



A COMPARATIVE STUDY BETWEEN TRANS-ABDOMINAL PRE PERITONEAL REPAIR (TAPP) AND OPEN INGUINAL HERNIA REPAIR (LICHTENSTEIN).

Dr. Sakshi Jaiswal	Senior Resident, Teerthankar Mahaveer Medical College And Research Center, Moradabad
Dr. Aviral Gupta	Senior Resident, Teerthankar Mahaveer Medical College And Research Center, Moradabad
Prof. S. C. Sharma	Professor, Teerthankar Mahaveer Medical College And Research Center, Moradabad

ABSTRACT **Aim and Objectives:** 1)To evaluate the outcomes of open hernia repair.2)To evaluate the outcomes of tans-abdominal pre peritoneal hernia repair(TAPP).3)To compare TAPP with open hernia repair on the basis of operation time and post operative morbidity. **Methods:** Study was conducted on sixty five patients of inguinal hernia, requiring elective hernia repair, attending the surgical outpatient department of TMMC&RC, Moradabad. Two groups were made, Group A – In this group, patients with inguinal hernia will undergo open hernioplasty. Group B- In this group, patients with inguinal hernia will undergo TAPP.And comparison will be done on the basis of operation time, postoperative complications, cosmesis, resume to daily basic work & follow up will be done minimum for 6 weeks.Patients who are willing for surgery were selected for open and laparoscopic procedure in randomized way. **Results:** In our study, 69.2% of the patients had undergone open Linchestein repair followed by 30.8% patients with TAPP. Out of the total (65 patients) patients, more than 50% of the patients were observed with right inguinal hernia followed by left inguinal hernia (26.2%) and bilateral inguinal hernia (21.5%). Although there were 87.7% patients with no post operative complications whereas 4.6% cases were observed with seroma followed by other complications like wound infection (3.1%), hematoma (3.1%) and neuralgia (1.5%). According to the age wise distribution of the study subjects, it was observed that the majority of the patients (32.3%) we're observed between the age group 55-65 years. The postoperative pain was assessed using VAS Score and it was obtained that the severity of the pain was major in the cases who underwent open Linchestein repair as compared to TAPP, which might be possible due to the uneven distribution of the patients in both the groups. The duration of surgery, length of hospital stay and the time period required to return to usual activities was significantly associated with the TAPP and open Linchestein repair. The length of hospital stay was shorter in case of TAPP than in open Linchestein technique. **Conclusion:** Complications after undergoing TAPP are found to be less in contrast with open repair, and therefore the TAPP is suggested to be an optimal technique for inguinal hernia repair. There is less operative pain, shorter hospital stay and the time to resume day to day work is shorter in case of TAPP. But the choice between both the techniques should be made in terms of keeping in view the limitations of both the techniques, depending on the patient's choice and other demographics like work, age, health status, cost etc.

KEYWORDS : bilateral inguinal hernia, laparoscopic transabdominal preperitoneal repair, open mesh hernioplasty.

INTRODUCTION

Hernia is the bulging of part of the contents of the abdominal cavity through a weakness in the abdominal wall¹. About 2/3rd of the hernias are occurs in inguinal region and almost 70% are indirect and rest are direct inguinal hernias². Regardless of the type or origin, surgical repair is the only definitive treatment of all hernias³. Inguinal hernias repair are most commonly performed surgery in general surgery. To reduce recurrence, hernia surgery underwent numerous refinements⁴. Linchtenstein et al in 1984, introduce tension free hernia repair and also include use of mesh for reducing recurrence⁵. Ger et al was first one to describe laparoscopic inguinal hernia repair which is gaining popularity in this laparoscopic era⁶.

