

THE PHARMA INNOVATION

Comparative study of clinical outcome of open pre peritoneal approach versus transinguinal lichtenstein approach for inguinal hernia

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Introduction: No disease of human body, belonging to the province of the surgeon, requires in its treatment a better combination of accurate, anatomical knowledge with surgical skill than hernia in all its varieties. 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%.

The meaning of hernia in Greek is bulge or budding and Latin it means rupture or tear. 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.

Aims and Objectives: To compare the clinical outcome of open pre peritoneal approach versus Trans inguinal Lichtenstein approach in relation to

1. Post-operative pain
2. Seroma formation
3. Wound infection
4. Recurrence

Materials and Methods: This study was prospectively conducted in the Department of General Surgery at a tertiary care teaching hospital, Over the period of 1 year, 30 cases, divided into two groups by random allocation technique. Groups A and B with 15 patients in each group

Results

Age distribution: 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 .

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.

Keyword: Totally extra peritoneal repair (TEP), trans abdominal pre peritoneal approach (TAPP), outpatient department (OPD), post-operative day (POD), chronic postoperative inguinal pain (CPIP).

INTRODUCTION: No disease of human body, belonging to the province of the surgeon, requires in its treatment a better combination of accurate, anatomical knowledge with surgical skill than hernia in all its varieties. Groin hernias are the most prevalent condition presented to surgeons worldwide, with over five lakh hernia surgeries performed each year.

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Men have a lifetime risk of 27.0% while women have a risk of 3.0% ^[1].

The meaning of hernia in Greek is bulge or budding and Latin it means rupture or tear. 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]

The groin accounts for over 75% of all abdominal wall hernias. 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].

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Materials and Methods

This study was prospectively conducted in the Department of General Surgery at a tertiary care teaching hospital, over the period of 1 year, 30 cases, divided into two groups by random allocation technique. Groups A and B with 15 patients in each group.

Patients who meet the inclusion criteria and willing to give written informed consent are

subjected to clinical examination. 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 month.

Inclusion criteria

1. Patients of all age groups above the growth period (<20 Years) with inguinal hernia.
2. Irrespective of congenital, acquired, direct hernias, Unilateral or bilateral hernias, recurrent inguinal hernias.
3. All the patients associated with or without co morbidities, like hypertension, diabetes etc. excluding chronic persistent cough.

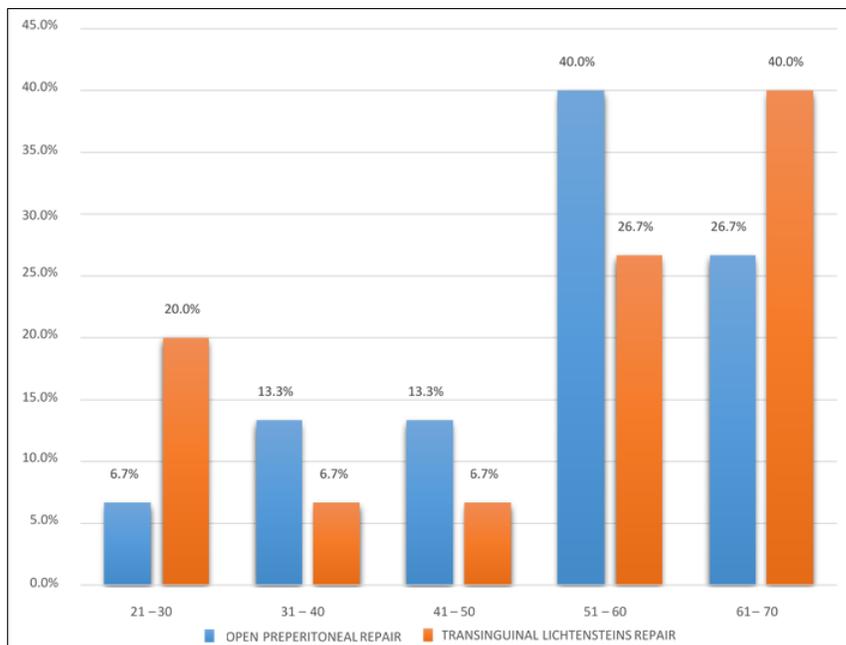
Exclusion Criteria

1. Patients in growth period (<20 Years).
2. Patients with strangulated hernias.
3. Patient with local infection.
4. Patients with obstructive uropathies.

