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Original Research Article

Assessment and comparison of laparoscopic hernia repair versus open hernia: a non-randomized study

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ABSTRACT

Background: Hernia is the abnormal exit of an organ or fatty tissue, such as the bowel, through the wall of the cavity in which it normally resides. Repair of inguinal hernia is one of the common surgical procedures done worldwide. Present study was performed with an aim to compare the effectiveness of laparoscopic hernia repair and Lichtenstein's hernioplasty and to know for any special pre-operative/ intra operative requirements for surgery.
Methods: Present study is a non-randomized comparative study. The study consisted 50 patients treated with Hernioplasty (20 cases of laparoscopic hernioplasty and 30 cases of open hernioplasty in the Department of General Surgery, during the study period of one year. Data were collected using a questionnaire.
Results: Mean operating time in group A was 92.25 minutes while in group B was 43.5 minutes, which is significantly supplementary. Pain score was significantly less in group A with 75% patients giving score 1-2 (mild pain) and 3 patients with discomforting pain with $p<0.05$.
Conclusions: laparoscopic pre-peritoneal mesh repair of inguinal hernia is safe and efficacious and offers definitive advantages over open mesh repair and should be an available option for all patients requiring elective Hernioplasty.

Keywords: Hernia, Laparoscopic, Non-randomized, Pain

INTRODUCTION

Hernia is the abnormal exit of an organ or fatty tissue, such as the bowel, through the wall of the cavity in which it normally resides. Repair of inguinal hernia is one of the common surgical procedures done worldwide. Irrespective of country, race or socioeconomic status hernia constitutes a major health-care drain. The definitive treatment of all hernias, regardless of their origin or type, is surgical repair with approximately 20 million repairs done worldwide annually.[1] The lack of consensus in the literature as to the optimum repair technique or prosthetic mesh to insure a long term durable result is also surprising.[2,3] The life time risk for men is 27% and for women is 3%. The wide use of mesh in the groin hernia repair[4] has gained more popularity and has almost replaced the suture repairs such as shouldice or maloney repair.[5,6] There is, however, a very large debate on relative merits of laparoscopic mesh placement by using two to three small abdominal incisions compared with placement of mesh by using an open approach through a standard groin incision. Studies mentioned that laparoscopic hernia repair has got added benefits of lesser pain, reduced discomfort, short hospital stay and early resumption of normal daily activities but still it is not being commonly performed due to need for general anaesthesia and long learning curve. In this context, the purpose of this study is to compare the most commonly practiced methods namely Lichtenstein's hernioplasty

and laparoscopic hernia repair in the hospital. Present study was performed with objectives to compare the effectiveness of laparoscopic hernia repair and Lichtenstein's hernioplasty, to assess the intra operative and post-operative complications, surgical requirements, skills, to know for any special pre-operative/ intra-operative requirements for surgery and to determine the long-term results of the procedure.

METHODS

Present study is a non-randomized comparative study. The study consisted 50 patients treated with hernioplasty (20 cases of laparoscopic hernioplasty and 30 cases of open hernioplasty) in the Department of General Surgery, during the study period of one year. Written consent taken from all the cases. Clearance from ethical committee of the hospital was taken for laparoscopic hernia repairs.

Inclusion criteria

All patients of both sex, who were 18 years of age or older with a diagnosis of inguinal hernia, either bilateral or unilateral and were medically fit to undergo the procedure were included in the study.

Exclusion criteria

Patients with age less than 18 years of age, contraindication to general anaesthesia (for laparoscopic repair) / Regional anaesthesia (for open repair), patients with complicated inguinal hernia like obstruction, strangulation or gangrene. Patients who have undergone previous lower abdominal surgeries.

Data were collected using a questionnaire. Preoperatively the patients were offered options of either laparoscopic repair or open Lichtenstein's repair for inguinal hernia, and were educated about the advantages, disadvantages and type of anesthesia. Preoperative evaluation of patient for laparoscopic repair includes: cardiac evaluation such as 2D ECHO if required. Pulmonary function test (PFT) for assessment of pulmonary function in some patients, and ultrasonography to rule out prostate enlargement.

