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A Study of Laparoscopic Totally Extra-Peritoneal MESH Repair of Inguinal Hernia and Trans Abdominal Pre-Peritoneal Mesh Repair of Inguinal Hernia

[1]Seelam Paparao and [2]K. Harikrishna Reddy

[1]*Department of General Surgery, Father Colombo Institute of Medical Sciences, Warangal, India*

[2]*Department of General Surgery, Dr Patnam Mahender Reddy Institute of medical sciences, Chevella, India*

ABSTRACT

This study is a prospective non-randomized case control study on 50 consenting patients presenting with inguinal hernia. TAPP repair is taking more time than TEP repair. Most of the surgeries both TAPP and TEP repair fall into 60-90 mins' operative time group. In both TAPP and TEP repair groups, there are no intra-op complications such as bowel injury, hemorrhage and injury to cord structures. There was no conversion in case of TAPP repair to OHR and there were 5 conversions from TEP to TAPP due to peritoneal breach. P value being 0.001, highly significant. In present study, there were 2 cases of infection in the TAPP re-pair group comparing to none in TEP repair group. In case of seroma formation 8(32%) cases in TAPP repair group compared to 4(16%) cases in TEP repair group. There were no cases of urinary retention in both TAPP and TEP repair group. P value being 0.001, highly significant. In present study, most of the patients were discharged in 1st post op day itself, TAPP 6 (24%) and TEP 16 (64%). But TEP operative group has more discharges than TAPP, 64% compared to 24%. In post op day 14 (56%) patients and 6 (24%) patients in TAPP and TEP group respectively. In post op day 3, each group had 3 discharges. In post op day 4 or more, 2 patients were discharged. Most of the patients of TEP group were discharged in post op day 1 and such as in TAPP group on post op day 2. P value being 0.045 which is significant.

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Key Words
Inguinal hernia, TAPP repair, TEP repair

Corresponding Author
K. Harikrishna Reddy,
Department of General Surgery, Dr Patnam Mahender Reddy Institute of medical sciences, Chevella, India

Author Designation
[1-3]Assistant Professor

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INTRODUCTION

The word hernia has become a household term due to its occurrence in all age groups. The occurrence of groin hernias is so common that the overall lifetime risk of developing one is 15% in male and about 5% in female. Despite such high incidence, the knowledge about the various complications associated with a hernia is not that widely made aware among the public as the condition itself[1]. The complications are associated with considerable morbidity and mortality. Inguinal hernia repair has been one of the most common operations performed by General Surgeons for years. Inguinal hernias emerge from the myopectineal orifice of Fruchaud. Hernia recurrences because of excessive tension on suture line, surgeons sought a way to create a tension free repair. The polypropylene mesh which is non-carcinogenic, non-allergic, non-inflammatory was introduced. Potential complications after primary inguinal repair include hemorrhage, severed vas deferens, nerves and testicular blood supply, visceral injury to bowel, bladder and vessels. Post-operative wound infection, hemorrhage, hydrocele, ischemic orchitis, neuralgia and testicular atrophy. The most significant advances to impact inguinal hernia repair have been the addition of prosthetic materials to conventional repair and the introduction of laparoscopy to general surgical procedures. The tension free repair has become dominant method of inguinal hernia repair. Recognizing that tension in a repair is the principal cause of recurrence. The era of tissue based repair was supplanted by tension free repairs with wide spread acceptance of prosthetic material for inguinal floor reconstruction[2]. Initially described by Liechtenstein, the repair involved placement of a marlex mesh over the entire floor of the inguinal canal. Laparoscopic inguinal hernia repair is another method of tension-free mesh repair, based on a pre peritoneal approach[3-5]. The laparoscopic approach provides the mechanical advantage of placing a large piece of mesh behind the defect covering the myopectineal orifice and using the natural forces of the abdominal wall to anchor the mesh in place. Laparoscopic inguinal hernia repair has added to the armamentarium of the general surgeon providing a technique that lessens postoperative pain and improves recovery. Refinements in approach and technique have led to the development of the newer techniques intraperitoneal onlay mesh, the trans abdominal pre peritoneal repair and the totally extra peritoneal repair. Over the years, surgeons all over the world have tried various techniques for repair of inguinal hernias. The learning curve of laparoscopic repair of inguinal hernia has been made all the steeper because of lack of documentation of results regarding duration of stay in hospital, complications, recurrence of hernia and patient satisfaction. Giving due consideration to above parameters, the present study compared TEP and TAPP procedures for laparoscopic approach of inguinal hernia. The aim of the present study was tocompare the two laparoscopic approaches to inguinal hernia repair namely the Trans abdominal pre-peritoneal approach and the totally extra peritoneal approach.

