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A Comparative Study Of Onlay Mesh Repair (Lichtenstein's) And Laparoscopic Totally Extra Peritoneal Mesh Repair In The Treatment Of Inguinal Hernia

[1]Dr. V. Muralidharan, [2]Dr. K. Ashok Kumar
[1,2]Assistant Professor, Department Of General Surgery,
Government Royapettah Hospital, Kilpauk Medical College& Hospital, Chennai, Tamil Nadu, India

***Corresponding Author:**
Dr. V. Muralidharan
Assistant Professor, Department Of General Surgery, Government Royapettah Hospital, Kilpauk Medical College& Hospital, Chennai, Tamil Nadu, India

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Abstract

Background : Inguinal hernia repair is the most common operation performed by general surgeons. The definitive treatment of inguinal hernia is surgery. Various techniques have been described for inguinal hernia repair in the literature over the decades. The use of mesh has shown a significant reduction in recurrence rates. Lichtenstein described the use of mesh in the operative technique for tension-free inguinal hernia repair with satisfactory outcomes, which popularized the use of polypropylene mesh among the general surgeons. The open Lichtenstein mesh repair of inguinal hernia has become a standard for inguinal hernia repair due to ease of performance along with low recurrence rates.

Aim Of The Study: To compare the results of Onlay (Lichtenstein's) and Laparoscopic totally extra peritoneal mesh repair in the treatment of inguinal hernia.

Methods : This study was conducted at Government Royapettah Hospital, Kilpauk Medical College& Hospital, Chennai, Tamil Nadu, India in the year 2021 september. Patients were randomly allocated into either of the 2 groups - one group undergoing Onlay mesh repair and the other group undergoing Inlay mesh repair**.**

Results : There was a significant difference in the overall complication rate between the two groups. Orchitis and Nerve paresis were virtually absent in the Laparoscopic mesh repair (TEP) group, which were present in a few number of patients in the onlay mesh repair group which is statistically significant ($p<0.05$).There was no recurrence at all in both the groups during this limited follow-up period. A longer period of study is therefore needed to identify recurrence within these groups to know the apparent advantage of mesh repairs**. Conculsion :** Although there is definite evidence of longer operative time and learning curve, laparoscopic TEP has added advantages like less postoperative pain, early resumption of normal activities, less chronic groin pain, and comparable recurrence rate compared to open Lichtenstein repair. Laparoscopic TEP can be performed with acceptable outcomes and less postoperative complications if performed by experienced hands.

Keywords: inguinal hernia, laparoscopy, laparoscopic TEP, Lichtenstein, mesh repair

Introduction

Inguinal hernias constitute the most common form of abdominal wall hernias. The incidence of inguinal hernia remains indefinite; however, nearly about 500,000 cases come to medical attention each year. Twenty or more years ago, international and US surveyswere conducted, wherein, the non-surgically treated inguinal hernia prevailed among 5% of men and similarly, same number of men had history of hernia repair. In contrast to laparoscopic hernia repair, the Lichtenstein hernia repair can be performed as daycare surgery under local anesthesia.Although

laparoscopic hernia repair is safe and effective, it requires a longer learning curve with more complications during the learning phase .[1]The benefits can only be attributed to countries with sufficient resources In Pakistan, where resources are limited, Lichtenstein hernia repair is a routine surgical procedure due to a lack of expertise and finances that patients have to bear. In such countries, laparoscopic hernia repair costs are relatively high compared to the average income per capita of male employees the primary breadwinners in most households.[2]The lifetime risk of inguinal hernia is estimated to be 27% and 3% for men and women respectively.2 Inguinal hernia repair is one of the commonly performed general surgeries among both adults and children accounting for more than 95% of all groin hernia repairs. Numerous repair techniques have been described since Eduardo Bassini published his first successful anatomy-based repair in 1890. During the 20th century, the repair trend has changed several times. Currently available repair options for inguinal hernias are viz., Lichenstein repair, Open type through inguinal incision, Laproscopic total extra peritoneal repair, Transabdominal pre-peritoneal repair etc. Prosthetic repairs are accepted to be superior to "non-mesh" suture repairs now days. [3]All the techniques will have both proponents as well as opponents. The use of endo-laparoscopic surgery for inguinal hernias differs globally, constituting from 0% to 55% of repairs in some high resource countries. The average use in most countries is unknown, but then the rates recorded in Australia, Switzerland and Sweden is 55%, 45% and 28% respectively. Sweden in its national registry has noted the rates of surgeries being 64% Lichtenstein, 25% TEP, 3% TAPP, 2.7% combined open and preperitoneal and 0.8% tissue repair.[4] Other registry revealed that between 2009 and 2016 an extensive variety of hernia repair techniques were in practise, including 39.0% TAPP, 25.0% TEP, 24.0% Lichtenstein, 3.0% plug, 2.6% Shouldice, 2.5% Gilbert prolene hernia system and 0.2% The reliable data from Asia and the United States are still deficient. Repair of inguinal hernia by the laparoscopic hernioplasty over open hernioplasty is preferable in terms of less postoperative pain and morbidity, wound complications, postoperative pain, early resumption of activity and work and better cosmetic results. Laparoscopic hernioplasty by totally extraperitoneal repair (TEP) technically eliminates the hazards of intra operational injuries.[5,6]