Each year in United States, about seven thousand hernia repair operation has been performed⁷. There were many studies showing the how the techniques and use of mesh were introduce in the hernia repair operation. The most common post-surgery complication was recurrence. Other complications were pain, delayed wound healing, delayed hospital admission. The centers that were specialized in hernia surgery have reported the failure rate of less than 1%⁸. worldwide, about 20 million of inguinal hernia repairs were performed every year. According to a report, 0.14 percent of the population is affected by inguinal hernias and it accounts for 70000 operations per year in UK. Incidence and related complications even in developed centers are still less. The incidence of hernias is still higher in the place where facilities were not proper and in places where it consider as a taboo, and lack of education^{9,15}.

Recently laparoscopic repair of inguinal hernia has gained popularity. The advantages of this technique include better patient comfort, earlier return to daily activities and also allow better exposure of groin anatomy. There are two approach of laparoscopic repair first is transabdominal preperitoneal method and second is total extra peritoneal technique. There are few disadvantages of the laparoscopic approach like, learning curves is more, operation time is more and require general anesthesia¹⁴. So, there are ongoing debate over which approach is better and effective in patients^{15,16}. Furthermore, several randomized studies have been conducted to compare laparoscopic and

open technique hernia repair¹⁷.

There is a significant transformation seen over last five years in the hernia repair approach. The research and their outcomes have improved due to the increased focus on hernia surgery, providing various strategies for the treatment of both simple and complex hernia. Unlike laparoscopic cholecystectomy, laparoscopic hernias repair is not very famous among surgeon. Although controversies regarding the most effective inguinal hernia repair are still in persistence.

MATERIAL & METHODS

- Study was conducted on sixty five patients of inguinal hernia, requiring elective hernia repair, attending the surgical outpatient department of TMMC&RC, Moradabad.
- Study Design: Prospective comparative study
- Period: From Januaray 2019 to June 2021

Inclusion Criteria

- Patients of both genders.
- Patients of age >18 years of age to < 70 years of age.
- Uncomplicated direct and indirect inguinal hernia.

Exclusion Criteria

- Patients not willing for surgery.
- Patients in ASA class IV and class V.
- Patients operated earlier especially in lower abdomen.

METHODOLOGY

- Patients with Inguinal hernia attending Surgical OPD or admitted under the Department of Surgery at TMMC&RC, Moradabad.
- The method of study consists of-
 - a) Detail history taking and though clinical examination as per the structured proforma.
 - b) Routine blood investigations
 - c) Radiological investigation- USG lower abdomen & X RAY Chest PA view.
- Two groups were made:

Group A – In this group, patients with inguinal hernia will undergo open hernioplasty.

Group B- In this group, patients with inguinal hernia will undergo TAPP.

And comparison will be done on the basis of operation time, postoperative complications, cosmesis, resume to daily basic work & follow up will be done minimum for 6 weeks.

Patients who are willing for surgery were selected for open and laparoscopic procedure in randomized way.

Statistical Analysis

The data was fed into the Microsoft excel sheet and the statistical analysis was done by statistical software SPSS version 21.0. The Quantitative (Numerical variables) were present in the form of mean and Standard Deviation and the Qualitative (Categorical variables) were present in the form of frequency and percentage. The distribution of all study variables were shown through charts and tables. A student t-test were used for comparing mean values between 2 groups while chi-square test was used for comparing frequency and Friedman test used for variable VAS score. The p-value was considered to be significant when less than 0.05.

Surgical techniques

TAPP Repair

The laparoscopic technique was performed using the transabdominal peritoneal route under general anesthesia without the placement of a nasogastric tube or urinary catheter. The 5-mm optical trocar was placed at the upper rim of the umbilicus. Both working trocars, one 5-mm and one 12-mm trocar, were placed at the level of the navel to the right and the left of the border of the rectus abdominis. A mostly blunt dissection was performed strictly along the anatomical landmarks (rectus muscle, epigastric vessels, symphysis and Cooper's ligament, and transverse fascia) and ended in complete anatomical dissection of the whole pelvic floor. Thorough hemostasis should always be performed. Parietalization was especially important, which involves removing all adhesions between the retroperitoneal tissue (fascia spermatica) and the peritoneum down to the middle of the psoas muscle. Two meshes were implanted, overlapping the defect. The mesh had to over- lap the defect by at least 3 cm in each direction. The meshes were fixed into position to the pectineal ligament and to the anterior abdominal wall. The peritoneum was closed with a 3-0 Vicryl running suture.