Results

Age distribution

- 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 .



Graph 1: Age distribution comparison between two groups

Gender distribution

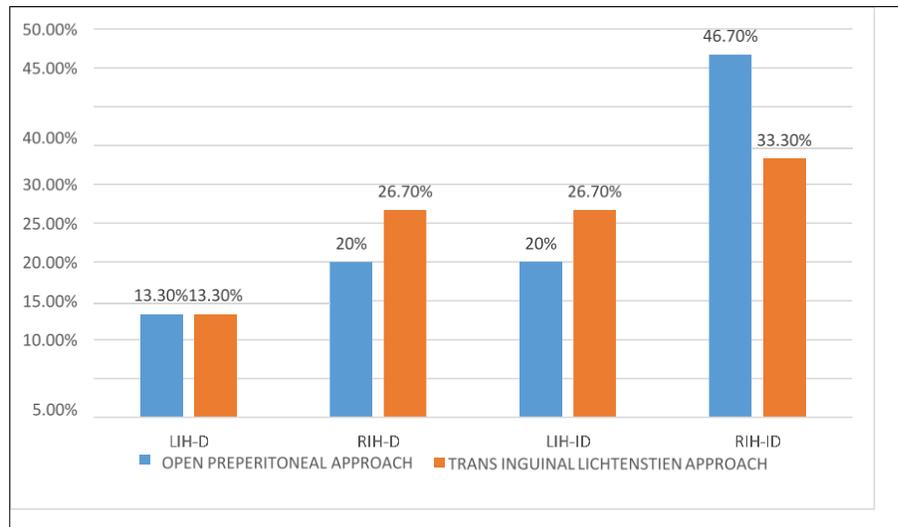
All the study participants were male in the present study.

Table 1: Gender distribution between two groups

	Open Preperitonea repair		Transinguinal lichtensteins repair		Total	
	N	%	N	%	N	%
Male	15	100%	15	100%	30	100%
Total	15	100%	15	100%	30	100%

Diagnosis

- In the present study, Left Direct inguinal hernia in 13.3% each in open preperitoneal repair group and Trans-inguinal Lichtenstein repair group.
- Right direct inguinal hernia were 20% of open preperitoneal repair group and 26.7% of Trans-inguinal Lichtenstein repair group.
- Left inguinal indirect hernia were 20% in open preperitoneal repair group and 26.7% of Trans-inguinal Lichtenstein repair group.
- Right inguinal indirect hernia were 46.7% in open preperitoneal repair group and 33.3% of Trans-inguinal Lichtenstein repair group.



Graph 2: Diagnosis comparison between two groups

Post-operative pain

Distribution of pain severity in both groups

In Lichtenstein group most of the patients had pain in range of 7-10 in POD 1 (66.6%) and in range of 4-6 in POD 2 (100%). However though the number decreased by POD 7 still most (53.3%) of the patients reported pain in range of

1-3. However, in Open preperitoneal group though most of the patients had pain in range of 4-6 in POD 1 (86.6%) and POD 2 (73.3%). Pain showed significant decrease by POD 7 with most (66.6%) of the patients reported no pain and 33.3% reported pain in range of 1-3.