Methods : This study was conducted at Government Royapettah Hospital, Kilpauk Medical College& Hospital, Chennai, Tamil Nadu, India in the year 2021 September. Patients were randomly allocated into either of the 2 groups - one group undergoing Onlay mesh repair and the other group undergoing Inlay mesh repair**.** Inclusion Criteria: Only elective cases were included in the study. Emergency cases were excluded from the study. Female patients were excluded from the study. Patients under 18 years of age were excluded from the study. Apart from the routine investigations, patients above 40 years of age and those complaining of symptoms of prostatism were investigated for evidence of prostatic hypertrophy by Digital rectal examination & Ultrasonogram of the Abdomen to determine the size of the prostate and assess for residual urine. Those found to have benign prostatic hypertrophy were treated for BPH before they were subjected to hernia repair.

Statistical analysis

Continuous data are presented in the form of mean ± standard deviation and compared using an independent *t* test, whereas categorical data are presented in frequency (%) and compared using the chi-square test. Statistical software named “MedCal-12.2.1” was used for analysis. Significance is set at 5% in this study. All *P* values <.05 were considered statistically significant in this study.

Table 1: Characteristics of participants

Patient Characteristic	Mean±SD OR Frequency/Percentage	
	Open Mesh Repair group	TEP group

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Age (Years)	45.24±10.05	42.00±10.92
Gender (Males)	25 (100.0%)	25 (100.0%)
Type of hernia (Right Indirect Inguinal)	14.0 (56.0%)	10 (40.0%)
Type of Anaesthesia		
General	0 (0.0%)	25 (100.0%)
Spinal	25 (100.0%)	0 (0.0%)

The mean duration of surgery among the study participants in TEP (49.60+3.62 mins) group was significantly higher compared to open mesh repair (45.96+4.63 mins) group (t=-3.097, P=0.003).

Table 2: Comparison of outcomes of two techniques

Particulars	Open Lichtenstein Mesh Repair (Mean±SD)	Total peritoneal Repair (Mean±SD)	Extra-t-value [95% C.I]	P-value
Duration of procedure (Mins)	45.96±4.63	49.60±3.62	-3.097 (-6.003-0.003* 1.277)	
Duration of hospital stay in the post- operative period (Days)	5.0±0.0	3.08±0.4	24.00 (1.76-2.08)	<0.001*
Time taken for resumption to work (Days)	10.08±0.76	5.08±0.28	30.93 (4.67-5.33)	<0.001*

The mean duration of post-operative recovery time among the study participants in TEP (3.08+0.4 days) group was significantly lower compared to open mesh repair (5.00+0.00 days) group (t=24.00, P<0.001).The mean duration of time taken for resumption to work among the study participants in TEP (5.08+0.28 days) group was significantly lower compared to open mesh repair (10.08+0.76 days) group (t=30.93, P<0.001)

Table 3: Comparison of rated post-operative pain scores between two techniques

Variable	Type of Hernial Repair	No. of people (N)	Median [IQR]	Mean Rank	U	P-Value
Pain scores	Open Lichtenstein Mesh Repair	25	7 [2]	37.68	8.00	<0.001*
	Total Extra-Peritoneal Repair	25	4 [2]	13.32		

The median of post-operative pain scores in TEP group was significantly lower (4) compared to open mesh repair group (P<0.001)

Table 4: Association of complications of per-operative and post-operative complications among the two different types of hernia repairs

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Type of Hernial Repair	Complications		Fisher's Exact(P-Value)
	Present (Column %)	Absent (Column %)	
Open Lichtenstein Mesh Repair	6 (100.0)	19 (43.2)	
Total Extra-Peritoneal Repair	0 (0.0)	25 (56.8)	(0.02)*
Total	06 (100.0)	44 (100.0)	

Among the study population, who developed complications, everybody belonged to open mesh repair group and the complications were significantly higher among the open mesh repair group compared to the TEP group (P<0.05).

