cons of its own. Nonetheless, using mesh to repair inguinal hernias has become commonplace in recent years. This is because, in addition to faster recovery periods and less postoperative pain, the recurrence rates with mesh repairs have been decreased from over 15% with tissue repairs to less than 1%. [5]

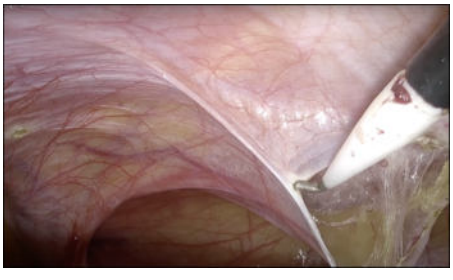

Image 1 Entry into pre peritoneal space in TAPP repair

Ralph Geer pioneered surgery using the laparoscopic method for repair of inguinal hernia. [6] These days, transabdominal preperitoneal (TAPP) and total extraperitoneal (TEP) repairs are most frequently performed laparoscopic procedures. A synthetic mesh and general anesthesia are needed for both surgeries. Whereas TEP approaches the hernia site via the preperitoneal plane, placing the mesh outside the peritoneum, TAPP accesses the hernia site through the peritoneal cavity. By using these techniques, the entire inguinal floor can be seen, making any femoral hernias or direct or indirect hernias visible.[7]

Laparoscopic repair is recommended by surgeons who endorse it for both bilateral and recurring hernias. Laparoscopic procedures allow for the simultaneous correction of bilateral hernias as well as the detection of any undiagnosed hernias on the opposing side. The TAPP method works especially well for swiftly identifying contralateral hernias. [8]

A meta-analysis of studies done by Yang et al. , compared repair of recurrent inguinal hernias using laparoscopic and Lichtenstein technique found decreased rates of wound infection and persistent discomfort in patients receiving laparoscopic treatment.[9]

Image 2 Mesh placement in TEP repair

A major prospective study was carried out by Köckerling et al. with 10,887 patients in the group undergoing TEP repair and 6,700 subjects in TAPP group. Their multivariable analysis does not show major differences in rates of intraoperative and general postoperative complications between TEP and TAPP. [10]

A comparative research by Vírcuae et al. with 36 TAPP and 34 TEP cases found that the TAPP group experienced two bleeding episodes that were treated by laparoscopic closure of the injured arteries. Three TEP cases and eight TAPP cases both had postoperative testicular edema.The authors concluded that no significant complications occurred, although there were a few minor issues related to the distinctions between TEP and TAPP. [11]

Bansal et al. conducted RCT compairing TEP and TAPP in which they found that whilst the frequency of formation of seroma was higher in

TEP, Longer surgery times, cord edema, and early postoperative discomfort were all significantly higher in TAPP patients. The two were priced similarly. [12]

Different studies have reported different results for the two methods; some have found them to be similar, while others have found TEP to be superior. The selection of surgery is contingent upon a number of patient variables. There is a dearth of information in India, especially in the north, contrasting these two surgical techniques. We therefore chose to carry out this investigation.

Aim And Objectives

Aim: To compare safety and post-operative outcomes in laparoscopic TAPP repair and laparoscopic TEP repair performed for inguinal hernia.

Objectives:

1. Comparison of immediate postoperative complications.
2. To compare postoperative hospital stay.
3. To compare recurrence rate.
4. To compare intraoperative time.

Methodology

Study Design: prospective observational comparitive study

Sample Size:

We utilize the Basic Sample Size Calculation Formula to determine the sample size for a study comparing two surgical procedures.

$$n = \frac{(Z_{\alpha/2}+Z_{\beta})^2.2.\sigma^2}{(M1-M2)^2 n}$$

Here:
n = sample size
$Z_{\alpha/2}$ = Z value (the number of standard deviations from the mean) for the desired confidence level
Z_{β} = Z value for the desired power
σ = standard deviation
M1−M2 = minimum detectable difference between the two groups
n=62.72, 62 participants in each group.

Elegibility Criteria:

Inclusion Criteria:

1) Patient undergoing laparoscpic hernioplasty
2) Unilateral inguinal hernia
3) Age between 25and 65 years
4) Male patients

Exclusion Criteria:

1) Patient younger than 25 years and older than 65 years
2) pregnant women
3) history of abdominal surgery
4) recurrent hernia
5) patients with co morbidities

Criterias To Be Assessed:

1. post operative hospital stay
2. pain in postoperative period
3. hematoma formation
4. seroma formation
5. wound/superficial infection
6. scrotal edema
7. infection of mesh
8. hernia of port site
9. Recurrence

Follow Up:

All patients are followed at seven days, thirty days and 6six months.

RESULTS

Mean Age and Standard Deviation

To calculate the p-value for the difference in mean ages between the TAPP and TEP groups, we use an independent samples t-test.

Group	Mean age	Standard deviation	P value
TAPP (n = 62)	45.64	15.50	0.624
TEP (n = 62)	47.44	16.36	

Duration Of Operation And Standard Deviation

Group	1 Day Stay	2 Day Stay	Total Patients	Mean Duration of Stay (days)	p-value
TAPP	57	5	62	1.08	0.313
TEP	55	7	62	1.11	

Early Postoperative Complications

The p-value for the difference in complications between the TAPP and TEP groups was determined using the Chi square test.

Group	Duration of operation (min)	Standard deviation	P value
TAPP (n = 62)	98.34	24.98	0.049
TEP (n = 62)	90.44	18.26	

Late Postoperative Complications

To calculate p-value for the difference in complications between TAPP and TEP groups, Fisher's Exact Test is used because of the small number of events.