If the patient is not fit for general anaesthesia, laparoscopic repair is not advised, and patient is advised to go for open Lichtenstein's repair. Operative steps and per operative complications were noted in detail and tabulated.

Post-operative assessment with respect to post-operative pain, hospital stay, and other complications were included as per protocol. Patients were followed up for a period of minimum six months after surgery. That is one week after surgery, once in a month for 3 months, and once in three months thereafter. At the end of the study comparison was be made between open Lichtenstein's repair and laparoscopic repair regarding safety and efficacy, duration of surgery with hospital stay and cost effectiveness, postoperative morbidity and patient satisfaction.

Statistical analysis

Qualitative data will be expressed as percentages and proportions. Quantitative data will be expressed as mean and standard deviation. The differences between two groups with respect to continuous variables will be analysed using t-test while categorical variables will be analysed using chi-square test.

All the statistical tests will be performed in SPSS version 15 software. P value <0.05 will be considered as statistically significant while P value <0.01 will be considered as statistically highly significant.

RESULTS

This study included 50 patients among which 20 patients (40%) were placed in group A (laparoscopic group) and 30 patients (60%) were placed in group B (Open Lichtenstein's repair).

Table 1: Distribution of patients according to gender.

Gender	Group A		Group B		Total	
	No.	%	No.	%	No.	%
Male	19	95	28	93.33	47	94
Female	1	5	2	6.6	3	6
Total	20	100	30	100	50	100

statistical significance at p≤0.01; Test applied chi-square test

Table 2: Distribution of patients according to age.

Gender	Group A		Group B		Total	
	No.	%	No.	%	No.	%
21-30	4	20	4	13.3	8	16
31-40	7	35	6	20	13	26
41-50	6	30	9	30	15	30
51-60	3	15	6	20	9	18
>60	0	0	5	16.6	5	10
Total	20	100	30	100	50	100

*statistical Significance at p≤0.05; Test applied chi-square test

Table 3 Associated disorders of the patients with hernia.

Gender	Group A		Group B		Total	
	No.	%	No.	%	No.	%
DM	1	5	2	6.6	3	6
Hypertension	2	10	3	10	5	10
Ischemic heart diseases	0	0	1	3.3	1	2
No disorders	17	85	24	80	41	82
Total	20	100	30	100	50	100

*statistical Significance at p≤0.05; Test applied chi-square test

Table 1 shows gender distribution of the patients, both groups A and B had mostly male patients and only three female cases were noted. Age of the patients in this study group A ranged from 21-60 years with the mean age of 38.85 years (Table 2). Age of the patient's in-group B ranged from 21- 70 years with mean age of 47.9 years. In this study, table 3 shows the associated disorders of the patients, group A, 15% had associated disorders, whereas in-group B, 80% had associated disorders.

The operating time was calculated from time of induction till the time of wound closure. In this study the mean operating time in group A was 92.25 minutes while in group B was 43.5 minutes, which is significantly supplementary ($p \leq 0.05$).

Pain score was significantly less in group A with 75% patients giving score 1-2 (mild pain) and 3 patients with discomforting pain with $p<0.05$. In the study, the length of postoperative stay for group A was less with a mean stay of 2.6 days with $p<0.0001$, when compared with group B, which has got a mean stay of 6.1 days. Patients with group A had mean follow up of 30.1 days when compared to group B with a mean follow up of 19.03 days with $p<0.01$. Patients with group A had mean follow up of 30.1 days when compared to group B with a mean follow up of 19.03 days with $p<0.01$.

