



An Observational Study of Comparison between Open Inguinal Hernia Repair Vs Laparoscopic Inguinal Hernia Repair

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Abstract

Introduction- Inguinal hernia repair is most commonly performed surgery over the world and one require having a sound knowledge of anatomy and physiology of groin region. Since the time Bassini described his technique, the search for an Ideal Inguinal Hernia repair is still on.

Objectives- To compare the following parameters between the two commonly performed methods of inguinal hernia repair, namely the Laparoscopic [Total Extra-Peritoneal (TEP) repair and Trans Abdominal Pre-Peritoneal (TAPP) repair] and Open Lichtenstein Hernioplasty I in term of Type of Inguinal Hernia (Direct or Indirect), Operative time, Post-operative pain (VAS Score), Post-operative complications, Hospital stay, Recurrence.

Methods- The present study is a single-centre, Prospective comparative two group study. It was conducted on patients admitted with the diagnosis of inguinal hernia at Department of General Surgery GCS Medical College, Hospital and Research Centre Ahmedabad July 2017 to January

2019. This study includes 60 patients who were subjected to open inguinal hernia repair and laparoscopic inguinal hernia repair depending upon their preference of choice of repair and type of anesthesia. SPSS was used for analysis.

Results- Group A (open), 19 patients (63.33%) had direct hernia whereas 11 patients (36.67%) had indirect hernia. In Group B (laparoscopic), 16 patients (53.33%) had direct hernia whereas 14 patients (46.67%) had indirect hernia. In Group A (Open), 24(80%) patients presented with unilateral hernia of which 13(43.33%) were Direct and 11(36.67%) were Indirect and 6(20%) patients presented with bilateral hernia of which all 6(20%) were Direct. In Group B (Laparoscopic), 20(66.67%) patients presented with unilateral hernia of which 6(20%) were Direct and 14(46.67%) were Indirect and 10(33.33%) patients presented with bilateral hernia of which all 10(33.33%) were Direct. Majority of the patients had moderate pain on POD 1 with mean VAS score of 4.73 ± 1.28 . On day 3 they has mild to moderate pain with mean VAS score of 2.33 ± 1.15 . the average hospital stay for Open Group was 2.7 ± 1.17 days and for Laparoscopic Group were 2.27 ± 0.88 days.

Conclusion- Our study supports the view that both Open Lichtenstein and TEP/TAPP repair of inguinal hernia are safe and efficacious and long term Randomized Control Trials with enhanced sample size and reduced confounding factors are required to establish the absolute superiority of one technique over the other.

Keywords- Inguinal Hernia, TEP/TAPP repair, Open Lichtenstein, Mesh, recurrence.

DOI: 10.48047/ecb/2023.12.si12.120

Introduction

Every surgical technique needs to be studied, its merits and demerits assessed; so that the patients in future may undergo only the best of the procedures. Thus research into newer techniques helps in improving the morbidity and mortality associated with the older standardized technique. As Surgeons we need to reinvent ourselves everyday so that the patient will gain maximum benefit from our efforts. Groin hernia is the most common condition referred to surgeons all over the world and over five lakh hernia repairs are performed annually^(1,2). The lifetime risk for men and women is 27% and 3% respectively⁽³⁾.

Inguinal hernia repair is most commonly performed surgery over the world and one requires having a sound knowledge of anatomy and physiology of groin region. Since the time Bassini described his technique, the search for an Ideal Inguinal Hernia repair is still on. An Ideal Hernia repair should be tension free, tissue based, with no potential damage to vital structures, no long term pain or complications and no recurrence⁽⁴⁾.

Stoppa's GPRVS procedure involves the placement of a large prosthetic material in the preperitoneal space deep to the transversalis fascia to cover the myopecteneal orifices on both sides⁽⁵⁾. The mesh acts as an artificial endoabdominal fascia preventing the visceral sac extension

through the defect. The increased intra abdominal pressure, the causative factor, presses the mesh against the abdominal wall, becoming a preventive factor for recurrence and herniation through other weaknesses.

Laparoscopic approaches are nowadays well-established procedures for managing an inguinal hernia ⁽⁶⁾. The techniques of laparoscopic hernia repair have evolved in parallel with experience and technology. The greater availability of space in the extraperitoneal approach facilitates the insertion of a much bigger mesh.^(7,8) There was no increase in intra-abdominal complications with laparoscopic repair ^(9, 10). Thus the treatment of hernia is based on anatomical knowledge of inguinal region which includes, repair by open and laparoscopic route. With the advancement of Laparoscopic skill, Laparoscopic hernia repair is gaining popularity.