Open Hernia Repairs-(Lintonstein Repair)

Incision of skin done parallel and above to IL.Aponeurosis been cut and separated, been holded with forceps. Identify the ilioinguinal and iliohypogastric nerves and save guard them. Cord is been identified and separated from the sac in case of indirect hernia which is not needed in direct hernia. The covering is separated by blunt dissection, care being taken to avoid any injury to spermatic veins and vas deference. The sac is separated by gauze stripping, and traction is applied to the sac until neck of sac comes into view. This is identified by the presence of the adherent pad of fat. IEA lies medial to the indirect and lateral to the direct hernia. When separation is complete the sac is opened at some distance from its neck and finger is introduced to insure that there is no adhesions with contents. Contents are pushed back to the abdominal cavity. Trans fixation of the sac is done. After trans fixation adequate space is created to place a mesh of required size and was fixed firstly with the periosteum of the PT and later fixed with shelving edge of IL. The lateral portion of the mesh was split such that 2/3rd in width is superior tail and 1/3rd till inferior tail. The medial edges is fixed to anterior rectus sheath. Then incision is closed in layers.

RESULT AND OBSERVATION

Table 1:- Group-wise Distribution Of The Study Subjects.

GROUPS (N=65)	f (%)
TAPP	20(30.8)
OPEN HERNIA REPAIR	45(69.2)

Table 2: - Represent Variables Distribution In The Form Of Frequency And Percentage With Respect To Groupwise.

VARIABLE	STATUS	TAPP f (%)	OPEN HERNIA REPAIR f (%)
Diagnosis	RT INGUINAL HERNIA	11(55)	23(51.1)
	B/L INGUINAL HERNIA	3(15)	11(24.4)
	LT INGUINAL HERNIA	6(30)	11(24.4)
	ABSENT	0	0

Post Operative Complication	STATUS	TAPP f (%)	OPEN HERNIA REPAIR f (%)
SEROMA	0(0)	0	3(6.7)
WOUND INFECTION	0(0)	0	2(4.4)
NEURALGIA	0(0)	0	1(2.2)
HEMATOMA	0(0)	0	2(4.4)
ABSENT	20(100)	37(82.2)	

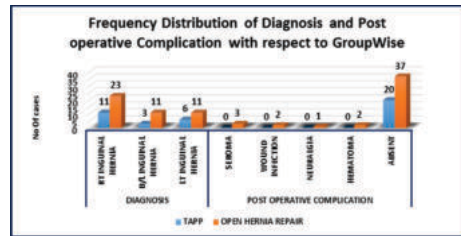


Table 2 and Graph shows the Diagnosis and Post-Operative Complication-wise distribution with respect the GroupWise of the study subjects illustrating the frequencies. The prevalence of RT INGUINAL HERNIA (51.1%) was higher than TAPP Group in our study.

Table 3: - Represent Of Variables Distribution In The Form Of Frequency And Percentage With Respect To Groupwise.

VARIABLE	STATUS	TAPP f (%)	OPEN HERNIA REPAIR f (%)
PATIENTS OPINION ABOUT COSMESIS	SATISFIED	5(25)	41(91.1)
	VERY SATISFIED	15(75)	4(8.9)

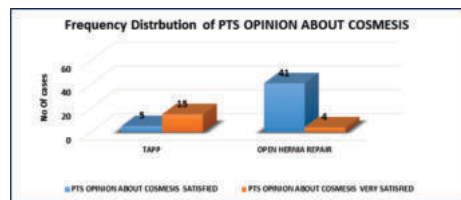


Table 3 and Graph shows the PTS opinion about cosmeses-wise distribution with respect the GroupWise of the study subjects illustrating the frequencies. The prevalence of satisfied (91.1%) was higher than TAPP Group in our study.

