

A PROSPECTIVE COMPARATIVE STUDY BETWEEN TRANS-ABDOMINAL PRE-PERITONEAL (TAPP) AND TOTALLY EXTRA-PERITONEAL (TEP) LAPAROSCOPIC INGUINAL HERNIA REPAIR

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ABSTRACT

Introduction: Minimally invasive techniques for inguinal hernia repair are gaining acceptance in the general population. The two well-known minimally invasive laparoscopic approaches are Trans-Abdominal Pre Peritoneal (TAPP) and Totally Extra Peritoneal (TEP) Inguinal Hernia Repair worldwide. **Objective:** The objective of this study was to compare factors pertaining to laparoscopic TAPP and TEP inguinal hernia repair approaches in terms of duration of the procedure, intraoperative conversion rate, postoperative complication rate and duration of hospitalization. **Design:** Comparative study. **Place of study:** Liaquat University Hospital Jamshoro and Minimal Invasive Surgical Centre Jamshoro. **Duration of study:** 6 months. **Methodology:** A total of 136 Inguinal Hernia were selected in this study and operated randomly by either Trans-abdominal Pre-peritoneal (TAPP) or Totally Extra-peritoneal (TEP) approach. The patient's follow-up was done for 3 weeks for proper assessment of postoperative complications. **Results:** The mean age of patients in TAPP group was 49.9 ± 12.0 and the mean age of patients in TEP group was 45.8 ± 11.2 years. No significant difference was observed in age between both groups. The mean surgery time in TEP group was significantly higher as compared to the TAPP group ($p = 0.027$) while the rate of conversion, complication rate and mean hospital stay were not statistically significant between both groups. There was no statistically significant difference in mean pain score between groups at 12 hours, 24 hours and 48 hours. **Conclusion:** It has been observed that there is no significant difference in TEP and TAPP techniques used for inguinal hernia repair in terms of outcome such as rate of conversion, complication rate, pain score and mean hospital stay. This study did not show any preference for one technique over the other therefore it is the surgeon's choice who can select the technique according to his expertise and skills.

Key Words: Inguinal hernia repair, Trans-abdominal Pre-peritoneal, Totally Extra-peritoneal

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INTRODUCTION

In recent years focus has been shifted from open surgery towards minimally invasive surgical technique for inguinal hernia repair. These methods are gaining popularity because of increased patient satisfaction and post-operative quality of life. The two well-known minimally invasive laparoscopic approaches are Transabdominal Pre-Peritoneal (TAPP) repair and Totally Extra Peritoneal (TEP) repair of Inguinal Hernia worldwide.¹ Posterior wall of inguinal canal was reinforced via laparoscopic approach. The Transabdominal approach allows the access to pre-peritoneal space via incising the peritoneum. Meanwhile, in the TEP repair, the

entire process is done without entering the peritoneal cavity.²

Trans-abdominal Preperitoneal approach for inguinal hernia repair was first elaborated by Arregui and his colleagues in the year 1992. Soon after that in 1993, another laparoscopic inguinal hernia repair approach called as Totally Extra Peritoneal was introduced by Mckernan and Laws.³ Since their introduction, studies have been done to establish the advantages of these approaches over the conventional gold standard Lichtenstein's repair.⁴ These include decreased postoperative pain, less chances to injury of spermatic cord, reduced rate of postoperative orchitis, relatively smaller recovery period as well as early return to active life. Laparoscopic

repair also have slight chances of recurrence i.e. 1.3% as opposed to open repair i.e. 9.8%. The only drawbacks are increased operative duration and need for general anesthesia.⁵

Varied researches have also been conducted to compare several factors pertaining to both the laparoscopic approaches. Researchers at Emergency County Hospital Timisiora, reported that TEP has a longer learning curve.⁶ Despite that another research at Chandka Hospital, Larkana concluded that TEP is relatively better option with minimal chances of visceral injury, adhesions and port site hernias.⁷ In a joint study at DOW University, Karachi and LUMHS, Jamshoro it has been concluded that with its reduced conversion rate and postoperative pain, TEP is beneficial for training budding surgeons.⁸ Meanwhile, TAPP is criticized due to its approach of entering the abdominal cavity that increase the possibility of injury to intra peritoneal structures even though it is easier to perform than TEP, in a research at All India Institute of Medical Sciences.⁹ However, few researchers at SGRRIMHS and SMIH, Dehradun claim the ability of TAPP for enabling perioperative diagnosis as well as identifying undiagnosed contralateral hernia.¹⁰ Though general consensus is that as far as intraoperative and postoperative complications except immediate post-operative pain are concerned, the results derived are not significant to condemn any of the approaches.¹¹⁻¹³

At present, limited studies have been conducted on the comparison of TAPP and TEP. Only a couple of researches have been carried out in Pakistan so far. There is limited number of resources and the risks of intraoperative as well as postoperative complications run high due to varied reasons. Hence, current study was proposed so that it can effectively correlate with the international findings of comparative research between various components which concern TAPP and TEP.