MATERIALS AND METHODS

- This study is a prospective non-randomized case control observational study performed after obtaining ethical clearance from the institutional ethics committee done on consecutive consenting cases who presented with a primary diagnosis of uncomplicated inguinal hernia to the department of General surgery at Narayana general hospital from the period December 2014 to September 2016.
- The patients who met the below said criteria were enrolled in the study after proper consent for examination and subsequent treatment.

Inclusion Criteria: Patients presenting with uncomplicated:

- Direct inguinal hernia
- Indirect inguinal hernia.

Exclusion Criteria:

- Patients admitted with irreducible complicated hernia.
- This study included patients of both the sexes.
- Patients were grouped accordingly as per the surgery chosen by the patient.
- The method of collection of data was by meticulous history, careful examination, appropriate radiological investigation, operative findings and follow up.
- Following a detailed history and clinical diagnosis a provisional diagnosis was made and the investigations were done.

- **The Investigations Done were:**
- HB%,TC, DC, ESR, BT, CT RBS, Blood Urea, Serum Creatinine and Serum Electrolytes Blood Grouping and Cross Matching HIV 1 and 2-HbsAg, ECG ,USG Abdomen.
- Based on the clinical diagnosis the surgery was planned .
- The intraoperative details were noted as to diagnosis, the duration of surgery, the treatment given.
- Once the surgery was over the post operative regimen appropriate for the case was followed.
- Procedures time were taken from the time of first incision to the closure of port sites.
- Intra op complications such bowel injury during port insertion noted and during surgery also

noted, hemorrhage during the surgery noted and injury to cord structures during sac dissection and other steps also noted.

- Conversion rates noted was from TAPP being converted to open inguinal hernia and TEP converted into TAPP respectively.
- Post op complications infection notably mesh infection were considered, seroma formation in the post op days of surgery noted and urinary retention in the immediate post op period also noted.
- Post op duration of stay, is the number of days' patient is hospitalized from the next day of surgery to the day of discharge.
- P value by chi square test was done by using SPSS software version 23.

RESULTS AND DISCUSSIONS

Table 1: Procedure Time (N=50)

Time(mins)	TAPP	%	TEP	%
< 60	5	20%	8	32%
60 to 90	10	40%	12	48%
91 to 120	8	32%	5	20%
>120	2	8%	0	0%
Total	25	100%	25	100%

- There have been no intra op complications such as bowel injury, hemorrhage and injury to cord structures in both TAPP (25) and TEP (25) study groups.
- In case of conversion rates, there have been no conversion from TAPP (25) to OHR but 5 cases of TEP (25) have been converted to TAPP.
- In this study, the TAPP repair has been planned to be converted to OHR if occasion arrives and TEP repair to be converted to TAPP.

Table 2: Post Op Complications (N=50)

Post op complications	TAPP	%	TEP	%
Infection	2	8%	0	0%
Seroma formation	8	32%	4	16%
Total	10	40%	4	16%

Table 3: Post Op Duration of Stay (N=50)

Post op duration of stay	TAPP	%	TEP	%
1 day	6	24%	16	64%
2 days	14	56%	6	24%
3 days	3	12%	3	12%
4 or more days	2	8%	0	0%
Total	25	100%	25	100%