Table 4: - Represent Of Variables Distribution In The Form Of Frequency And Percentage With Respect To Groupwise.

VARIABLE	STATUS	TAPP f (%)	OPEN HERNIA REPAIR f (%)
POST OPERATIVE PAIN (VAS AT 12 HRS)	MILD	4(20)	9(20)
	MODERATE	16(80)	36(80)
VAS AT 24 HRS	MILD	19(95)	43(95.6)
	MODERATE	1(5)	2(4.4)
VAS AT 48 HRS	MILD	20(100)	45(100)

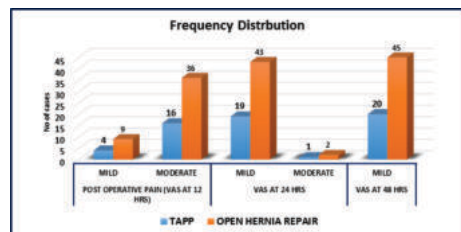


Table 4 and Graph shows the Post-operative pain distribution with respect the GroupWise of the study subjects.

Table 5:- Represent Of Variables Distribution In The Form Of Frequency And Percentage With Respect To Groupwise.

VARIABLE	STATUS	TAPP f (%)	OPEN HERNIA REPAIR f (%)
AGE GROUP	<25	3(15)	6(13.3)
	25<35	6(30)	3(6.7)
	35<45	2(10)	9(20)

45<55	3(15)	9(20)
55<65	4(20)	17(37.8)
>65	2(10)	1(2.2)

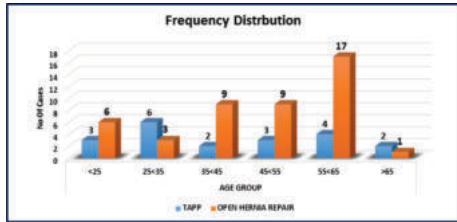


Table 5 and Graph shows the Age Groups distribution with respect the GroupWise of the study subjects.

Table 6: - Represent Of Variables Distribution In The Form Of Frequency And Percentage With Respect To Groupwise.

VARIABLE	STATUS	TAPP f (%)	OPEN HERNIA REPAIR f (%)
DURATION OF SURGERY	60<120 MINTS	13(65)	39(86.7)
	120<180 MINTS	7(35)	6(13.3)
LENGTH OF STAY	0-5 DAY	19(95)	12(26.7)
	6-10 DAY	1(5)	33(73.3)
RETURN TO USUAL ACTIVITY	0-5 DAY	19(95)	6(13.3)
	6-10 DAY	1(5)	29(64.4)
	11-15 DAY	0(0)	10(22.2)

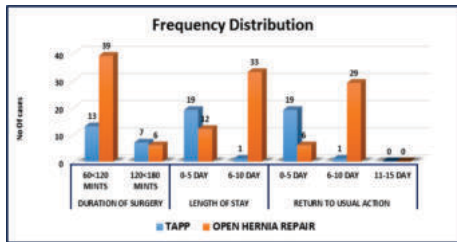


Table 6 and Graph shows the duration of surgery, Length of stay and Return usual action in day wise distribution with respect the GroupWise of the study subjects.

DISCUSSION

An optimal method for repair of hernia should be easily to learnable, simple to perform, require short period of convalescence, have a low rate of recurrence and cause minimal problems to the patients during the postoperative period¹⁸. Morbidity in patients may result due to all these drawbacks.

Conventional hernia surgeries are aimed at reducing the hernial sac and reconstructing the posterior wall through open incision. In selected cases, such operations done as day care procedures, but it has been pre-assumed that the open repair has been associated with prolonged hospital stay, a delayed return to usual activities, more recurrence and increased post-operative pain. However, in literature, the advantages of laparoscopic approach has reported shorter hospital stays and reduced post-operative pain¹⁹.