Materials and Methods

The present study is a single-centre, Prospective comparative two group study. It was conducted on patients admitted with the diagnosis of inguinal hernia at Department of General Surgery, GCS Medical College, Hospital and Research Centre Ahmedabad July 2017 to January 2019. This study includes 60 patients who were subjected to open inguinal hernia repair and laparoscopic inguinal hernia repair depending upon their preference of choice of repair and type of anesthesia. This study also includes the patients having bilateral hernia which follow the selection criteria, but for the purpose of calculation they were treated as unilateral case with mean values of both sides taken into account.

The diagnosis of primary inguinal hernia was made on basis of history of reducible groin swelling and essentially on clinical examination. Detailed history was collected including age, chief complaints and duration, other associated conditions like chronic cough, chronic constipation, urinary complaints etc, history of previous abdominal surgeries, family history, occupation etc. Detailed physical examination was conducted.

The selected patients were divided into two groups-

Group A- Lichtenstein Open Inguinal Hernioplasty

Group B- Laparoscopic Totally Extra Peritoneal (TEP) Repair/ Laparoscopic Trans Abdominal PrePeritoneal (TAPP) Repair

Inclusion criteria:

- Patient diagnosed with uncomplicated inguinal (Direct or Indirect) hernia
- Patient willing to Participate In Study and give Informed Written Consent
- Male patients ≥ 18 years.

Exclusion criteria:

- Patient not fit for Anaesthesia

- Patient of <18 years age
- Complicated hernia
- Recurrent Inguinal hernias
- Severe renal , Cardiovascular, hepatic conditions
- Addictions like alcohol abuse , drugs abuse, tobacco abuse
- Drug hypersensitivity

Laparoscopic repair: General anesthesia with oral intubation with endotracheal tube. Patients were induced with Propofol and maintained with Sevoflurane or Isoflurane. Open repair: Spinal anesthesia with 25G spinal needle with Bupivacaine 0.5% - H as per patient's weight and height. Patient underwent either open (Lichtenstein tension free hernioplasty) or laparoscopic methods (TEP or TAPP). If the patient was operated under spinal anesthesia he was kept nil by mouth for 6 hours along with foot end elevation. Patient was allowed to take liquids after 6 hours then gradually light diet was started and then he was shifted to full diet from the next day. If the patient was operated under general anesthesia he was kept nil by mouth for 6 hours or till the bowel sounds returned. Head end of patient was elevated and oxygen support was given if necessary. Intravenous drip was given till the oral liquids were started and tolerated. Early ambulation was encouraged.

Statistical Analysis-

Descriptive and inferential statistical analysis has been carried out in the present study. Results on continuous measurements are presented on Mean \pm 2SD (Min-Max) and results on categorical measurements are presented in Number (%). $P < 0.05$ will be considered statistically significant. Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. Chi-square test has been used to find the significance of study parameters on categorical scale between two or more groups.

Results-

TABLE 1: Distribution according to Inguinal Hernia Type

Type Of Inguinal Hernia	Group A (n=30)	Group B (n=30)		
		TEP	TAPP	Total
Direct	19 (63.33%)	11 (36.67%)	5 (16.67)	16 (53.33%)
Indirect	11 (36.67%)	09 (30%)	5 (16.67)	14 (46.67%)
Total	30 (100%)	20 (66.67%)	10 (33.33%)	30 100%

As per table 1 in Group A (open), 19 patients (63.33%) had direct hernia whereas 11 patients (36.67%) had indirect hernia. In Group B (laparoscopic), 16 patients (53.33%) had direct hernia whereas 14 patients (46.67%) had indirect hernia. In Group A (Open), 24(80%) patients presented with unilateral hernia of which 13(43.33%) were Direct and 11(36.67%) were Indirect and 6(20%) patients presented with bilateral hernia of which all 6(20%) were Direct. In Group B (Laparoscopic), 20(66.67%) patients presented with unilateral hernia of which 6(20%) were Direct and 14(46.67%) were Indirect and 10(33.33%) patients presented with bilateral hernia of which all 10(33.33%) were Direct. The mean age of the patients in Group A (Open) was 52.73 ± 16.82 years (Ranged from 20-76 years) and in Group B (Laparoscopic) was 46.3 ± 16.81 years (Ranged from 21-72 years). There was no significant difference in age of both the groups ($p=0.1440$). In Group A (Open), in 29(96.6%) patients hernia disappeared on lying down and in 1(3.4%) patient hernia had to be manually reduced whereas in Group B (Laparoscopic) in all the patients' hernia disappeared on lying down. None of the patients in both the groups had complained of nausea, vomiting, abdominal distension or persistent cough. However 1(3.3%) patient in Group B (laparoscopic) had chronic constipation associated with hernia.