Table :5 COMPLICATIONS

Sl.No	*Complications*	*Onlay mesh repair %*	*Laparoscopic mesh repair %*
1.	Cord oedema	7	3
2.	Orchitis	6	-
3.	Testicular atrophy	-	-
4.	Recurrence	-	-
5.	Nerve Paresis	8	-

Discussion

Inguinal hernia is commonly encountered pathological problem by the surgeon in the surgical practice. There are various methods for inguinal hernia repair, but 'Tension- free repair' is the procedure of choice. These tension-free repair procedures can be roughly categorized into two groups; laparoscopic and open anterior approach Ideal technique for effective inguinal hernia repair is still controversial. [7]Although open tension free mesh techniques of inguinal hernia repair offers good results but the superiority of laparoscopic technique was reported for postoperative pain, discomfort and earlier return back to work. Hernia repair surgeries are done all over the world. It is the most common surgery next to appendectomy. Lichtenstein repair has become procedure of choice for repair of inguinal hernia all over the world. It hasdecreased the recurrence rates to less than 0.3%.Though recurrence rates are less, the post- operative pain has become a world-wide problem.Inguinodyniahas becomeone of the foremost complications of hernia repair after 6 months of surgery.[8] Causative factors for Inguinodynia are many, most common of which are injury to nerves and mesh placement. Placing the mesh in the parietal compartment causes injury to the

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nerves which requires neurectomy or neurolysis. Laparoscopic surgeries reduce the risk of post-operative pain and other complications butmany patients are not able to afford the treatment.[9] Open pre-peritoneal mesh repair will be useful for such patients .In this study, the occurrence of postoperative complications like hematoma, wound infection, scrotal swelling, and testicular pain were not statistically significant in both groups. Seroma formation was more in the laparoscopic TEP group (7.9%) as compared to the Lichtenstein group (3.4%). Spermatic cord edema was more in the Lichtenstein group (9.3%) as compared to the laparoscopic.Out of 30 patients in case group, 5 (16.7%) patients had injury to peritoneum and 2 (6.7%) patients had injury. In our study of 60 patients we found that patients who underwent TIPP had less pain compared to Lichtenstein repair. Their scores were statistically significant when compared on POD 1, 7, 30 and 180 (<0.0001on day1, 0.0001 on day 7, 0.004 on day 30 and 0.0014 on day 180). On day 14 and 90 the 'p' value (0.09 on day 14 and 0.08 on day 90) though doesn't show any significance but is showing statistical significance with relation to mean when compared with the Lichtenstein group. [10]We also found the quality of life to be better in patients who underwent TIPP. All the scores were assessed using VAS from post-operative day 1-180. All patients had regular follow up in the study.to vessels. In control group no patients had injury to peritoneum and vessels. The p value of 0.019 was seen in case and control group with reference to injury to peritoneum is significant . Pre- peritoneal mesh repair of inguinal hernia deduced that the surgery is associated with less wound seroma and post-operative complications.[11] In study of 71 patients found that 5.7% of the patients developed wound seroma and 17.14% of them developed wound induration when compared with Pre-peritoneal repair. In our study of 60 patients we observed that 6.7% of the patients from the control group developed wound seroma compared to 20% with that of Lichtenstein group. [12]We also found a statistically significant difference in patients with wound seroma between both the groups (p value 0.0468).After Lichtenstein repair, the quality of life is poor and pain is high as reported by a number of studies. With proper nerve identification and handling.[13,14,15]

Conclusion

There was a significant difference in the overall complication rate between the two groups. Orchitis and Nerve paresis were virtually absent in the Laparoscopic mesh repair (TEP) group, which were present in a few number of patients in the onlay mesh repair group which is statistically significant (p<0. 05).There was no recurrence at all in both the groups during this limited follow-up period. A longer period of study is therefore needed to identify recurrence within these groups to know the apparent advantage of mesh repairs.C Analgesic requirement was significantly lower in the laparoscopic mesh repair (TEP) group when compared to the Onlay mesh repair group which is statistically significant. (p<0.05)Cord oedema is present in a statistically significant minimal number of patients in the Laparoscopic mesh repair (TEP) group when compared to the Onlay mesh repair group.

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