In present study, Procedure time is considered from the time of first incision to the closure of skin. Time taken for surgery was longer in TAPP than in TEP. Majority of patients in TAPP and TEP fell into 60-90 min time group i.e. 10(40%) and 12(48%) patients. Most of the TAPP and TEP procedures were completed in 60 min to 90 min group. In 90-120 mins' operative time group, there were only 5(20%) in TEP and 8(32%) in TAPP. In >120mins' operative time group, no patient in TEP group but TAPP there are 2(8%) patients. A higher rate in TAPP than TEP with 0.9% versus 0% and 0.4% versus 0% was reported by **Cohen**[6] **and Felix**[7] respectively. In present study, there were no intra-op complications in both TAPP and TEP group. TEP has been associated with a higher conversion rate as compared to TAPP as demonstrated in various studies by **Cohen *et al,* Felix *et al* and Van Hee**[8]. In present study in the TEP group 5 out of 25 patients (20%) were converted to TAPP due to breach in the peritoneum and there was no conversion in the TAPP group. Of these patients, 10,887 (61.9 %) had a TAPP and 6700 (38.1%) a TEP repair. Postoperative surgical complications [OR=2.323 (1.882., 2.866)., p\0.0001] were noted more often after TAPP. In the TEP group, 37.8% of patients had seroma compared to 18.3% in the TAPP group (p=0.021). However, there was a higher incidence of scrotal oedema in the TAPP group (16 vs. 9, p=0.009). The wound infection rates were equal (2% vs. 3%). **Markus Gass**[9] studied the data on 4,552 patients undergoing TEP (n=3,457) and TAPP (n=1,095) that were collected prospectively. Patients undergoing TEP had a significantly higher rate of intraoperative complications (TEP 1.9% vs. TAPP 0.9%, p=0.029) and surgical postoperative complications (TEP: 2.3% vs. TAPP: 0.8%, p=0.003) and they concluded that intraoperative and surgical postoperative complications were significantly higher in patients undergoing TEP. **Tariq Nawaz**[10] 120 patients undergoing herniorraphy were divided into two groups. Sixty patients into Laparoscopic Total Extra Peritoneal (TEP)Techniques group and 60 into Trans abdominal Pre peritoneal (TAPP) Technique. In TEP group no patient developed port site infection whereas 1 patient in TAPP group developed port site infection. One patient developed mesh infection in each group. In TEP group return to daily activity was 4 days where as in TAPP group return to daily activity was 5 days. No patient developed deep site infection in both groups. Among the complications, surgical emphysema regressed by 3rd post-operative day, without surgical intervention. The reported rates of 0.2% and 0% for TAPP and TEP respectively in a study by **Weiser**[11] No difference noted in a study by **Tamme**[12]**.** In the present study, infection refers to mesh infection, 2 (8%) patients developed infection in TAPP group whereas no post-operative infection in TEP. In present study, 8(32%) patients in TAPP whereas 4(16%) patients in TEP developed seroma formation. The results were in favour of TAPP as contrast to TEP in present study. There were no reported cases of urinary retention in present study. Mean post-operative hospital stay was 2.27 days for laparoscopic TEP repair hernia repair and 2.53 days for laparoscopic TAPP. The post-operative hospital stay is statistically similar between two groups with p=0.286. Overall the TEP was far better procedure compared to TAPP. Return to normal domestic activities and work was 9.8+5.979 days and 7.53+3.65 days in TAPP and TEP respectively.

In present study, the operation day is considered post op day 0 and next days are considered day 1 and so on. As of post op duration of stay 1 day is 6 patients in TAPP and 16 patients in TEP. For post op duration of stay 2 days are 14 patients in TAPP and 6 patients in TEP. For post op duration of stay 3 days are 3 patients in TAPP and 3 patients in TEP. Two patients in the TAPP group and no patients in the TEP group were noted in post op duration of stay in 4 days or more group. Comparatively, post op duration of stay, TEP group were better than TAPP group by having lesser post op duration of stay.

CONCLUSIONS

- The word hernia has become a household term due to its occurrence in all age groups.
- Inguinal hernia repair has been one of the most common operations performed by General Surgeons for years.
- The most significant advances to impact inguinal hernia repair have been the addition of prosthetic materials to conventional repair and the introduction of laparoscopy to general surgical procedures.
- With laparoscopy gaining in treatment of hernia, many studies have come up to provide data about which type of laparoscopic hernia repair is better TAPP vs TEP.
- In present study, we have compared many parameters in both TAPP and TEP repairs.
- In case of procedure time, TAPP takes longer time than TEP in present study similar many other studies done before.
- In case of Intra-op complications, comparable parameters were difficult to achieve in present study, a bigger non-randomized study is required to assess the intra-op complications and find out which of the laparoscopic repairs are better in the category of intra-op complications.
- In case of conversion rates, in present study the TEP had more conversions to TAPP whereas TAPP had no conversions, which is also as such other studies.
- In case of post-op complications, TAPP had more complications comparable to TEP in present study such as other studies.
- In post-op duration of stay, TEP have less post-op duration of stay than TAPP in present study.
- As comparing the parameters, the present study shows some light over which procedure is better, but still larger study is re-quired to conclude upon one.

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