DISCUSSION

Successful hernia treatment should offer high patient satisfaction, low cost, low recurrence rate, and rapid return to work.[7] Laparoscopic and open hernia repairs fulfil this criterion.[8] However, the question about the most appropriate technique still confuses the community of surgeons. Several studies have compared the laparoscopic and open techniques for inguinal hernia repair. The advantages of laparoscopic hernia repair over traditional open repair in terms of limited post-operative pain, shorter hospitalisation, early resumption of activity and improved cosmetic have been readily apparent and accepted. Despite excellent long-term outcome after TAPP repair, the use of laparoscopy in hernia repair is still limited.[9]

In this study, most of the patients were male, both in the group A and group B. A female was operated upon in each group. This indicates the low incidence of inguinal hernia in females in general population. Majority of the patients operated were having right inguinal hernia in both groups with bilateral hernias making 10% in each group. No significant variations were noted between the females operated in the two groups.

The mean operative time was 92.25 minutes for laparoscopic hernia repair and 43.5 minutes for Open Lichtenstein's hernia repair, which was extremely significant. The overall mean operative time was significantly more in laparoscopic hernia repair than open repair. Operating times of surgical techniques varies between surgeons and also vary considerably between centres. It reduces with experience and comparison between laparoscopic and open surgery is subject to bias due to pre-existing familiarity with open techniques.[10] It is less important to the patient than a successful operation; the time taken to perform the surgery can have cost implications.[11] National Institute for clinical excellence stated that the laparoscopic surgery was associated with a statistically significant increase in operation time compared with open methods of hernia repair.[12] Meta-analysis of 16 randomized control trials of Trans abdominal pre-peritoneal repair demonstrated on overall increase of 13.33 minutes compared with open repair. Meta-analysis of eight randomized control trial of totally extra peritoneal (TEP) repair demonstrated an overall increase of 7.89 minutes compared with open repair.

The operative time to perform unilateral primary inguinal repair has frequently been reported as longer for laparoscopic compared to open repair, however the mean difference in 36 of 37 randomized trials is 14.81 minutes.[12] The average time taken for TAPP/TEP (65.7 min) was significantly longer than that for the Lichtenstein repair (55.5 min) in a meta-analysis published by Schmidt et al involving 34 trials.[13]

Post-operative pain scores were obtained using Visual Analogue Scale (VAS).[14] In this study post-operative pain is significantly less in group A when compared with group B. The pain scores were obtained using visual analogue scale at 12 hours, 1 day and 2 days after surgery showed that the percent of patients after laparoscopic repair who had mild pain is 75%, 15% patients with discomforting pain and 10% patients with distressing pain. Whereas, only 3.33% of the patients of open hernia have mild pain with 43.33% of patients having discomforting pain and 43.3% of patients having distressing pain significantly. 10% of the patients with open hernia repair had horrible pain (pain score 7-8) but no patient in laparoscopic pain had horrible pain. A 2003 Cochrane database systematic review demonstrated less persisting pain, and less persisting numbness in the laparoscopic groups. Similarly, another meta-analysis study from the EU Hernia Trialists Collaboration reported decreased post-operative pain with the employment of laparoscopic methods.[15] Therefore, there is ample evidence that laparoscopic hernia repair produces less postoperative pain and is associated with similar or less risk of persisting pain than open mesh repair.

In the present study post-operative pain is significantly less in laparoscopic group than open Lichtenstein's group. The difference between the two groups was statistically significant. This is in accordance with the last two studies described above. The postoperative pain can further be reduced with the help of newer analgesic techniques like TAPP block, peri-portal infiltration of

bupivacaine and advances in fixation devices like glue and self-retaining meshes.