MATERIAL AND METHODS

The research was carried out at surgery wards, Liaquat University Hospital Jamshoro and Minimal Invasive Surgical Centre Jamshoro after approval of Ethical and advanced board. Informed and written consent were taken. Duration of study was 6 months. Study design was randomized controlled trial. Sampling technique was non-probability consecutive. All patients having Primary Unilateral Inguinal Hernia, aged 18 years or above, fit for general anesthesia selected and randomly divided into TAPP and TEP groups. Patients who have Hepatitis B or C positive, coagulopathies, uncontrolled hypertension or diabetes mellitus was excluded from the study. The sample size was 136 with 68 patients in TAPP group and 68

in TEP group. Data was collected via pre structured proforma. Inguinal Hernia was diagnosed through history, clinical examination and ultrasonography. Patients was underwent routine baseline investigations mandatory for performing surgery. Patient's follow up was done for 3 weeks. For statistical analysis SSPS 21.0 version was used. Kolmogorov-Smirnov test was applied to observe the normality. Mean and standard deviation was reported for normality distributed data and analyzed by independent sample t-test. Frequency and percentages were reported for qualitative data and analyzed by Chi-square test or Fisher exact test. $p \leq 0.05$ was considered as significant.

RESULTS

A total of 136 clinical diagnosis of Primary Unilateral Inguinal Hernia were selected in this study and operated by either transabdominal pre-peritoneal patch (TAPP) or totally extra peritoneal (TEP). The mean age of patients in group TAPP was 49.9 ± 12.0 and mean age of patients in group TEP was 45.8 ± 11.2 years. No significant difference was observed in age between both groups. The mean duration of surgery in group TAPP was 73.4 ± 14.8 whereas the mean duration of surgery in group TEP was 82.4 ± 16.2 minutes. The mean surgery time significantly longer for patients in the TEP group as compared to TAPP group ($p = 0.027$) as presented in table 1. Rate of conversion was observed in only 1 (1.5%) patient in group TEP while it was not observed in group TAPP ($p > 0.999$). Hematoma was the commonest complication that was observed in 9 (6.6%), followed by surgical site infection 7 (5.1%), impaired wound healing 3 (2.2%), seroma 2 (1.5%). The difference was not statistically significant between groups as shown in table 2. Similarly, no significant difference observed in hospital stay between both groups. The distribution of hospital stay of patients between TAPP and TEP group is presented in figure 1. Chi square test was used to compare the overall complication rate between both groups. Overall complication rate in TAPP group was 19.1%. Overall complication rate in TEP group was 13.2%. This difference was found to be statistically insignificant (p value = 0.352). (Figure 2). Comparison of mean pain score was also not statistically significant between groups at difference point time (Figure 3).

Table 1: Comparison of mean of age and duration of surgery between TAPP and TEPP groups

Variables	Group TAPP n = 68	Group TEPP n = 68	p-value
Age (years)	49.9 ± 12.0	45.8± 11.2	0.195
Duration of surgery (minutes)	73.4 ±14.8	82.4±16.2	0.027*

* Significant

Table 2: Comparison of postoperative complications between TAPP and TEPP groups

Complications	Group TAPP n=68	Group TEPP n=68	p-value
Conversion	0(0.0%)	1(1.5%)	> 0.999
Seroma	2(2.9%)	0(0.0%)	0.496
Haematoma	5(7.4%)	4(5.9%)	> 0.999
Scrotal Edema	0(0.0%)	1(1.5%)	> 0.999
Meshoma	0(0.0%)	0(0.0%)	-
Impaired wound healing	2(2.9%)	1(1.5%)	> 0.999
Surgical Site Infection	4(5.9%)	3(4.4%)	> 0.999
Reoperation	0(0.0%)	0(0.0%)	-
Overall complications	13 (19.1%)	9 (13.2%)	0.352

