

Comparative Study of Clinical Outcome of Open pre Peritoneal Approach versus Transinguinal Lichtenstein Approach for Inguinal Hernia

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Abstract:

Background: One of the most common operations in the general surgery department is inguinal hernia repair. The concept of hernia repair underwent evolution from Bassini's repair to tension-free repair with the introduction of polypropylene mesh. This mesh can be implanted using either an open or laparoscopic technique. Laparoscopic repair is popular and this method is still being debated because it requires well equipped instruments and cost effective to the patient is more, long duration of surgery, general anesthesia requirement and associated complication. Open Pre peritoneal approach is theoretically and practically sound alternative approach established right before the laparoscopic era to treat challenging recurrent groin hernias with significant scarring and tissue loss.

Aim of the study to compare the clinical outcome of open pre peritoneal approach versus Trans inguinal Lichtenstein approach in relation to post-operative pain, Seroma formation, Wound infection and Recurrence.

Materials and Methods: This was a Prospective comparative study done in Department of general surgery, Narayana Medical College Hospital, Nellore from November 2019 to July 2021 in 30 cases, divided into two groups by random allocation technique. Groups A and B with 15 patients in each group.

Results: In the open pre peritoneal repair group, the mean age was 52.46 ± 12.29 , in the Trans-inguinal Lichtenstein repair group it was 51.60 ± 15.94 . The incidence of chronic groin pain in Lichtenstein group was 20% at 3 months and 6.6% at 6 months. Incidence of seroma at end of post op 7th day was higher in Trans inguinal Lichtenstein repair group (33.3%) compared to Open pre peritoneal repair group (6.7%). Incidence of wound infection was observed in Trans- inguinal Lichtenstein repair group to be 20% by the end of 1st month. There was only one case of recurrence in Transinguinal Lichtenstein group at 6 months. There were no recurrences in the open pre peritoneal repair group.

Conclusion: From the study it can be concluded that inguinal hernia repair with open pre peritoneal approach (Trans rectus sheath pre peritoneal approach TREPP) has resulted in better patient comfort with low post-operative pain and also few complications. There was no recurrence observed in my study, the follow up period was only 6 months. TREPP seems to be an effective and safe technique which gives an approach to inguinal, femoral and obturator hernias and shares the same anatomical relationship in TEP and TAPP approaches which gives a better understanding of the TEP and TAPP procedures.

Keywords: Inguinal Hernia, Trans Rectus Sheath Pre Peritoneal Approach, Open Pre Peritoneal Repair.

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Introduction

Groin hernias are the most prevalent condition presented to surgeons worldwide, with over five lakh hernia surgeries performed each year. Men have a lifetime risk of 27.0% while women have a risk of 3.0%. [1] The hernia treatment has developed since the beginning of surgical history through different stages through the times of Greek, Romans and Egyptians. As the saying goes the history of hernia surgery is the history of surgery. [2] Inguinal hernias are more common on the right side than on the left. Males are seven times more prone than females. Indirect inguinal hernias are more common

than direct hernias. Femoral hernias are less common accounting for fewer than 10% of all groin hernias. [3] The typical feature of groin hernias is that they emerge through the myopectineal orifice of Fruchaud, between the lower limb and abdomen, it acts as a route for nerves, lymphatic's, muscles, tendons and blood vessels. [4] General factors such as weakening of muscle and fascia by advancing age; lack of physical activity; obesity; pulmonary diseases such as COPD and emphysema; chronic constipation; prostatomegaly; and appendectomy incision. [5] One of the most common operations in

the general surgery department is inguinal hernia repair. The concept of hernia repair underwent evolution from Bassini's repair to tension-free repair with the introduction of polypropylene mesh. [6] This mesh can be implanted using either an open or laparoscopic technique. [7,8] Each operative technique has its own advantages and disadvantages. Tissue repairs like such as modified Bassini, Illi-opubic tract repair, Shouldice, and many others either requires good surgical experience or is tension repairs fraught with recurrences. Recurrences vary from surgeon to surgeon and center to center owing to complexity of the procedures. [9] Though Lichtenstein tension-free repair is considered as ideal technique it is associated with complications post-operative seroma formation, chronic post-operative inguinal pain (CPIP), scrotal swelling, wound infection, mesh rejection, testicular atrophy and infertility. [10]

Laparoscopic repair is popular and this method is still being debated because it requires well equipped instruments and cost effective to the patient is more, long duration of surgery, general anesthesia requirement and associated complication. [11] Open Pre peritoneal approach is theoretically and practically sound alternative approach established right before the laparoscopic era to treat challenging recurrent groin hernias with significant scarring and tissue loss. Prosthesis can be placed between hernia contents and hernia defect in pre peritoneal space.