The overall incidence of morbidity after laparoscopic groin hernia repair has been quite variable. It is quite possible that complications do occur in any surgical procedure as in the case with laparoscopic hernioplasty, but it is possible to reduce their incidence. Serious complications specific to the laparoscopic technique, although reduced in parallel with training and experience, seen especially in the early stages of hernia surgery and mostly associated with TAPP, have been reported. Complication rates vary from 3% to 25%.[16,17] Incidences of complications after laparoscopic inguinal hernia repair are higher compared with open repair. In MRC hernia trial group, all serious complications occurred in the laparoscopic group.[18]

In VA trial, complication rate was 39.1% in lap group including 2 deaths but 33.4% in open group. In an extensive review by Cochrane group in conjunction with European Hernia trialist group, found serious vascular and visceral injuries more often in laparoscopic group Shoulder pain was transient which got subsided on its own in 1-2 days. The complications regarding wound infection are almost similar in both groups which were managed conservatively. One patient in open repair group had mesh infection but no mesh infections in laparoscopic group. Study regarding mesh infection might require more number of cases or large case series to analyse and arrive at a definite conclusion.

None of the patients in either group had serious vascular or visceral injuries. A thorough knowledge of the anatomy and the operative approach, along with advanced laparoscopic skills will reduce the possibility of significant complications. With experience and technical improvements, the complications are now minimal in the laparoscopic repair and studies indicate similar complication rates between open and laparoscopic repairs. In the present study, the mean post-operative hospital stay was 2.6 days for laparoscopic hernia repair group, whereas it was 6.1 days for Open Lichtenstein's repair. Hence the mean post-operative hospital stay was significantly less in laparoscopic repair than open hernia repair with $p < 0.0001$ which was extremely significant. So, from this study it can be concluded that laparoscopic hernia repair is associated with less postoperative hospital stay and better comfort than open hernia repair. Studies state that patients have a shorter convalescence and a faster return to work and activities after laparoscopic repair compared to open mesh repair. Data regarding time to return to activity are rather subjective. Type of employment or profession, to which patient is returning will influence how long he needs to be away from work. Patient who is doing desk job in office will return to work earlier than a patent with a job that entails heavy lifting.

Time to return to daily activities was found to be one day shorter for laparoscopic group than those undergoing open repair of hernia in a VA hernia trial group. However, at three months of follow up, there was no difference in the activity level between the laparoscopic and open group. In the present study patients who underwent laparoscopic hernia repair were able to return to their normal work earlier in a mean period of 8.25 days than those patients who underwent open repair returned to their normal work in a mean period of 12.63 days with $p<0.001$ which is extremely significant. This is a great advantage for Indian patients particularly who attend government hospital like ours who earn livelihood on a day to day basis Most studies mentioned early return to normal work as an advantage of laparoscopic hernia repair, which has been repeated in this study. However, as mentioned, there might not be any difference between the two groups in the level of activity on long-term follow up.

One of the major criticisms of laparoscopic hernia repair is that it is more expensive to perform than open hernia repair. The primary reason for this relates to the cost of extra equipment used for the laparoscopic repair with secondary costs attributed to perceived increases in operating time for the laparoscopic procedure.[18]

CONCLUSION

Inguinal hernia is a common problem, which can be treated only by surgery. The results support the view that laparoscopic pre-peritoneal mesh repair is safe and efficient when compared to open mesh repair of inguinal hernia. There is definitive learning curve for surgeons who are newly exposed. The complication rate reduces as the surgeons become more experienced in this procedure comparable with that of open repair. Laparoscopic pre-peritoneal mesh repair is safe with less post-operative morbidity associated with faster recovery and satisfaction as documented by less post-operative pain, earlier mobilization and discharge from the hospital, as well as early return to work. The hard working below poverty people should be given best treatment, which should allow them to go for their regular work at the earliest and with complete integrity.

As it is costly in private hospitals, the faculty of government hospitals should cater the best treatment at free of cost for poor. To achieve this goal the surgeons should improvise their technical skills in laparoscopic repair of inguinal hernia (TAPP and TEP) with short learning curve. The present study supports the view that laparoscopic pre-peritoneal mesh repair of inguinal hernia is safe and efficacious and offers definitive advantages over open mesh repair and should be an available option for all patients requiring elective hernioplasty.

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