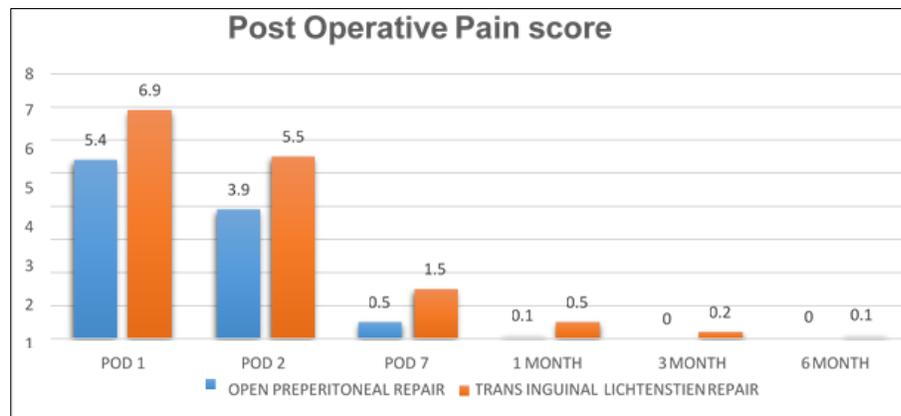
Table 2: Pain Severity Distribution in two groups of patients studied

Open Preperitoneal repair (vas score)	POD 1	POD 2	POD 7
0	0	0	10
1 – 3	0	4	5
4 – 6	13	11	0
7 – 10	2	0	0
Transinguinal Lichtensteins Repair (VAS)	POD 1	POD 2	POD 7
0	0	0	6
1 – 3	0	0	8
4 – 6	5	15	1
7 – 10	10	0	0
P value	0.005*	0.03*	0.26

Comparison of postoperative pain

In the present study, Mean VAS score were significantly lower in open preperitoneal repair compared to Trans inguinal Lichtenstein repair

group at post-operative day 1, day 2, day 7, 1st month, 3rd month as the p value calculated to be <0.05.



Graph 3: VAS score comparison between two groups at different periods of follow-up

Discussion

The use of mesh in inguinal hernia repair is thought to be the most critical factor in preventing recurrence. However, the two current 'standard' mesh repair methods each have their own set of drawbacks: TEP has a long learning curve and requires general anesthesia and Because the three inguinal nerves are subjected to iatrogenic damage (dissection, coagulation, mesh fixation) or direct contact with the mesh in Lichtenstein procedure, causing risk of chronic postoperative inguinal pain (CPIP).

In fact, TREPP is the optimal hybrid method, as it is medial approach avoids all three inguinal nerves and eliminates the need of general anesthesia.

Age and Sex

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 ^[4].

Study by J.F.M. Lange *et al.* in 2014 regarding the 1st 1000 cases of TREPP - The 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 ^[5].

Study by W.J.V William Bokkerink *et al.* in 2017-recurrent inguinal hernia after Lichtenstein's repair – TREPP as alternative technique included 38 patients where mean age was 59.6 years with range of patient's age between 26 - 81 years ^[6].

A study conducted by W.J.V William Bokkerink *et al.* in 2020 – TREPP versus TIPP, a randomized controlled trail 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 ^[7].

A study conducted by J. L. Faessen *et al.* in 2020 regarding the efficacy and safety of TREPP – 96.6% underwent TREPP were male patients and mean age was 64.8 years ^[8].

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 ^[9].

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.
- All the cases are unilateral hernia and right sided indirect inguinal hernia was the most common Hernia in both groups. There was no significant difference in diagnosis between two groups.

Study by G.G.KONING *et al.* in 2011 regarding the first 50 cases of TREPP showed 76% having left-sided hernia, 98% diagnosed as indirect hernia [4].

A study done by J.F.M. Lange *et al.* in 2014 regarding the 1st 1000 cases of TREPP – 90.5% were unilateral hernias in which 40.1% are left sided and 50.3% are right sided [5].

A study conducted by W.J.V William Bokkerink *et al.* in 2020 – TREPP versus TIPP, a randomized controlled trail included 800 patients with 400 patients in each group – 47.7% were left sided hernia and 52.3% were right sided hernia in TREPP group [7].

A study conducted by T. L. R. Zwols *et al.* in 2020 - In Strangulated

Inguinal Hernia - emergency TREPP showed 30.3% were left sided and 69.7% are right sided hernia [9].