However, these more "contemporary" pre peritoneal procedures are being pushed for inguinal hernia repair, with the goal of minimizing the prevalence of long-term post-operative discomfort linked to the presence of prolene mesh in the inguinal canal. [12]

Aim of the study to compare the clinical outcome of open pre peritoneal approach versus Tran's inguinal Lichtenstein approach in relation to Post-operative pain, Seroma formation, Wound infection and Recurrence

Materials and Methods: This was a Prospective comparative study done in Department of general surgery, Narayana Medical College Hospital, Nellore from November 2019 to July 2021 in 30 cases, divided into two groups by random allocation technique. Groups A and B with 15 patients in each group.

Inclusion Criteria: Patients above 20 Years with inguinal hernia of all types with or without co morbidities, like hypertension, diabetes etc. excluding chronic persistent cough.

Exclusion Criteria: Patients above <20 Years, with strangulated hernias, with local infection and with obstructive uropathies.

Demographic data of the patients recorded in the proforma. After preliminary investigations and confirmation of diagnosis and pre-anesthetic check-up, the patients were subjected to the required surgery. These patients were grouped into 2 by Random Allocation Technique.

Group A patients were subjected to Trans rectus sheath pre-peritoneal approach (TREPP). Group B patients were subjected to Transinguinal Lichtenstein approach.

All the patients were assessed for complications like post-operative pain evaluated using Visual Analogue Scale, seroma formation, wound infection and recurrence in immediate and regular post-operative periods. After discharge patients were asked to regularly follow up in OPD. At the end of the study, Observations in both the groups will be made. After discharge post operatively patients were assessed on 7th day, 1st, 3rd, 6th week.

Statistics: Data Entry was done using Microsoft excel 2013 and analysis done using SPSS V 22 version software. Qualitative data was expressed in frequencies and percentages and Quantitative data in mean and standard deviation. Non parametric statistics i.e. Chi-square test/ Fishers exact test was used to find the significant association between the two qualitative variables.

Results

In the open pre peritoneal repair group, the mean age was 52.46 ± 12.29 , in the Trans-inguinal Lichtenstein repair group it was 51.60 ± 15.94 .

There was no statistically significant association observed with relation to Age and Study groups as the p value calculated to be >0.05 .

At 3 months three patients in Lichtenstein group complained of groin pain at site of surgery while no patient in open preperitoneal group had similar complaint. At 6 months after surgery one patient in Lichtenstein group and no patients in open preperitoneal group complained of groin pain which persisted despite using pain medications.

The incidence of chronic groin pain in Lichtenstein group was 20% at 3 months and 6.6% at 6 months. The difference between the two groups is not statistically significant with incidence of chronic groin pain significantly high in Lichtenstein group with a P value of 0.09. Incidence of seroma at end of post op 7th day was higher in Trans inguinal Lichtenstein repair group (33.3%) compared to Open pre peritoneal repair group (6.7%). Incidence of wound infection was observed in Trans- inguinal Lichtenstein repair group to be 20% by the end of 1st month. There was only one case of recurrence in Transinguinal Lichtenstein group at 6 months. There were no recurrences in the open pre peritoneal repair group.

Table 1: Age and Sex Distribution between Two Groups

Age in years	Open Preperitoneal Repair		Transinguinal Repair	
	Number	%	Number	%
21-30	1	6.7	3	20
31-40	2	13.3	1	6.7
41-50	2	13.3	1	6.7
51-60	6	40	4	26.7
61-70	4	26.7	6	40
Mean	52.46 ± 12.29		51.6 ± 15.94	
Chi square test	2.46		P 0.65NS	
Male	15	100	15	100
Female	15	100	15	100

Table 2: Diagnosis Distribution between Two Groups

Diagnosis	Open Preperitoneal Repair		Transinguinal Repair	
	Number	%	Number	%
LIH - Direct	2	13.3	2	13.3
RIH- Direct	3	20	4	26.7
LIH -Indirect	3	20	4	26.7
RIH- Indirect	7	46.7	5	33.3

Table 3: Pain Severity in Two Groups

VAS	Open Preperitoneal Repair			Transinguinal Repair		
	POD1	POD 2	POD 7	POD1	POD 2	POD 7
0	0	0	10	0	0	6
1-3	0	4	5	0	0	8
4-6	13	11	0	5	15	1
7-10	2	0	0	10	0	0
P value	0.005	0.03	0.26			

Table 4: Vas Score In Two Groups during Follow-up

Follow up	Open Preperitoneal Repair		Transinguinal Repair		P value
	Mean	SD	Mean	SD	
1 st POD	5.4	0.5	6.9	0.7	0.001
2 nd POD	3.9	0.7	5.5	0.5	0.001
7 th POD	0.5	0.8	1.5	1.4	0.01
1 st Month	0.1	0.3	0.5	0.8	0.04
3 rd Month	0.0	0.0	0.2	0.4	0.04
6 th Month	0.0	0.0	0.1	0.3	0.16