TABLE 2: USG and Intra Operative Parameters

USG and Intra operative parameters	Group A (n=30)	Group B (n=30)	P Value
Defect size on USG (mm)	24.7±9.03	22.4±6.43	0.2605
Overlap of Defect by Mesh (cm)	4.4±1.10	5.86±0.50	<0.0001
Operative Time (min)	78.5±30.08	92.67±23.05	0.0451

As per table 2 the mean Defect size on USG in Open group was 24.7 ± 9.03 and in Laparoscopic group was 22.4 ± 6.43 mm. This difference was not statistically significant ($p=0.2605$). However the mean Overlap of defect by Mesh in Open Group was 4.4 ± 1.10 cm and in Laparoscopic group was 5.86 ± 0.50 cm which was statistically significant ($p < 0.0001$). The mean operative time for Open group was 78.5 ± 30.08 mins and for Laparoscopic group was 92.67 ± 23.05 . This difference in time was statistically significant ($p=0.0451$).

TABLE 3: VAS Score for Pain Distribution

VAS Score	Group A (n=30)	Group B (n=30)	P value
Day 1	4.73±1.28	4.76±1.19	0.9254
Day 3	2.33±1.15	2.16±1.14	0.5674
Day 7	0.67±0.60	0.73±0.63	0.7070
Day 30	0.03±0.18	0	-
3 Months	0	0.03±0.18	-
6 Months	0	0	-
1 Year	0	0	-

Majority of the patients had moderate pain on POD 1 with mean VAS score of 4.73 ± 1.28 . On day 3 they had mild to moderate pain with mean VAS score of 2.33 ± 1.15 . For Group B (Laparoscopic): Majority of the patients had moderate pain on POD 1 with mean VAS score of 4.76 ± 1.19 . On day 7 they experienced negligible to mild pain with mean VAS score of 0.73 ± 0.63 . The difference in VAS score in both the groups was not significant (p value on day 1, day 3 and day 7 was 0.9254, 0.5674 and 0.7070 respectively).

TABLE 4: Post Operative Complications

Complication	Group A (n=30)	Group B (n=30)	P value
Wound infection	2(6.67%)	1(3.33%)	0.5562
Seroma	1(3.33%)	0	0.3176
Mesh Rejection	0	0	-
Recurrence	0	0	-
Scrotal Oedema	0	1(3.33%)	0.3176

As per table 4 in Group A (Open) 2(6.67%) patients had wound infection whereas in Group B (Laparoscopic) 1(3.33%) patient had developed wound infection. This was not significant with p value = 0.5562. In Group A (Open) 1(3.33%) had Seroma formation whereas no patient developed this in Group B (Laparoscopic). This was not significant with p value = 0.3176. No patient in both groups had recurrence or mesh infection.

TABLE 5: Post-operative Parameters

	Group A (n=30)	Group B (n=30)	P value
Hospital stay (days)	2.7 ± 1.17	2.27 ± 0.88	0.1131
Stitch removal (days)	11.26 ± 1.57	10.9 ± 1.51	0.3691

As per table 5 the average hospital stay for Open Group was 2.7 ± 1.17 days and for Laparoscopic Group were 2.27 ± 0.88 days. This was not statistically significant with p value=0.1131. The average day of stitch removal for Open Group was 11.26 ± 1.57 days and for Laparoscopic Group was 10.9 ± 1.51 days. This was not statistically significant with p value=0.369.