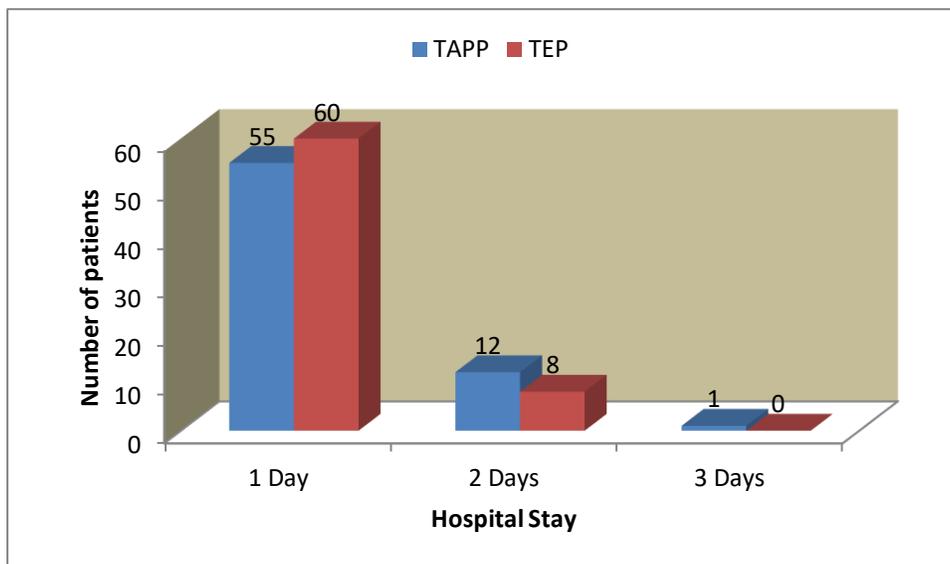


Figure 1: Comparison of hospital stays between TAPP and TEPP groups
p-value = 0.365

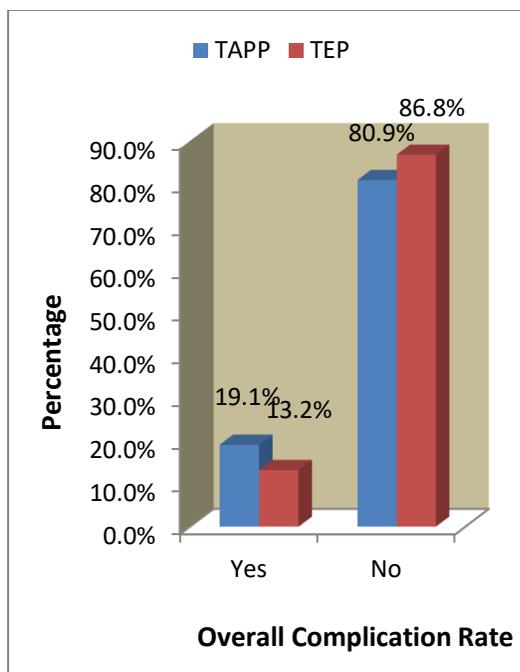


Figure2: Comparison of overall complication rate between TAPP and TEP groups

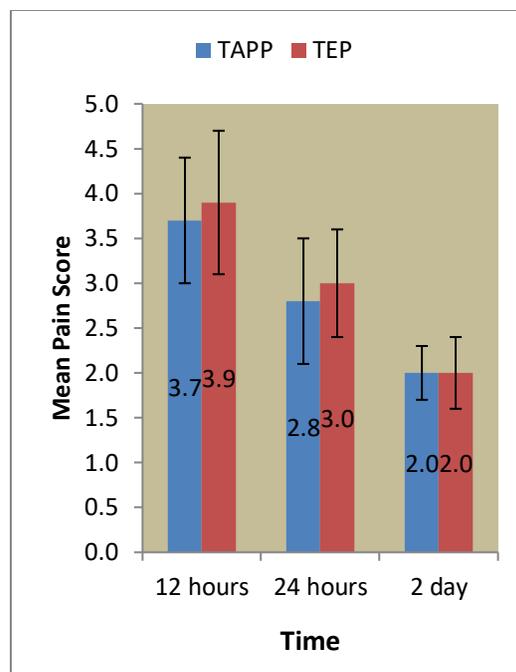


Figure3: Comparison of pain score between groups at difference point time

DISCUSSION

Laparoscopic surgery for inguinal hernia repair is gaining popularity among the general population and in new era surgeons. When laparoscopic hernia repair was compared with open technique shows no significant difference in recurrence rate, complications rate and pain in both procedures.¹⁴⁻¹⁸ Open technique is easy to learn while laparoscopic hernia repair has long learning curve. Laparoscopic techniques has many advantages over open hernioplasty. Laparoscopic hernia repair is associate with less hospital stay, early return to work, increased patient satisfaction and good quality of life. Two laparoscopic techniques are used for repair for hernia i.e. TEP and TAPP but there is controversial data available regarding superiority of one technique over the other. TAPP is easy to learn but abdominal cavity is entered and mesh is placed in preperitoneal space to cover the all hernia orifices at inguinal region. TEP has long learning curve and less postoperative pain as compared to TAPP; in this technique mesh is placed in preperitoneal space without entering into peritoneal cavity and there is less chances of damage to intrabdominal organs and post-hernioplasty intestinal obstruction due to adhesions.¹⁴⁻¹⁶ Several studies has been done for comparing TEP and TAPP including and met analysis of randomized controlled trials worldwide without making census of superiority of one technique over the other.¹⁵⁻¹⁷ This current study had been performed to find out the superiority of one technique over the other for inguinal hernia repair.