Discussion

In the present study there was no significant difference in age distribution. Majority of subjects were in age group 51 to 60 years in both groups. Mean age in open preperitoneal approach is 52.46 years, ranging from 30-70 years and in Trans inguinal Lichtenstein approach is 51.60 years, ranging from 23-68 years. All the participants were males. Study by G.G. Koning et al in 2011 regarding the first 50 cases of TREPP - All patients were male, in which range of patient's age was between 24 and 81 years, with a mean age of 54 years. [13] In a study by J.F.M. Lange et al patient group consisted more of male patients (93.8%), in which range of patients age was between 18 – 99 years with a mean age of 61.4 years. [14]

A study conducted by W.J.V William Bokkerink et al in 2020 TREPP versus TIPP, a randomized controlled trial included 800 patients with 400 patients in each group. Mean age was 57.9 years and 57.5 years in TREPP and TIPP respectively. 98.2% and 98% were males in TREPP and TIPP respectively. [15] A study conducted by T. L. R. Zwols et al in 2020 – In Strangulated Inguinal Hernia - emergency TREPP resulted with mean age 67 years and range of patient's age being from 23–97 years. [16] Mean age in the present study is similar to the mean age in various studies available on TREPP in the literature. In the present study Left Direct inguinal hernia in 13.3% each in open preperitoneal repair group (TREPP) and Trans-inguinal Lichtenstein repair group. Right direct inguinal hernias are 20% of open preperitoneal repair group (TREPP) and 26.7% of Trans-inguinal Lichtenstein repair

group. Right inguinal indirect hernias are 46.7% in open preperitoneal repair group (TREPP) and 33.3% of Trans-inguinal Lichtenstein repair group. Left inguinal indirect hernia were 20% in open preperitoneal repair group (TREPP) and 26.7% of Trans-inguinal Lichtenstein repair group. Study by G.G.Koning et al in 50 cases of TREPP showed 76% having left-sided hernia, 98% diagnosed as indirect hernia. [13] A study done by J.F.M.Lange et al 90.5 % were unilateral hernias in which 40.1% are left sided and 50.3% are right sided. [14] A study conducted by W.J.V William Bokkerink et al with 400 patients in each group – 47.7% were left sided hernia and 52.3% were right sided hernia in TREPP group.

A study done by G.G.Koning et al in 2011 regarding the first 50 cases of TREPP - mean postoperative pain did not exceed a visual analog scale (VAS) Score of 4 (1–10 scale) in the first 14 days. Postoperative pain was controlled easily with paracetamol. [13] A study conducted by J. L. Faessen et al in 2020 regarding the efficacy and safety of TREPP - The reported post-operative pain at the follow-up control between 6 and 8 weeks was the highest in the Lichtenstein group (21.2%) compared with the TREPP (10.7%) and the TEP (13.8%) group, but did not significantly differ ($P = 0.466$). [17]

A study conducted by Suryaram Aravind et al in 2018 compared Lichtenstein repair versus open preperitoneal repair [18] Post-operative pain scores are significantly low in open preperitoneal repair (TREPP) compared to Lichtenstein repair. Similar results were shown in the various studies found in the literature. Chronic (postoperative) pain has been defined as pain lasting at least 2–3 months (after surgery), but modifications are proposed to this timeframe. [19,20] A group of experts in hernia surgery and chronic pain has suggested modifying the definition for chronic pain after hernia repair as pain lasting at least 6 months after operation. [21] The reason for this extended period of time is because the inflammation around the mesh is still ongoing after 3 months, and there is a chance that some patients will improve substantially from 3 to 6 months postoperatively. The incidence of CPIP ranges from 0.7 to 75%, depending on the study and the definition of chronic pain used.

In the present study, the difference between the two groups is not statistically significant with incidence of chronic groin pain significantly high in Lichtenstein group (20% at 3 months and 6.6% at 6 months). None of the patients who underwent TREPP had CPIP. A study done by G.G. Koning et al in 2011 regarding the first 50 cases of TREPP – none of the patients complained chronic pain. [13] A study done by J.F.M. Lange et al in 2014 regarding the 1st 1000 cases of TREPP - total of 49 patients reported experiencing CPIP (5.3 %). [14] A

study conducted by W.J.V William Bokkerink et al with 400 patients in each group - presence of any pain (both at rest and during activity only) at 2 weeks and 6 months follow-up differed significantly: respectively 31.8% of TREPP versus 39.8% of TIPP patients ($P = 0.025$) and 10.8% (TREPP) versus 17.7% (TIPP) ($P = 0.023$). CPIP at rest 1 year postoperatively was present in 12 patients, 7 after TREPP (1.9%) versus 5 patients after TIPP (1.4%) ($P = 0.535$). [15]