Discussion

The ideal method of hernia repair should cause minimal discomfort to the patient, both during the surgical procedure and in the postoperative course. It would be technically simple to perform and easy to learn, would have a low rate of complications and recurrence, and would require only a short period of convalescence. Finally, cost-effectiveness is important. Various studies have been conducted to find the best method for the repair of inguinal hernia. Some of the studies relevant to our study are Wellwood et al ⁽¹¹⁾ conducted a randomized controlled trial of 403 patients with inguinal hernias to compare tension-free open mesh hernioplasty under local anaesthesia with

transabdominal preperitoneal laparoscopic hernia repair under general anaesthesia. They studied the time until discharge, postoperative pain, and complications; patients' perceived health (SF-36), duration of convalescence, and patients' satisfaction with surgery; and health service costs. Sharma DK et al ⁽¹²⁾ conducted a prospective study (from 1st June 2012 to 31st May 2013) to observe the differences between the two methods of inguinal hernia repair in terms of operative time, postoperative pain, need for analgesia, hospital stay and postoperative complications. It included 40 patients of inguinal hernia who were randomized to TEP and Lichtenstein tension free mesh hernioplasty groups. They found that laparoscopic TEP is significantly lengthier procedure than open Lichtenstein repair especially in the learning phase as the mean operative time of TEP repair was 75.6 minutes and that of open Lichtenstein repair was 54 minutes. In the study of Bringman et al ⁽¹³⁾ the mean age in Open group was 54±11 years and in laparoscopic group it was 55±12 years. In present study the mean age in Open group was 52.73±16.82 years and in laparoscopic group it was 46.3±16.81 years. This was comparable to all the above studies. It also suggested the younger patients' preferred laparoscopic repair over open repair. Johansson B et al ⁽¹⁴⁾ found that 37% were direct hernias in open group and 39% were direct hernias in laparoscopic group. In Bringman et al ⁽¹³⁾ study, in open group 43% were direct hernias and 54% were indirect hernias whereas in laparoscopic group 37% were direct hernias and 53% were indirect hernias. In present study, in open group 63.33% were direct hernias and 36.67% were indirect hernias whereas in laparoscopic group 53.33% were direct hernias and 46.67% were indirect hernias. This differed from both studies however as the study population was small no conclusive inference can be drawn. In the present study the mean operative time in open group was 78.5±30.08 mins and in laparoscopic group was 92±23.05 mins. This was more than the above studies but was comparable with the fact that laparoscopic repair takes longer duration as compared to open repair which can be attributed to higher learning curve in laparoscopic surgery with requirement of expertise of operating surgeon. In the studies of Johansson B et al ⁽¹⁴⁾ and Sharma DK et al ⁽¹²⁾ the mean operative time in open group was 37±16 mins and 54 mins respectively and in laparoscopic group was 65±25 mins and 75.6 mins respectively. Wellwood et al ⁽¹¹⁾ in their study found that the pain on day 1 was more in Laparoscopic repair but on day 4 and day 7 the pain was almost comparable between open and laparoscopic methods. Sharma et al ⁽¹²⁾ found that on day 1 mean VAS score was more for Open repair (3.52) as compared to laparoscopic repair (2.64). Johansson B et al ⁽¹⁴⁾ found that in open group the total post operative complications were seen in 13% patients (7% wound infection, 2% seroma/hematoma and 4% recurrence) where as in laparoscopic group they were seen in 7% patients (3% seroma/hematoma and 4 % recurrence). In the study of Bringman et al ⁽¹³⁾, in open group the total post operative complications were seen in 11.7% patients (3.9% wound infection and 7.8% seroma/hematoma) where as in laparoscopic group they were seen in 7.7% patients (1.1% wound infection, 4.4% seroma/hematoma and 2.2 % recurrence).

The study has few limitations, firstly, Small sample size. Secondly, all the patients enrolled in our study were not operated by the same surgeon. Operative outcome varies depending on the skill

and experience of the operating surgeon. Thirdly, this study was done in a single hospital. Multicentric large randomized control trial studies are needed for better outcome assessment.

Conclusion

The present study comparing Open Inguinal Hernia Repair (Lichtenstein) and Laparoscopic Inguinal Hernia Repair (TEP/TAPP) came out with the following conclusions as Laparoscopic Repair has following advantages to Open Repair in terms of Smaller skin incision thus cosmetically better, Less post operative pain and complications, The same incision can be used for repair of bilateral inguinal hernia or occult femoral hernia, Decreased hospital stay, Early return to routine activities and early rehabilitation but limitations also. Hence, our study supports the view that both Open Lichtenstein and TEP/TAPP repair of inguinal hernia are safe and efficacious and long term Randomized Control Trials with enhanced sample size and reduced confounding factors are required to establish the absolute superiority of one technique over the other.

Conflict of Interest- None declared

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