In comparison to open repair, the studies recorded some of the disadvantages of TAPP in terms of delayed oral intake, vascular and visceral injury, possibility to convert to open repair and possibility of post-operative ileus.

Several studies have reported that groin hernia repair is done in approximately 90% of the male patients. Also, in comparison with women, it is observed that inguinal hernias occur eight times as often in men²⁰. The present study recruited a total of 65 cases which consisted only of males. However several studies have been conducted which recruited both female as well as male cases. In 2009, a similar study was conducted by Umme Salma et al., consisting of 60 patients with direct inguinal hernia²¹. In contrast to our current study, another study conducted by Khan N²² et al in 2011 consisted of 40 male cases followed by 10 female cases. Moreover, male preponderance was observed in most of the studies. The findings by Martin Kurzer²³ of British hernia centre, reported a total of 975 male patients and 3% female patients. Similarly, 90% of total cases were males in the study conducted by Ira M. Rutkow, followed by 10% female²⁴.

Out of 65 patients, TAPP procedure was performed in 20 (30.8%) cases whereas the open hernia repair was done in the remaining 45 (69.2%) cases. In relevant to our findings, Khan N reported in his study that out of 100 cases, 50 cases were examined with TAPP procedure and the remaining 50 cases were examined with Open repair technique. Similarly, the findings by Salma U et al showed equal number of cases in both the groups i.e. 30 cases in each group (TAPP and Open hernia Repair).

The present study reported that right sided inguinal hernia was most common (52.3%) as compared to bilateral and left inguinal hernia. The left inguinal hernia were observed in 17 (26.2%) pts followed by bilateral inguinal hernia (21.5%). Similar findings were reported by N Khan et al. who reported that the right sided inguinal hernia were observed in most of the cases as compared to the left sided inguinal hernia. The study subjects in his findings were divided into two groups- the one in which TAPP procedure was performed and the other group consisted of the patients with open repair. It was reported that out of 100 cases, 64 cases were observed with right sided inguinal hernia followed by left inguinal hernia (26 cases) and bilateral inguinal hernia (10 cases). Similarly, the findings by Rutkow reported the majority of the cases with right sided direct inguinal hernia. However, MA Bahram, in his study of 300 cases, showed that the unilateral site of inguinal hernia was observed in the majority of the cases as compared to bilateral inguinal hernia²⁵.

The present study showed the majority of the patients (32.3%) between the age group 55-65 years of age followed by the age group 45-55 years (18.5%), 35-years (16.9%), 25-35 years (13.8%), 15-25 years (13.8%) and >65 years (4.6%). Similar study was conducted by M. Rutkow. According to his findings, the highest incidence (30%) of the cases was observed in the age group 45-64 years followed by the age group 15-44 years (26%), >65 years (26%) and <15 years (18 years). His findings were quite same as ours as the majority of the cases were observed between the age group 55-65 years of age. Moreover, Mithun VV reported the highest incidence of hernia between the age group 44-65 years (42.6%) followed by the age group 15-44 years (36.1%) and >65 years (21.3%)²⁶.

Our findings reported that the mean age of the study subjects was 47.42±15.13. Moreover, the mean duration of the surgery and the mean value of the days of returning to normal activities was reported to be 72.77±33.19 and 12.32±3.20 respectively. However, Bahram et al. in his study reported that the mean age of the study subjects in Group 1 was 38±12.7 whereas in case of Group 2, the mean age of the study subjects was 41±13.4. On the other hand the mean duration of days for group 1 was 1±0.43 whereas for group 2 it was 1±0.74. Similarly, the study by Khan N et al. revealed that the mean age of the patients following Open repair was 35.0 ± 11.07 whereas for the patients following TAPP procedure, the mean age was 39.50 ± 9.43. Also, it was reported that the mean operative time in case of open repair was 55.40 ± 10.73 whereas in case of TAPP procedure, the mean operative time was 87.10 ± 11.60.