A study conducted by J. L. Faessen et al in 2020 regarding the efficacy and safety of TREPP - rate of CPIP for which the patient contacted the hospital was similar in the study groups: TREPP: 1.7%; TEP: 1.6%; Lichtenstein: 1.9%; ($P = 0.591$). [17] Results from present study support the belief that the placement of the mesh in the preperitoneal space and no manipulation in the inguinal canal avoiding the inguinal nerves is beneficial in reducing risks on CPIP. [22] Seroma are a known post-operative occurrence after laparoscopic and open inguinal hernia repairs, especially in patients with large scrotal hernias. The incidence varies between 0.5 and 12%. Park et al. suggest that a seroma should be considered a complication only if it persisted for more than six weeks, presents continuous growth, or becomes symptomatic. [23]

A study conducted by Suryaram Aravind et al in 2018 compared Lichtenstein repair versus open preperitoneal repair - 2 (6.7%) patients had seroma in Lichtenstein repair whereas none of the patients in open preperitoneal repair had seroma. [18] In present study, Incidence of seroma at end of post op 7th day was higher in Trans inguinal Lichtenstein repair group (33.3%) compared to Open preperitoneal repair group (6.7%), which were managed conservatively. The incidence was high in the present study may be due to more tissue dissection and smaller sample size.

In present study, Incidence of wound infection in Trans- inguinal Lichtenstein repair group is 20% and none of patients in open preperitoneal repair (TREPP) had wound infection which was not statistically significant. But clinically Lichtenstein repair group had higher incidence. All three patients reported were superficial infections were managed with regular dressing and oral antibiotics. No cases of mesh infections were reported. A study done by G.G. Koning et al in 2011 regarding the first 50 cases of TREPP – none of the patients had wound infection. [13] Study done by W.J.V William Bokkerink et al in 2020 – Surgical site infection in TREPP - 14 (3.6%) and in TIPP - 17 (4.3%) (p value 0.592). [15] Study done by J. L. Faessen et al in 2020 regarding the efficacy and safety of TREPP - Wound infection rates showed a significantly lower rate in favor of TEP when compared with TREPP and Lichtenstein (TREPP: 4 (6.9%); TEP: 3 (1.6%); Lichtenstein: 4 (7.7%), $P = 0.040$).

[17] In present study incidence of wound infection in open preperitoneal approach (TREPP) is 0% which is less compared to available studies, whereas higher in Lichtenstein group due to smaller sample size.

In present study, there was only one case (6.7%) of recurrence in Transinguinal Lichtenstein group at 6 months. There were no recurrences in the open preperitoneal repair group (TREPP) which is statistically significant. A study done by G.G.Koning et al in 2011 regarding the first 50 cases of TREPP - No recurrences after a mean follow-up of 2 years.¹³ A study done by J.F.M.Lange et al in 2014 regarding the 1st 1000 cases of TREPP - of 915 patients, 11 (1.2 %) reported experiencing a recurrence after treatment. [14]

Study done by W.J.V William Bokkerink et al in 2020 overall recurrence rate was higher in the TREPP group, 8.9% vs 4.6% TIPP group, ($P=0.022$).¹⁵ Study done by J. L. Faessen et al in 2020 regarding the efficacy and safety of TREPP- the recurrence rate within 1-year post-operative did not differ significantly as well: TREPP: 1.7%; TEP: 2.1%; Lichtenstein: 0.0% ($P = 0.591$). [17]

Study done by T. L. R. Zwols et al in 2020 comparing the results of TREPP, TEP, and Lichtenstein repair there was no statistically significant difference in recurrences in the TREPP group compared to Lichtenstein (3.8% vs 2.5%; $p = 0.42$), nor in the TREPP versus TEP comparison (3.8% vs 2.8%; $p = 0.55$). [24] From the literature it is clearly evident that inguinal hernia repair popularized the preperitoneal mesh position due to promising result of low recurrence, less chronic pain and lower complication rates. After Lichtenstein repair, the quality of life is poor and pain is high as reported by a number of studies.

Conclusion:

From the study it can be concluded that inguinal hernia repair with open pre peritoneal approach (Tran's rectus sheath pre peritoneal approach TREPP) has resulted in better patient comfort with low post-operative pain and also few complications. There was no recurrence observed in my study, the follow up period was only 6 months.

TREPP seems to be an effective and safe technique which gives an approach to inguinal, femoral and obturator hernias and shares the same anatomical relationship in TEP and TAPP approaches which gives a better understanding of the TEP and TAPP procedures. It has been developed to avoid mesh placement in the inguinal canal in a primary repair. There is no contact of mesh with the cord structures and nerve which reduces the postoperative pain (Inguinodynia), and sensory loss. Hence the Trans rectus sheath pre peritoneal approach (TREPP) is a simple alternative technique to the Trans inguinal

Lichtenstein approach which can be used for treating inguinal hernia.

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