All the patients in this study were male. This reflects the gender specific incidence of inguinal hernia in general population. The mean age of patients in group TAPP was 49.9 ± 12.0 and mean age of patients in group TEP was 45.8 ±

11.2 years. No significant difference was observed in age between both groups. Relatively younger and middle aged patients could be explained by theselection of the unilateral, uncomplicated, primary inguinal hernia cases for the study.

In present studymeans operative time was less in laparoscopic TAPP repair than in laparoscopic TEP repairand it was statistically significant. This study coincides with other similar studies. This could be explained by the fact that TAPP is considered slightly easier since the operation is intra-peritoneal and surgeons are more familiar with intra-abdominal anatomical structures.²¹ Some studies also contradicts with present study andduration of TEP surgery was significantly higher than TAPP. TEP repair has longer duration of surgery. The reasons behind these results arethat TEP is technically difficult and less familiarity of surgeons with anatomy in preperitoneal space.²²

In this study rate of conversion was observed in only 1.5% in group TEP while it was not observed in group TAPP. The conversion rate in TEP is variable.²³⁻²⁸ Study finding was supported by the study done by Zeineldinet al. who also had 2 cases of TEP being converted to TAPP because of entry into the peritoneum while creating the TEP plane.¹⁶but this complication can be prevent by careful dissection and respecting anatomical structures.^{24-26, 28} In a study done by Tamme et al.also conclude that there is no significant difference in conversion rate in both techniques and it was observed in 0.24 % cases.²³⁻²⁷

In current study we compared the post-operative pain at 12 hour, 24 hour and 2days. Visual

analogue scale (VAS) was used to score the pain. Comparison of mean pain score was also not statistically significant between groups at difference point time. This may be due to the residual effect of general anesthesia in both the groups and use of good analgesics. Our results are comparable with study done by Tolver et al. which observed that there is no significant difference among TEP and TAPP for inguinal hernia repair²⁹ In a study done by Gurung et al. showed that postoperative pain were significantly higher in TAPP group.²²

Overall complication rate in TAPP group was 19.1% and 13.2% in TEP group but there was no statistically significant difference found in both groups. Scrotal edema, seroma or hematomas are known complications of open as well as laparoscopic hernia surgery. Many factors are responsible for such complications such as hernia with a large sac, reoperation for a recurrent hernia, and the surgical proficiency as well. Hematoma was the commonest complication that was observed in 9(6.6%) patients in present study; out of which 5 cases were in TAPP group while 4 cases were in TEP group. Different results were observed in a study done by Wake et al. in which there was only one case of haematoma out of 28 patients who underwent TAPP repair while no patient had haematoma in TEP group which comprised of 24 patients.²⁰ In current study seroma was found in 2 patients in TAPP group while no seroma was seen TEP group and they were statistically insignificant. Our finding was supported by the study of Zeineldin A which showed 2 cases of seroma in TAPP and 4 in TEP, which was also insignificant statistically.²¹ In this study 4 cases had surgical site infection, 2 had impaired wound healing in TAPP group while 3 cases showed surgical site

infection and 1 case showed impaired wound healing in TEP group. Comparable results were seen in a study done by Wake BL et al²⁰

CONCLUSION

It has been observed that there is no significance difference in TEP and TAPP techniques used for inguinal hernia repair in terms of outcomes such as rate of conversion, postoperative pain, complications rate and mean hospital stay. This study did not show any preference of one technique over the other therefore it is surgeon's choice who can select the technique according to his expertise and skills.

ETHICAL APPROVAL

The protocol for the study was approved by the institutional ethics committee

CONFLICT OF INTEREST

Authors declared no conflict of interest

DISCLOSURE

This is thesis based article. Thesis has been submitted by Dr RafiaUnar for partial fulfilment of Master of Surgery at Liaquat University of Medical and Health Sciences Jamshoro

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PATIENT CONSENT

Consent of the patients was taken prior to the writing of the manuscript.

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