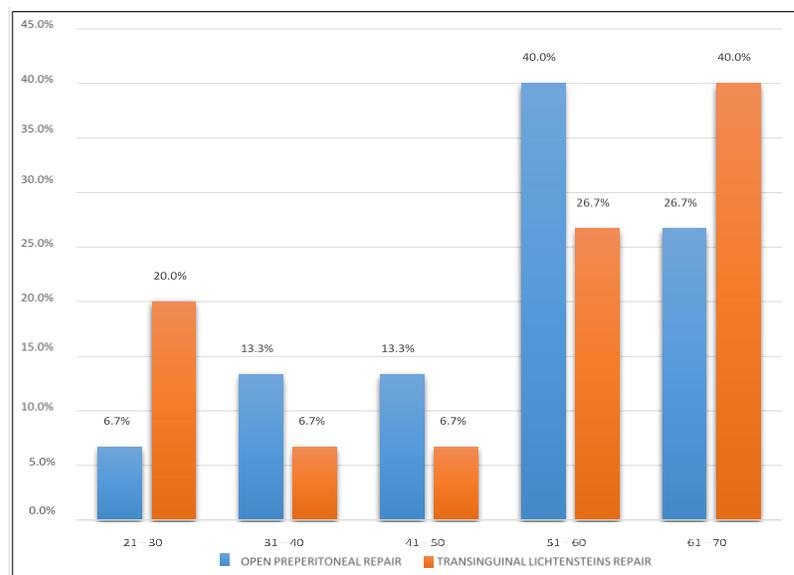
Studies showed that right sided hernia are more common than left sided hernia. In present study also right sided hernias are more in number than left sided hernia.

A study conducted by Suryaram Aravind *et al.* in 2018 compared Lichtenstein repair versus open preperitoneal repair [10]

- Chronic (postoperative) pain has been defined as pain lasting at least 2–3 months (after surgery), but modifications are proposed to this timeframe [11, 12].
- 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 [13].

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 [14, 15, 16, 17-22].

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].



Graph 4: Preperitoneal repair and Lichtenstein repair

Conclusions

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. 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.

References

- Jenkins JT, O'Dwyer PJ. Inguinal hernias. *BMJ*. 2008;336(7638):269.
- Legutko J, Pach R, Solecki R, Matyja A, Kulig J. Rys historyczny leczenia chirurgicznego przepuklin [The history of treatment of groin hernia]. *Folia Med Cracov*. 2008;49(1-2):57-74. Polish. PMID:272
- Malangoni MA, Rossen MJ. Hernias. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL, editors. *Sabiston's Textbook of Surgery*. 21st edition, Philadelphia: Saunders. 2008;2(Ch.44):1155-79.
- Koning GG, Andeweg CS, Keus F, Van Tilburg MWA, Van Laarhoven CJHM, Akkersdijk WL. The transrectus sheath preperitoneal mesh repair for inguinal hernia: technique, rationale and results of the first 50 cases. *Hernia*. 2012;16(3):295-299.
- Trans Rectus Sheath Extra-Peritoneal Procedure (TREPP) for Inguinal Hernia: The First 1,000 Patients J. F. M. Lange M. M. Lange D. A. Voropai M. W. A. van Tilburg J. P. E. N. Pierie R. J. Ploeg W. L. Akkersdijk _ Societe' Internationale de Chirurgie World J Surg, 2014. DOI 10.1007/s00268-014-2475-5.
- The TREPP as alternative technique for recurrent inguinal hernia after Lichtenstein's repair: A consecutive case series W.J.V. (Willem) Bökkerink a,A.M. (Alexandra) Persoon b, W.L. (Willem) Akkersdijk b, C. J.H.M. (Kees) van Laarhoven a, G.G. (Giel) Koning a, a Department of Surgery, Radboud University Medical Center, Geert Grootteplein Zuid 10, 6525 GA Nijmegen, The Netherlands - b Department of Surgery, St. Jansdal Hospital, Wethouder Jansenlaan 90, 3844 DG Harderwijk, The Netherlands - <http://dx.doi.org/10.1016/j.ijsu.2017.02.022> 1743-9191/© 2017 IJS Publishing Group Ltd. Published by Elsevier Ltd.
- Open Preperitoneal Inguinal Hernia Repair, TREPP versus TIPP in a Randomized Clinical Trial Willem J. V. Bökkerink, MD, Y Giel G. Koning, MD, PhD, y Patrick W. H. E. Vriens, MD, PhD, z – DOI:10.1097/SLA.00000000000005130 *Annals of Surgery*, 2021 Nov, 274(5).
- Safety and efficacy in inguinal hernia repair: a retrospective study comparing TREPP, TEP and Lichtenstein (SETTLE) J. L. Faessen – *Hernia* <https://doi.org/10.1007/s10029-020-02361-w> published online 5th Jan 2021 – Springer
- Emergency TREPP for Strangulated Inguinal Hernia Repair: A Consecutive Case Series T.L.R. Zwols, MD W.L. Akkersdijk, MD W.J.V. Bökkerink, MD C.S. Andeweg, MD, PhD J.P.E.N. Pierie, MD, PhD G.G. Koning, MD, PhD - *Surg J*. 2020;6:e62-e66. DOI <https://doi.org/10.1055/s-0040-1705171>.ISSN 2378-5128.
- Lichtenstein Repair Vs Open Pre-Peritoneal Mesh Repair for Inguinal Hernia: A Prospective Comparative Study Suryaram Aravind, Tridip Dutta Baruah, Ganesh Babu C.P.- *New Indian Journal of Surgery*, 2018, Nov-Dec, 9. DOI: <https://dx.doi.org/10.21088/nij.s.0976.4747.96> 18.4