On the basis of comparison of means between TAPP procedure and open hernia repair, the variables like duration of stay, number of days of hospital stay, and resuming back to usual days were found to be statistically significant with respect to both the procedures. On the other hand, it was observed that the variables like age and VAS Score were statistically insignificant. A study conducted by Mithun VV, depicted the similar findings which showed that the duration of surgery was highly significant with respect to the TAPP procedure as well as open hernia repair.

Undesired mortality and morbidity is resulted due to the surgical complications. A higher rate of post-operative complications were indicated by the findings of Köckerling et al, The majority of the patients were observed with the post-operative complication of Seroma (4.6%) followed by wound infection (3.1%), Hematoma (3.1%) and neuralgia (1.5%) whereas 57 patients, of the total cases were observed with no complications²⁷. In relevant to our findings by Mithun VV, it was reported that out of 61 study subjects, there were 53 (86.9%) cases observed with no complications whereas the majority of the cases were observed with the post-operative complication seroma (9.8%) followed by the other post-operative complications like wound infections (1.6%) and Hematoma (1.6%).

In the present study, the operative time was lower in open hernia repair as compared to TAPP. On contrary to our other studies by Bahram et

al., Neumayer and Ridings et al Reported that the operative time in TAPP was lower^{28,29}. On the other hand the findings by Kumar et al, and Erhan et al observed the similar results in accordance to our findings³⁰

According to our findings, the number of days in hospital stay was less in case of TAPP as compared to open hernia repair, showing a significant association. Alike results were shown by the study conducted by Braham M et al. Moreover, the results by Erhan et al showed the similar results as of ours, but there was no significant association observed between the days in hospital admission with TAPP & open hernia repair³¹. In relevant to our study, there were several studies showing the association.

Also, the patients undergone TAPP in our study, returned early to their usual activities as compared to open hernia repair. In relevant to our findings, Braham et al. also reported that TAPP patients returned to their activities due to minimal surgical trauma, lower wound complications, and less pain. In relevant to our findings, Nadim K et al. also reported that the wound infection was observed in open Lincchestein repair.

In our study, it was observed that the mean period of hospitalization was slightly lower in case of TAPP procedure as compared to open hernia repair. In correspondence to our study, the results depicted by Mithun VV reported that the period of hospitalization was slight fewer as compared to the laparoscopic repair. Moreover, the present study also reported that the mean period of returning to the usual days in case of TAPP procedure was lower than that of open hernia repair. Other factors like age was statistically insignificant with respect to both the procedures.

The post-operative pain in the present study was assessed by VAS Score. For the severity of score, it was obtained that in case of TAPP procedure there were 80% pts with mid intensity postoperative pain followed by 20% patients with mild post-operative pain. In case of open hernia repair it was observed that there were 36 patients with mid intensity postoperative pain followed by 9 patients with mild post-operative pain. Similar study conducted by Mithun VV, used a verbal graphic rating scale (VRS) for assessing the post-operative pain and it was observed that in comparison with laparoscopic repair, the severity of pain was more in case of hernioplasty.

Our study reported that the variables like age, VAS Score, were statistically insignificant to the duration of surgery whereas between the variables like length of hospital days, return to usual activities and the duration of the surgery, an significant difference was observed (p-value<0.05). However the study conducted by Umma Salma et al. reported that regarding hospital stay, the results showed that there is no significant statistical difference regarding postoperative hospital stay in either open or laparoscopic hernia repair.

Operative site bleeding, wound infections, hematoma, neuralgia, are significant problems in patients undergoing surgery. However, these complications were not observed in TAPP according to our findings. The findings by Braham M et al. also reported that these complications can be reduced in TAPP. After the surgery, the majority of the patients can perform normal activities after one week. This somehow depends upon the type of profession. According to our study, the patients undergone open repair were observed with longer period of time to resume to their day to day work.

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