Complications	TAPP	TEP	Percentage TAPP	Percentage TEP	P value
Pain	4	5	6.45%	8.06%	0.729
Seroma	3	8	4.84%	12.90%	0.213
Hematoma	4	8	6.45%	12.90%	0.367
Wound infection	5	4	8.06%	6.45%	1.000
Scrotal edema	2	2	3.23%	3.23%	1.000

Post Op Hospital Stay

Complication	TAPP (n = 62)	TEP (n = 62)	Percentage TAPP	Percentage TEP	p-value
Mesh infection	1	0	1.61%	0%	0.450
Port site hernia	0	0	0%	0%	-
Recurrence	0	0	0%	0%	-

DISCUSSION

Comparison Of Mean Age

Patients in the TEP group had an average age of 47.44 years, compared to 45.64 years in the TAPP group. Despite this difference, the p-value of 0.624 suggests that the variation in the mean age between two groups is not statistically significant. This indicates that age is unlikely to have influenced the clinical outcomes between the two techniques in this study.

Duration Of Operation

In our study the duration of operation was longer for TAPP group (98.34 minutes) in contrast to TEP group in which average duration was 90.44 minutes, with a p-value of 0.049. This implies that compared to TAPP, TEP is linked to a shorter operating duration. This reduced operative time with TEP could be due to the less complex nature of the approach compared to TAPP, potentially leading to reduced overall surgical time.

The mean operating time for a one-sided total extraperitoneal repair was found to be between 50 to 185 minutes, according to Shakya et al. The average duration of bilateral TEP was 120 minutes. In contrast, unilateral Transabdominal Preperitoneal (TAPP) surgery took an average of 95.4 minutes, and bilateral TAPP repair took an average of 140 minutes, and range is from 75 to 190 minutes. [13]

The TAPP procedure has a average operation time of 52.6 ±23.5 min, according to Köckerling et al. The mean operation length of the TEP approach was much shorter, at 48.58±21.52 minutes. [10]

The operation duration in TAPP was found to be longer than in TEP in all of the aforementioned trials, albeit some of them fell short of statistical significance. These results were similar to our study. However, Vírcuae et al. observed that the TEP group had a lengthier surgery (average 74 min) than TAPP group (average 69 min). [11]

Early Postoperative Complications

The comparison of early postoperative complications reveals the following:

- **Pain**: Pain was slightly more common in TEP group (8.06%) compared to TAPP group (6.45%), though the difference is not significant statistically (p-value 0.729).
- **Seroma**: The TEP group had a higher rate of seroma production (12.90%) in contrast to the TAPP group (4.84%); nevertheless, the statistical significance of this difference is not supported by the p-value of 0.213. Seroma formation is slightly higher in TEP repair may result from pre-peritoneal space significant tissue dissection, mesh implantation, and monopolar cautery, which all trigger inflammatory reactions that lead to seroma formation.

- **Hematoma**: Hematoma occurred in 12.90% of TEP patients compared to 6.45% in TAPP patients. The p-value of 0.367 suggests that this difference is also not statistically significant.
- **Wound Infection**: The TAPP group had a slightly greater incidence of wound infection (8.06%) than the TEP group (6.45%), but the difference was not statistically significant (p-value 1.000). As peritoneum is breached in case of TAPP contact of skin with peritoneal fluid which may be infected in cases of subclinical intra abdominal infections may lead to wound infections. In TEP we did not breach the peritoneum.
- **Scrotal Edema**: Both groups had the same rate of scrotal edema (3.23%), and the p-value of 1.000 indicates no significant difference. There is no evidence that surgery increases the incidence of scrotal edema; it is a rare complication.

Early postoperative complications did not significantly differ between the two procedures, which could indicate that the immediate postoperative results of the two techniques are comparable.

In both groups, the postoperative complications were similar. Additionally, there was no difference in the rate of recurrence or return to regular activities between the two types of repair. [14] According to Köckerling et al., there are notable variations between the two surgical procedures in terms of the intraoperative complications in their large sample size study. [10]

Late Postoperative Complications

For late postoperative complications:

- **Mesh Infection**: Mesh infection occurred in 1.61% of TAPP patients and 0% of TEP patients. The p-value of 0.450 suggests that this difference is not statistically significant.
- **Port Site Hernia And Recurrence**: Both port site hernia and recurrence were absent in both groups. Therefore, statistical analysis is not applicable for these complications.

The low incidence of late postoperative complications in both groups indicates that both surgical techniques are effective in preventing such issues, although the small number of events limits the statistical power of the analysis.

Postoperative Hospital Stay

The average duration of the hospital stay was 1.08 days for TAPP and 1.11 days for TEP, with a p-value of 0.313. This difference is not statistically significant, suggesting that both techniques result in similar hospital stays. The slight difference in mean duration of stay may not have clinical significance given the p-value.

CONCLUSION

In this comparative study of TAPP versus TEP for inguinal hernia repair, several findings were observed:

1. **Mean Age**: Mean age of the two groups was comparable.
2. **Duration of Operation**: TEP was associated with shorter operating times than TAPP, which may suggest a more efficient procedure.
3. **Early Postoperative Complications**: Both techniques had comparable rates of early complications. Differences observed were not statistically significant.
4. **Late Postoperative Complications**: The incidence of late complications was low and similar across both techniques, with no significant differences.
5. **Postoperative Hospital Stay**: The duration of hospital stay was similar for both techniques, indicating no significant difference in recovery time.

Overall, both TAPP and TEP appear to be effective techniques for inguinal hernia repair with comparable safety profiles and outcomes. The choice between TAPP and TEP may be influenced by factors such as operative time and surgeon preference rather than significant differences in clinical outcomes. Further studies with larger sample sizes may be needed to confirm the above findings and explore other potential benefits or drawbacks of each technique.

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