11. Werner MU, Kongsgaard UE. I. Defining persistent post-surgical pain: is an update required? *Br J Anaesth.* 2014;113(1):1-4.
12. Schug SA, Pogatzki-Zahn M. Chronic pain after surgery or injury. *Pain Clin Updates.* 2011;14(1):1-5.
13. Alfieri S, Amid PK, Campanelli G, *et al.* International guidelines for prevention and management of post-operative chronic pain following inguinal hernia surgery. *Hernia.* 2011;15(3):239-249.
14. Erhan Y, *et al.* chronic pain after Lichtenstein and preperitoneal (posterior) hernia repair. *Can J Surg.* 2008;51(5):383-387.
15. Bay-Nielsen M, Perkins FM, Kehlet H. Pain and functional impairment 1 year after inguinal herniorrhaphy: A nationwide questionnaire study. *Ann Surg.* 2001;233(1):1.
16. Poobalan AS, *et al.* chronic pain and quality of life following open inguinal hernia repair. *Br J Surg.* 2001;88(8):1122-1126.
17. Callesen T, Bech K, Kehlet H. Prospective study of chronic pain after groin hernia repair. *Br J Surg.* 1999;86(12):1528-1531.
18. Courtney CA, *et al.* Outcome of patients with severe chronic pain following repair of groin hernia. *Br J Surg.* 2002;89(10):1310-1314.
19. Cunningham J, *et al.* Cooperative hernia study. Pain in the Post repair patient. *Ann Surg.* 1996;224(5):598-602.
20. Grant AM, Scott NW, O'Dwyer PJ. Five-year follow-up of a randomized trial to assess pain and numbness after laparoscopic or open repair of groin hernia. *Br J Surg.* 2004;91(12):1570-1574.
21. Liem MS, *et al.* Comparison of conventional anterior surgery and laparoscopic surgery for inguinal-hernia repair. *N Engl J Med.* 1997;336(22):1541-1547.
22. Neumayer L, *et al.* Open mesh versus laparoscopic mesh repair of inguinal hernia. *N Engl J Med.* 2004;350(18):1819-1827.
23. Bendavid R, Kux M. In: *Abdominal Wall Hernias: Principles and Management.* Bendavid R, Abrahamson J, Arregui ME, Flament JB, Phillips EH, editor. New York: Springer; Seromas, 2001, 753-756.